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Characterizing and quantifying chemical ingredient use in consumer products: Comparing estimates of chemical use between two separate databases

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SUPPLEMENTARY INFORMATION

S1: Chemical ingredients and properties

S2: Summary of ingredient groupings

S3: Euromonitor ingredient defintions

Table SI: Table summarizing chemical ingredients and their associated CAS numbers used to extract relevant data from CPDat as part of the study evaluation.

	Ingredient	EUROMONITOR Ingredient Function	CAS Number
1	Isopropyl Alcohol	Alcohol	67-63-0
2	Ceteareth-2	Alkoxylated fatty alcohol	68439-49-6
3	Sodium Laureth Sulfate	Anionic surfactant	9004-82-4
4	Climbazole	Antifungal	38083-17-9
5	Retinyl Palmitate	Antioxidant ester / Vitamin A	79-81-2
6	Benzophenone-1	Benzophenones	131-56-6
7	Trimethylolpropane	Building block	77-99-6
8	Ethoxydiglycol	DEGEE	111-90-0
9	Glyceryl Stearate	Diglyceride of fatty acid	11099-07-3
10	Stearoxytrimethylsilane	Emollient	18748-91-9
11	Trimethylolpropane Triethylhexanoate	Emollient ester	26086-33-9
12	Neopentyl Glycol Dicaprylate/dicaprate	Emollient ester	70693-32-2
13	Cetearyl Ethylhexanoate	Emollient ester	90411-68-0
14	C12-15 Alkyl Benzoate	Emollient ester	68411-27-8
15	2-Ethylhexyl 2-ethylhexanoate	Emollient ester	7425-14-1
16	Isopropyl Myristate	Emollient ester	110-27-0
17	C12-15 Alkyl Ethylhexanoate	Emollient ester	90411-66-8
18	Isopropyl Isostearate	Emollient ester	68171-33-5
19	PEG-4 Diheptanoate	Emollient ethers	70729-68-9
20	PEG-2 Stearate	Emollient ethers	106-11-6
21	Glycol Oleate	Emollient ethers	9004-96-0
22	Glycol Stearate	Emollient ethers	111-60-4
23	Propylene Glycol Stearate	Emollient ethers	142-75-6
24	Beheneth-20	Emollient ethers	26636-40-8
25	Laureth-4	Emulsifier	68439-50-9
26	PEG-5 Stearate	Emulsifier / co-emulsifier	32518-68-6
27	Sodium Isostearoyl Lactylate	Emulsifier / co-emulsifier	66988-04-3
28	Glyceryl Oleate	Emulsifier / co-emulsifier	25496-72-4
29	Steareth-2	Emulsifier / co-emulsifier	16057-43-5
30	C12-14 Pareth-12	Emulsifier / co-emulsifier	68439-50-9

31	Glyceryl Hydroxystearate	Ethoxylated Glycerol esters	1323-42-8
32	PEG-30 Glyceryl Cocoate	Ethoxylated Glycerol esters	68201-46-7
33	Stearic Acid	Fatty acid	57-11-4
34	Myristic Acid	Fatty acid	544-63-8
35	Caprylic Acid	Fatty acid	124-07-2
36	Coconut Acid	Fatty acid	61788-47-4
37	Palmitic Acid	Fatty acid	57-10-3
38	Sodium Palmitate	Fatty acid	408-35-5
39	Behenic Acid	Fatty acid	112-85-6
40	Glyceryl Rosinate	Fatty acid ester (Emulsifier)	65997-13-9
41	Glycol Distearate	Fatty acid ester (Emulsifier)	627-83-8
42	Hexyl Laurate	Fatty acid ester (Emulsifier)	34316-64-8
43	Phytantriol	Fatty alcohol (Emulsifier)	74563-64-7
44	Coconut Alcohol	Fatty alcohol (Emulsifier)	68425-37-6
45	Cetearyl Alcohol	Fatty alcohol (Emulsifier)	67762-27-0
46	Myristyl Alcohol	Fatty alcohol (Emulsifier)	112-72-1
47	Stearyl Alcohol	Fatty alcohol (Emulsifier)	112-92-5
48	Hydroxycitronellal	Fragrance	107-75-5
49	Coumarin	Fragrance	91-64-5
50	Cinnamyl Alcohol	Fragrance	104-54-1
51	Benzyl Cinnamate	Fragrance	103-41-3
52	Benzyl Alcohol	Fragrance	100-51-6
53	Benzyl Salicylate	Fragrance	118-58-1
54	Cinnamal	Fragrance	104-55-2
55	Eugenol	Fragrance	97-53-0
56	Amyl Cinnamal	Fragrance	122-40-7
57	Hexyl Cinnamal	Fragrance	101-86-0
58	Linalool	Fragrance	78-70-6
59	Methyl Benzoate	Fragrance	93-58-3
60	Citronellol	Fragrance	106-22-9
61	Limonene	Fragrance	138-86-3
62	Batyl Alcohol	Glycerol humecant	6129-13-1
63	Methylpropanediol	Glycerol solvent	2163-42-0
64	Panthenyl Ethyl Ether	Hair conditioning agent	119516-54-0
65	Cetrimonium Bromide	Hair conditioning	57-09-0

		agent	
66	Cetrimonium Chloride	Hair conditioning agent	112-02-7
67	Behentrimonium Chloride	Hair conditioning agent	17301-53-0
68	2-methylresorcinol	Hair dye	608-25-3
69	Resorcinol	Hair dye	108-46-3
70	Myreth-3	Hydrogenated vegetable oil	26826-30-2
71	Tartaric Acid	Hydroxy acid	87-69-4
72	Glycolic Acid	Hydroxy acid	79-14-1
73	Methylisothiazolinone	Isothiazolinones	2682-20-4
74	Methylchloroisothiazolinone	Isothiazolinones	26172-55-4
75	Sodium Lactate	Lactates	72-17-3
76	Methyl Lactate	Lactates	547-64-8
77	Menthyl Lactate	Lactates	61597-98-6
78	Lauryl Lactate	Lactates	6283-92-7
79	Butylparaben	Parabens	94-26-8
80	Isobutylparaben	Parabens	4247-02-3
81	Sodium Methylparaben	Parabens	5026-62-0
82	Methylparaben	Parabens	99-76-3
83	Ethylparaben	Parabens	120-47-8
84	Propylparaben	Parabens	94-13-3
85	Isopropylparaben	Parabens	4191-73-5
86	O-cymen-5-ol	Perservative	3228-02-2
87	Aminomethyl Propanediol	pH buffer	115-69-5
88	Dipropylene Glycol	Poly alkelyene glycol	25265-71-8
89	Benzalkonium Chloride	Polychlorophenols / Quatenary salts	8001-54-5
90	Stearalkonium Chloride	Polychlorophenols / Quatenary salts	122-19-0
91	Cocotrimonium Chloride	Polychlorophenols / Quatenary salts	61789-18-2
92	Caprylyl Methicone	Polymer	17955-88-3
93	Polyquaternium-46	Polyquaterniums	174761-16-1
94	Quaternium-15	Polyquaterniums	4080-31-3
95	Ethylhexylglycerin	Preservatives / antioxidants	70445-33-9
96	Sodium Benzoate	Preservatives / antioxidants	532-32-1
97	Ascorbyl Palmitate	Preservatives / antioxidants	137-66-6
98	Caprylyl Glycol	Preservatives / antioxidants	1117-86-8
99	Ortho-phenylphenol	Preservatives / antioxidants	90-43-7

100	Propane	Propellant / hydrocarbon	74-98-6
101	Butane	Propellant / hydrocarbon	106-97-8
102	Zinc Pyrithione	Pyrithiones	13463-41-7
103	Butyloctyl Salicylate	Salicylic acid / ester	190085-41-7
104	Tridecyl Salicylate	Salicylic acid / ester	19666-16-1
105	Propylene Glycol Isoceteth-3 Acetate	Skin conditioning agent	93385-13-8
106	Sodium Cocoate	Skin conditioning agent	61789-31-9
107	Butoxyethanol	Solvent	111-76-2
108	Ethyl Acetate	Solvent	141-78-6
109	Butyl Acetate	Solvent / fragrance	123-86-4
110	Butyl Methoxydibenzoylmethane	Sunscreen	70356-09-1
111	Octocrylene	Sunscreen	6197-30-4
112	Benzophenone-3	Sunscreen	131-57-7
113	Sodium Laurate	Surfactant	629-25-4
114	Cocamide	Surfactant / adjuvant	68140-00-1
115	Sodium C14-16 Olefin Sulfonate	Surfactant / adjuvant	68439-57-6
116	Sodium Cetearyl Sulfate	Surfactant / cleanser	59186-41-3
117	Sodium Stearate	Thickener / surfactant	822-16-2
118	Thioglycolic Acid	Thioglycollates	68-11-1
119	Decyloxazolidinone	Various -	7693-82-5
120	Retinyl Acetate	Vitamin A	127-47-9
121	Niacin	Vitamin B	59-67-6
122	Cocamide MEA	Waxes	68140-00-1
123	Dimethicone		9006-65-9
124	Dimethicone (emollient)		191044-49-2
125	Dimethicone (conditioning agent)		63148-62-9
126	Ethylhexyl Methoxycinnamate	Sunscreen	5466-77-3
127	Triclosan		3380-34-5
128	Permethrin	Insecticide	52645-53-1
129	Butylated Hydroxyltoluene (BHT)		128-37-0
130	Proplylene Glycol	Solvent	57-55-6

S2: Summary of ingredient groupings and comparison of results between information obtained from the Cosmetic Ingredient Review, Euromonitor Passport database and the Chemical and Products Database.

Alkyl Acetates

The alkyl acetate ingredients are esters of acetic acid and the corresponding alcohol, with the shorter chain alkyl acetates (methyl, propyl, isopropyl, t-butyl, isobutyl and butoxyethyl; molecular weight range 74-160 g/mol). They are used in cosmetics as fragrance ingredients and solvents, with the longer chain alkyl acetates (nonyl, myristyl, cetyl, stearyl, and iso-stearyl; MW range 186-312) being used as skin-conditioning agents. Ingredients under this category included in this assessment are:

Table 1: Summary of alkyl acetate ingredients

Ingredient	Inclusion level range (%)[a]	Function
Ethyl acetate (CAS No. 141-78-6)	0.000002-85	Solvent/Fragrance
Butyl acetate (CAS No. 123-86-4)	25-72	Solvent
Isopropyl acohol (CAS No. 67-63-0)	0.002-100	Antifoaming agent/fragrance/solvent/viscosity degreasing agent

[a] Summary of information presented in Cosmetic Ingredient Review publications (1, 2)

The wide range of inclusion levels for ethyl acetate and isopropyl alcohol reflect uses in different types of products. For both ingredients their use in nail care products as a solvent result in higher inclusion levels being reported. Both ethyl acetate and isopropyl alcohol, however, are used in other consumer product categories, where inclusion levels are typically <0.01% and <5% for ethyl acetate and isopropyl alcohol, respectively. The relatively low inclusion level of ethyl acetate in products, such as eye make-up, hair, and oral hygiene products is reported to be consistent with use as a fragrance, enhancing floral scents (2). In the European Union, methanol is allowed only as a denaturant for ethanol and isopropyl alcohol at a concentration of 5%, calculated as a percentage ethanol or percentage isopropyl alcohol (1). A combination of use in a wide range of product types accompanied with significantly different inclusion levels, results in a skewed distribution when summarizing the inclusion levels of either ethyl acetate or isopropyl alcohol, which represents an important factor to consider. This is particularly evident in the data extrapolated from Euromonitor, where a median value of 3% is significantly <12.11% obtained for the mean value for ethyl acetate, for instance. In these instances, it may be appropriate to model the inclusion level use of these ingredients as a log-normal distribution, using the median value as the central value. The use of ethyl acetate in personal care products, however, is generally dominated by use in nail care products (2), whereby the mean value representing the most appropriate central value to apply, with use most likely consistent with a normal distribution. Data extrapolated from CPDat for ethyl acetate, for instance, return majority of inclusion level data associated with nail care products, with a range of inclusion levels of between 5-86% being obtained, which is also consistent with data extrapolated from Euromonitor, with a range of between 0.1-82% being estimated. In this instance, the mean and median values obtained from CPDat are similar, with values of 30.7% and 28.2% being obtained respectively. Data obtained from CPDat are thus in excellent agreement with results reported in the Cosmetic Ingredient Review.

Alkyl Esters

The alkyl esters are generally used in personal care products as skin-conditioning agents. The maximum inclusion level reported for isopropyl myristate of 76.6% relates to its use in a hair spray

product, where lower inclusions levels of 23% are found in deodorant formulations (3). An exception is also presented, whereby myristyl laurate is reportedly used as a surfactant/emulsifying agent, representing a class of fatty ester emulsifiers, with inclusion levels up to 2%, consistent with data obtained from Euromonitor that ranges from 0.1 to 3.9%. Data from CPDat for myristly laurate, on the other hand, are limited to 9 products, all from the same manufacturer, with the same inclusion level of 0.12%. For the esters used as emollients, Euromonitor appears to capture the lower inclusion levels, with usage between 0.1 and 8.1% being extrapolated, whereas CPDat covers a wider range of inclusion levels, ranging from 0.5 to 28% across 48 products. As noted elsewhere, it appears that where there is larger variability between different product categories associated with different functional uses, it may be that CPDat better captures the range of inclusion level values, however, the data from Euromonitor are more representative of the weighted average across all products. As observed elsewhere, the range of inclusion levels reported by both Euromonitor and CPDat result in a skewed distribution, with the median value being <mean for isopropyl myristate. The distribution for myristyl laurate, on the other hand, is much less variable.

Table 1: Summary of alkyl ester ingredients

Ingredient	Inclusion level range (%)[a]	Function
Isopropyl myristate (CAS No. 110-27-0)	0.000005-77.3	Skin conditioning agent / emollient / binder ; fragrance ingredient
Isopropyl isostearate (CAS No. 31478-84-9; 68171-33-5)	0.5-19	Skin conditioning agent / emollient / binder
Myristyl laurate (CAS No. 22412-97-1)	0.1-2	Surfactant / emulsifying agent

[a] Summary of information presented in Cosmetic Ingredient Review (3)

Alkyl Glyceryl ethers

Alkyl glyceryl ethers are used as either as skin-conditioning agents or surfactants in cosmetic products applied to the skin and hair (4). They are captured within the Euromonitor database as glycerol humecants. Ethylhexylglycerin reportedly inhibits the growth and multiplication of odor-causing bacteria and enhances the efficacy of preservatives used HPCPs, where it is often used in combination with the preservatives phenoxyethanol, methylisothiazolinone or methylparaben (4).

Table 1: Summary of alkyl glyceryl ether ingredients

Ingredient	Inclusion level range (%)[a]	Function
Ethylhexylglycerin (CAS No. 70445-33-9)	0.000001-8	Skin-conditioning agent; deodorant agent
Batyl alcohol (CAS No. 544-62-7)	0.03-3	Skin-conditioning agent/occlusive; emulsion stabilizer

[a] Summary of information presented in Cosmetic Ingredient Review publications (4)

Ethylhexylglycerin tends to be the most widely used alkly glyceryl ether, which is consistent with the data reported in CPDat, where no uses of batly alcohol are reported in personal care products. The use of ethylhexlyglycerin is reported up to a maximum of 8%, which is generally consistent with the range and variance of inclusion levels obtained from Euromonitor, where a maximum of 11.4% is estimated. The data from Euromonitor reflect a normal distribution with a median value of 2.59% and a mean value of 2.2%. The data obtained from CPDat, on the other hand, represent the lower range of inclusion levels, with a median value of 0.2% and a mean value of 0.1%. The results taken from CPDat tend to reflect the raw central tendency values, where it is noted that maximum values up to 10% are reported for a number of product types. It may be that following curation of the CPDat data for ethylhexylglycerin that alignment may be possible.

Alkyl PEG ethers

The group of alkyl PEG ethers typically function as surfactants, although there are exceptions. Generally, lower chain length ingredients function as surfactants/emulsifying agents, but as the chain length increases the function may shift to surfactant/solubilizing agents and/or surfactant/cleansing agent (5). The ingredients with the greatest frequency of use are reported to include ceteareth 20 and steareth 21 (5). Based on a review conducted by the Personal Care Products Council related to the use of the alkyl PEG ethers, the majority are used at concentrations <5%, with the exception of C12-13 pareth 3, reported with an inclusion level of 32% in a product meant to be diluted (5).

Table 1: Summary of alkyl PEG ingredients

Ingredient	Inclusion level range (%)[a]	Function
Ceteareth-20 (CAS No. 68439-49-6)	0.008-11	Nonionic Surfactant / emulsifier / emollient
Beheneth 20 (26636-40-8)	0.7-2	Nonionic Surfactant / emulsifying agent
Myreth 3 (CAS No. 27306-79-2 ; 26826-30-2)	3	Nonionic Surfactant
Steareth 21 (CAS No. 9005-00-9)	0.01-7	Nonionic Surfactant / emulsifying agent
C11-15 Pareth 7 (CAS No. 68131-40-8)	0.00008-1	Nonionic Surfactant / emusifying agent

[a] Summary of information presented in Cosmetic Ingredient Review publications (5)

Anionic surfactant

This group of ingredients is generally dominated by the use of sodium laureth sulfate, which is the sodium salt of sulfated ethoxylated lauryl alcohol, used in a wide range of consumer products primarily as a surfactant emulsifier, cleansing agent in soaps and shampoos over a wide range of concentrations from 0.1% to 50% (6).

Table 1: Summary of anionic surfactant ingredients

Ingredient	**Inclusion level range (%)[a]**	**Function**
Sodium Laureth Sulfate (CAS Nos. 1335-72-4; 3088-31-1; 9004-82-4, generic; 68585-34-2, generic; 68891-38-3, generic; 91648-56-5)	0.1-50%	Surfactant

[a] Summary of information presented in Cosmetic Ingredient Review publication (6)

Antimicrobials - triclosan

Antimicrobials, such as various metal salts, quaternary salts, salicylic acid and its salts and triclosan used in oral care, soaps and deodorant products. Of these ingredients, triclosan has received considerable attention over the last two decades (7). In Europe, Canada and Australia, the use of triclosan in personal care products is limited to a maximum inclusion level of 0.3%; in Japan, a maximum inclusion level of 0.1%.

Table 1: Summary of triclosan usage.

Ingredient	**Inclusion level range (%)[a]**	**Function**
Triclosan (CAS No. 3380-34-5)	0.01-0.3	Antimicrobial

[a] Summary of information presented in Cosmetic Ingredient Review (7)

Data obtained from Euromonitor imply limited use of triclosan in toothpaste products, where the total tonnage of triclosan (reported as a single chemical ingredient) is <0.1% of total ingredients used in toothpaste. In soap and deodorant products, Euromonitor reports no use of triclosan in the U.S. market during the last five year period.

Data obtained from CPDat are generally consistent with the observations obtained from Euromonitor, with use of triclosan reported in a total of 40 individual products, with inclusion level data limited to 11 of those products. Product types include hand soap, shampoo and toothpaste. Inclusion levels reported range from <0.1-0.3%. General agreement, therefore, can be seen between both Euromonitor and CPDat, although usage in soaps and shampoos reflected in CPDat may reflect historical use patterns, whereby many companies have phased out use in products other than toothpaste following public concern during the last several years.

Benzophenones

Benzophenones are used in cosmetic products mainly as light stabilizers, but are also used as sunscreen agents. In the U.S., sunscreen products are understood to contain active ingredients and are thus categorized as over-the-counter (OTC) drug products, not cosmetics. Benzophenone-3 is used only as a light stabilizer in the U.S. and is not used as a sunscreen agent, although in Europe it is permitted to be used as a sunscreen agent up to a maximum inclusion level of 6%. The different regulatory requirements under different jurisdictions therefore influence the use and inclusion level of these ingredients within different geographic markets (8). For instance, octocrylene is permitted to be used to a maximum inclusion level of 10% as the acid in the U.S. and Europe (9). In Hawaii, on the other hand, a law banning the sale of any sunscreen containing benzophenone-3 without a prescription entered into force on January 1, 2021 (HI SB2571), prompted by environmental concerns.

Table 1: Summary of benzophenones and sunscreen agents used in personal care products

Ingredient	Inclusion level range (%)[a]	Function
Benzophenone-1 (CAS No. 131-56-6)	0.009-1.1	Light stabilizer
Benzophenone-3 (CAS No. 131-57-7)	0.001-0.5	Light stabilizer / sunscreen agent
Benzophenone-4 (CAS No. 4065-45-6)	0.000035-1.6	Light stabilizer / sunscreen agent
Octocrylene (6197-30-4)	Maximum = 10%	Sunscreen agent

[a] Summary of information presented in Cosmetic Ingredient Review (Tentative amended report for public comment available at https://www.cir-safety.org/ingredients, Berardesca et al.(9) and Sabzevari et al. (8).

Data obtained from CPDat report a range of inclusion levels of between 0.01-6% for the benzophenones, based on reporting information for >270 individual products, with a mean and median value of about 4%. Similar results are obtained for octocrylene, another type of sunscreen agent, where inclusion levels obtained from 175 individual products reports a range of between 0.006-10%, consistent with the maximum level permitted under existing legislation (8, 9), and a mean and median value of about 6.5%, implying that inclusion levels of octocrylene are possibly slightly higher than that of the benzophenones. Data extrapolated from Euromonitor, on the other hand, result in a skewed distribution that favours the lower inclusion levels, with a range of values of between 0.1-3.2% and a mean and median value of 1% and 0.3%, respectively, values that appear to be more consistent with the Cosmetic Ingredient Review summary. The range of values obtained from Euromonitor for Octocrylene are between 0.1-3.2%, similar to that of the benzophenones, although the mean and median values in this instance are both about 1%. Given the regulatory

guidance that exists regarding the use of sunscreen agents in personal care products, the data extrapolated from Euromonitor possibly represent an underestimate, by a factor of two, of inclusion level use in individual products, however, the data may be appropriate for estimating environmental release if considering release from all sun-care products, since there are various types of sunscreen agents that can be used, with those represented here not used in all sun-care products.

Benzyl alcohol / Fragrances

Benzyl alcohol, benzoic acid and its salts (i.e. sodium, calcium, magnesium and potassium benzoate) are used as fragrance ingredients. Consequently, benzyl alcohol is applied here as a surrogate for fragrance ingredients. While it is acknowledged that inclusion levels of fragrances will be characterized by considerable variability, it is anticipated that he variance in use for benzyl alcohol should provide a basis from which to understand the use of fragrances in HPCPs more generally. It is recommended that a more detailed assessment regarding the use of a specific fragrance ingredient will require case-by-case evaluation. Furthermore, although benzyl alcohol is generally used as a fragrance ingredient it has a number of other potential functions in HPCPs, including as a pesticide, pH adjuster, preservative, solvent and/or viscosity decreasing agent (10).

Table 1: Summary of benzyl alcohol and fragrance ingredients

Ingredient	Inclusion level range (%)[a]	Function
Benzyl alcohol (CAS No. 100-51-6)	0.000006-10	Fragrance ingredient; preservative; solvent; viscosity decreasing agent
Sodium Benzoate (CAS No. 532-32-1)	0.000001-1	Fragrance ingredient; corrosion inhibitor ; preservative

[a] Summary of information presented in Cosmetic Ingredient Review publications (10)

In the EU the maximum authorized concentrations for benzoic acid and sodium benzoate as preservatives in HPCPs is 2.5%, except in oral care products at 1.7% and leave-on products at 0.5% (10). The maximum inclusion level for benzyl alcohol (10%) is limited to its use in hair dyes only. The variance in use reported is consistent with the results obtained from Euromonitor, which reports a skewed distribution with a median value of 0.5% and a mean value of 0.9%. The CPDat data are less skewed, with a median value consistent with CPDat of 0.3% and a mean value of 0.57%. Consequently, there is relatively good agreement between the various sources of information related to the inclusion levels of benzyl alcohol in HPCPs.

Butylated hydroxytoluene

Butylated hydroxytoluene (BHT) is widely used in HPCPs, functioning as an antioxidant, where it has been found to be most efficacious at an inclusion level of between 0.01-0.1%, particularly in combination with a sequestering agent, such as EDTA or citric acid, although use has been reported to be as high as 0.5% (11).

Table 1: Summary of BHT usage

Ingredient	Inclusion level range (%)[a]	Function
Butylated hydroxytoluene (CAS No. 128-37-0)	0.0002-0.5	Preservative / antioxidant

[a] Summary of information presented in Cosmetic Ingredient Review

Data obtained from CPDat support the widespread use of BHT, with 2220 individual products reporting its use, although inclusion levels are limited to only 79 products, with a maximum inclusion level of 1%, reported for a single product. The mean and median values are about 0.05%, which is

consistent with the data reported in the Cosmetic Ingredient Review. Data extrapolated from Euromonitor are limited to a single value of 0.1%, which is also consistent with both data obtained from CPDat and the Cosmetic Ingredient Review, all of which imply a relatively narrow distribution related to the inclusion levels of BHT, centring around 0.1%.

Butylene glycol / Dipropylene glycol

Butylene and dipropylene glycol, along with ethyoxydiglycol and hexylene glycol, are used as humectants, emulsifiers, plasticizers and solvents. Use of ethoxydiglycol appears to be largely related to hair dye formulations, whereas butylene and dipropylene glycol are used in a broad range of product types and categories (12).

Table 1: Summary of butylene glycol and dipropylene glycol ingredients

Ingredient	Inclusion level range (%)[a]	Function
Butylene glycol (CAS No. 107-88-0)	0.00007–89	Humectants ; emulsifiers ; plasticizers ; solvents
Dipropylene glycol (CAS No. 110-98-5)	0.004-50	Humectants ; emulsifiers ; plasticizers ; solvents

[a] Summary of information presented in Cosmetic Ingredient Review (13)

The range of inclusion levels reported in the Cosmetic Ingredient Review are generally well captured in CPDat, which reports use of either butylene or dipropylene glycol in 542 individual products, with evaluation of inclusion levels limited to 24 products, ranging from between 0.02-98%. Inclusion levels, however, are not as well captured in the data extrapolated from Euromonitor, with a range of between 0.1-4.5%. As noted elsewhere, the lower estimates of inclusion in Euromonitor are related to the method of extrapolation, whereby use is averaged across an entire product category. The extrapolation of data from Euromonitor is likely more representative of environmental emissions, whereas the data from CPDat may provide a better estimate of the probability distribution of inclusion levels, useful for human health assessment. It should be noted, however, that the distributions reported in both CPDat and the Cosmetic Ingredient Review, are generally influenced by extreme values used in a select number of products, which results in a significantly skewed distribution, with a mean value of 8.93% and a median value of 2%. Consequently, the larger values reported in CPDat, influenced by 3/24 products with inclusion levels >50%, strongly influence the distribution obtained. Considering how the data from CPDat and the Cosmetic Ingredient Review are distributed, the mean and median values of 0.62% and 0.15% obtained from Euromonitor may represent a more realistic use scenario across all products. A general observation is that inconsistencies between the different sources of data related to inclusion levels appear to be greater when inclusion levels range from <0.1% to >80%, particularly for chemical ingredients that are used for a variety of functions, ranging from humectants to solvents, for instance.

Cationic Surfactants

Benzalkonium chloride is a commonly used cationic surfactant, classified as a quaternary ammonium cationic detergent (14). They are used in various products, including fabric softeners, shampoos, conditioners and body lotions, where use provides additional functionalities, such as a conditioning agent or as a disinfectant/bactericide. Percent inclusion levels for benzalkonium chloride in cosmetic products that come into contact with the skin are recommended not to exceed 0.1%, although higher inclusion levels for products with no skin contact are possible (2).

Table 1: Summary of cationic surfactant ingredients

Ingredient	Inclusion level range (%)[a]	Function
Benzalkonium Chloride (CAS No. 8001-54-5)	0.01-0.5	Foaming and cleansing agent ; conditioner; bactericide
Stearalkonium Chloride (CAS No. 122-19-0)	0.01-0.5	Foaming and cleansing agent ; conditioner; bactericide
Cocotrimonium Chloride (CAS No. 61789-18-2)	0.01-0.5	Foaming and cleansing agent ; conditioner; bactericide

[a] Summary of information presented in Cosmetic Ingredient Review (2, 15)

The various reports related to the use of benzalkonium chloride obtained from the Cosmetic Ingredient Review are generally consistent with data obtained from both CPDat and Euromonitor. CPDat for instance reports a range of inclusion level of between 0.005-2%, whereas data extrapolated from Euromonitor report a range of inclusion for cationic surfactants of between 0.1-1.8%. Good agreement between both CPDat and Euromonitor can be seen for this chemical ingredient, with median values of 0.13% and 0.5%, respectively.

Fatty acids

Fatty acids and their salts can have a large range of uses in HPCPs as well as in food. They are used as anticaking agents, emulsion stabilizers, viscosity increasing agents, opacifying agents and surfactants. Additional functional uses include as hair and skin conditioning agents, binders, slip modifiers, antioxidants, fragrance ingredients, colorants, skin protectants, cosmetic biocide and film formers. Ingredients listed here include the more widely used fatty acids in HPCPs. Stearic acid, for instance, is reported as being one of the most widely used fatty acid ingredients, the majority of which are known to be associated with leave-on eye makeup and skin-care products. Palmitic acid, is the second most widely used, also in eye makeup and skin-care products, although increasing use in rinse-off products is noted. In terms of inclusion levels, Sodium palmitate can be found at relatively high inclusion levels in bath soaps and detergents (55.8%), whereas inclusion of stearic and palmitic acid is at 37.4 and 21%, respectively, in rinse-off products such as shaving cream.

Table 1: Summary of fatty acid ingredients

Ingredient	Inclusion level range (%)[a]	Function
Behenic acid (CAS No. 112-85-6)	0.024-22	Opacifying agent ; surfactant / cleansing agent
Caprylic acid (CAS No. 124-07-2)	0.0018-4	Fragrance ingredient; surfactant / cleansing agent
Myristic acid (CAS No. 544-63-8)	0.00002-20	Fragrance ingredient; opacifying agent; surfactant / cleansing agent
Palmitic acid (CAS No. 57-10-3)	0.000000001-21	Fragrance ingredient; opacifying agent; surfactant / cleansing agent; surfactant / emulsifying agent
Sodium palmitate (CAS No. 408-35-5)	0.06-55.8	Surfactant / cleansing agent; emulsifying agent; viscosity increasing agent (aqueous)
Stearic acid (CAS No. 57-11-4)	0.00006-37.4	Fragrance ingredient; surfactant / cleansing agent; surfactant / emulsifying agent
Sodium Laurate (629-25-4)	0.005-14	Surfactant / cleansing agent; surfactant / emulsifying agent

[a] Summary of information presented in Cosmetic Ingredient Review (16)

Due to the different functional uses extracting accurate inclusion/tonnage data from Euromonitor database can be difficult and will require additional insight regarding use. Evaluating inclusion levels, tonnage data and exposure for this class of ingredients will likely need to carried out on a case-by-case scenario. It should be noted that the Euromonitor estimates tend to represent the lower inclusion levels, whereas the CPDat data capture a bit better the maximum inclusion levels. This is possibly due to the manner in which the data are reported and extrapolated. Whereas the CPDat data present inclusion level information for specific products, where available, the Euromonitor data aggregate information across all products on the market. Consequently, while some products may represent high inclusion levels they may not represent a major share of the market. Since Euromonitor uses a market-based approach the noise in the variance is possibly reduced, resulting in estimates that reflect variance across product types, normalized by the market size. In the instance of sodium laurate, CPDat reports use in only 8 individual products, with 4 of them including information related to inclusion levels, with a range of between 0.1-12%, which is seen to be in good agreement with the Cosmetic Ingredient Review. Data extrapolated from Euromonitor report a range of between 0.1-24%, which is representative of the various different types of surfactants. This is to be expected, since output for specific ingredients for this class of chemicals cannot be extracted directly from Euromonitor, however, the estimated inclusion level obtained is within a factor of 2 of the data reported in the Cosmetic Ingredient Review, which in this instance is perceived as a reasonably good approximation of use in the market at a lower tier of evaluation.

Fatty alcohols (emulsifiers)

The fatty alcohols are primarily used as emulsifiers, emollients, antifoaming agents and surfactants in HPCPs. Stearyl alcohol is more widely used than oleyl alcohol, represented with more products captured in CPDat. The inclusion level of oleyl alcohol from CPDat is limited to values ranging from 32.5-32.9%, whereas stearyl alcohol has a larger number of products reporting inclusion levels that range between 0.375-3.5%. Extrapolation of data from Euromonitor for the fatty alcohols results in a range of values between 0.1-10.6%, generally consistent with the range of stearyl alcohol (13, 17).

Table 1: Summary of fatty alcohol ingredients

Ingredient	Inclusion level range (%)[a]	Function
Oleyl alcohol (CAS No. 143-28-2)	0.02-56	Emulsifier; emollient; stabilizer; antifoaming agent; carrier
Stearyl alcohol (CAS No. 112-92-5)	0.0002-18	Emulsion stabilizer; emollient; surfactant; lubricant ; antifoaming agent

[a] Summary of information presented in Cosmetic Ingredient Review (13, 17)

Glycerol solvents

Propanediol may be prepared by fermentation from corn-derived glucose using a biocatalyst or also obtained from plants that produce glycerol (18). Propanediol and methylpropanediol represent the two most widely used alkane diols in HPCPs. Maximum inclusion levels of propanediol (39.9%) are associated with use in non-spray deodorants, whereas methylpropanediol (21.2%) can have relatively high inclusion levels in body and hand products (18).

Table 1: Summary of glycerol solvent ingredients

Ingredient	Inclusion level range (%)[a]	Function
Propanediol (CAS No. 504-63-2)	0.0001-39.9	Solvent ; Viscosity decreasing agent
Methylpropanediol (CAS No. 2163-42-0)	0.025-21.2	Solvent

[a] Summary of information presented in Cosmetic Ingredient Review (18)

There are more products in CPDat reported for propanediol than for methylpropanediol, with limited reporting on inclusion levels available. Inclusion levels range from between 0.2 to 2.13%. Similar results are obtained from data extrapolated from Euromonitor for the glycerol solvents, with an estimated range of between 0.1 to 1%. The discrepancy between CPDat, Euromonitor and the Cosmetic Ingredient Review suggests that the maximum inclusion levels reported by the Cosmetic Ingredient Review may be limited to a small number of products and that the distribution of inclusion levels may be skewed to the lower inclusion levels as captured by both CPDat and Euromonitor for this class of ingredients.

Glycol Stearate; Glycol Distearate

These ingredients are mixed esters of ethylene glycol and stearic acid (42.5%). They are used as emulsifiers, dispersants, opacifiers and viscosity modifiers. Inclusion levels in personal care products vary depending on the intended functionality and can range from 0.1% to 10%.

Table 1: Summary of glycol stearate and glycol distearate ingredients

Ingredient	Inclusion level range (%)[a]	Function
Glycol stearate (CAS No. 141-78-6)	0.0001-6	emulsifiers, dispersants, opacifiers and viscosity modifiers
Glylcol distearate (CAS No. 123-86-4)	0.2-9	emulsifiers, dispersants, opacifiers and viscosity modifiers

[a] Summary of information presented in Cosmetic Ingredient Review (19)

Lactates

The salts of alpha hydroxy acids, such as sodium, ethyl, myristyl and lauryl lactate are used in a range of leave-on and rinse-off products at varying inclusion levels. The functional uses in HPCPs include use as a pH-buffering agent (Sodium Lactate) or as a skin-conditioning agent, either as humectant or emollient (20). The use of ethyl lactate is less clear, with use reported in nail care products at inclusion levels of between 45-95%, suggesting potential use as a solvent.

Table 1: Summary of lactate ingredients

Ingredient	Inclusion level range (%)[a]	Function
Sodium Lactate (CAS No. 72-17-3)	0.0002-8	Buffering aget ; skin-conditioning / humectant
Ethyl Lactate (CAS No.97-64-3)	0.15-95	Not reported
Myristyl Lactate (CAS No. 1323-03-1)	0.01-13.2	Skin-conditioning agent / emollient
Lauryl Lactate (CAS No. 6283-92-7)	0.14-10	Skin-conditioning agent / emollient

[a] Summary of information presented in Cosmetic Ingredient Review (20, 21)

Data related to sodium lactate obtained from CPDat suggest 85 individual products with this ingredient included, however, inclusion levels are limited to data obtained from 5 products, with a range of between 0.86-15%. Euromonitor data are less extensive, with an extrapolated inclusion level estimated at 0.1% across three product categories. Considering the data obtained from all three sources (Cosmetics Ingredient Review, CPDat and Euromonitor) it is reasonable to conclude that lactates are used in a limited number of products, and although maximum inclusion levels of up to 15% (CPDat) can be estimated. Since Euromonitor extrapolates usage based on estimating use across a product category, use in a limited number of products results in a lower inclusion level estimate. Estimating exposure across a population therefore can be problematic, since exposure to this group of ingredients entirely relies on addressing the variability of product use by consumers in the market place. It is suggested that the Euromonitor data are likely useful for use in estimating environmental releases, since the variability in consumer use is averaged across whole product categories, but that human exposure would require case-by-case evaluation.

Methylisothiazolinone

Methylisothiazolinone (MIT) is used as a preservative in bath soaps and detergents, hair conditioners and shampoos, with a maximum concentration of 0.01% (22).

Table 1: Summary of methylisothiazolinone usage

Ingredient	Inclusion level range (%)[a]	Function
Methylisothiazolinone (CAS No. 2682-20-4)	0.000000035-0.01%	Preservative

[a] Summary of information presented in Cosmetic Ingredient Review (22).

Data obtained for MIT from the CPDat database report a range of inclusion levels between 0.000175 and 0.1%, which is generally consistent with an inclusion level of 0.2% estimated from the Euromonitor database. Both CPDat and Euromonitor suggest usage about an order of magnitude greater than the maximum level reported in the Cosmetic ingredient Review suggesting the approaches of CPDat and Euromonitor to possibly represent conservative estimates of usage. It should be noted, however, that the distribution of use is better represented from data obtained from CPDat than from Euromonitor, whereby Euromonitor is limited to a value of 0.2% obtained from three different product categories, whereas CPDat represents the variance of inclusion levels obtained for >300 individual products. In this instance, it is observed that CPDat provides good coverage of use for this chemical ingredient.

Monoglyceryl Monoesters

Glyceryl monoesters are not necessarily pure monoesters but rather comprised of mixtures with mono-, di, and tri-esters in ratios of approximately 4:4:2, respectively. Of the various ingredients that fall under this category, glyceryl stearate represents the most frequently encountered ingredient in cosmetic products. Inclusion levels of glyceryl stearate can be up to 17% in leave-on deodorants and 14% in perfumes. Glyceryl rosinate is reported to have the highest inclusion level, of 96%, used in a depilatory product. Generally, there is an increasing trend in use of ingredients, such as glyceryl stearate in products, although the inclusion levels remain relatively constant. It should be further noted that glyceryl stearate is widely used in foods as a surfactant, emulsifier and thickener. Glyceryl stearate is used as an anti-scalant and dough conditioner in breads and also as a base in

pharmaceutical products. Consequently, exposure to glyceryl stearate can be via oral, dermal and inhalation pathways.

Table 1: Summary of monogylceryl monoester ingredients

Ingredient	Inclusion level range (%)[a]	Function
Glyceryl cocoate (CAS No. 61789-05-7)	1-2	Skin conditioning agent/emollient ; surfactant/emulsifying agent
Glyceryl hydroxystearate (CAS No.1323-42-8)	0.5-2	Skin conditioning agent/emollient ; surfactant/emulsifying agent
Glyceryl oleate (CAS Nos. 111-03-5 ; 161403-66-3 ; 25496-72-4 ; 37220-82-9 ; 68424-61-3	0.0001-3	Fragrance ingredient; Skin conditioning agent/emollient ; surfactant/emulsifying agent
Glyceryl rosinate (CAS No. 8050-31-5)	0.018-96	Depilating agent; fragrance ingredient; Skin conditioning agent/emollient ; surfactant/emulsifying agent
Glyceryl stearate (CAS No. 11099-07-3 ; 123-94-4 ; 31566-31-1	0.0002-18.9	Fragrance ingredient; Skin conditioning agent/emollient ; surfactant/emulsifying agent

[a] Summary of information presented in Cosmetic Ingredient Review (23)

Due to the different functional uses extracting inclusion/tonnage data from Euromonitor database can be difficult and will require additional insight regarding use. In this instance, various Euromonitor categories can be mined for information, including as a monoglyceride, fatty acid ester (emulsifier), or emollient ester. Glyceryl stearate, the dominant ingredient in use, has been allocated as a monoglyceride of fatty acid, with inclusion levels consistent with this category represented, with a median value of 0.4%. The CPDat data, on the other hand, report greater variability with a median value of 3%. Evaluating inclusion levels, tonnage data and exposure for this class of ingredients will likely need to carried out on a case-by-case scenario.

Panthenol, Pantothenic acid and derivatives

Panthenol, panthothenic acid and derivatives are typically used as hair conditioning agents, with panthenol also being reported as being used as a skin-conditioning agent-humectant and a solvent (24). Panthothenic acid, the water soluble vitamin B_5, and its alcohol, panthenol, have structural similarities with each of the derivatives. For instance, panthenyl ethyl ether is the ether form of panthenol. Panthenol and panthenyl ethyl ether represent the two most widely used ingredients for this group of chemicals in HPCPs (24).

Table 1: Summary of panthenol and panthenyl ethyl ether ingredients

Ingredient	Inclusion level range (%)[a]	Function
Panthenol (CAS No. 81-13-0 (D-) ; 16485-10-2 (D,L-)	0.0000053-5.3	Hair and skin conditioning agent; humectant; solvent
Panthenyl ethyl ether (CAS No. 667-83-4)	0.001-2	Hair conditioning agent

[a] Summary of information presented in Cosmetic Ingredient Review (24)

The distribution of inclusion levels obtained from both Euromonitor and CPDat is relatively narrow, with maximum inclusion levels of 0.8% and 1%, reported, respectively. There is thus relatively good agreement between the two methods, which are generally consistent with the inclusion levels reported in the Cosmetic Ingredient Review, suggesting a high level of confidence when using any of the methods for deriving an inclusion level for this group of chemical ingredients.

Parabens

Parabens are widely used in HPCPs, methylparaben being the most widely used of the parabens in 2019, largely in leave-on formulations, followed by propylparaben (25). Methylparaben also had the highest inclusion level of the parabens, at 0.9% reported in shampoos, with the highest inclusion level in leave-on products at 0.8% (25). Generally the maximum inclusion level for parabens is <1%. The functional use of parabens is generally as a preservative, but they also find use as a fragrance ingredient in some products.

Table 1: Summary of paraben ingredients

Ingredient	Inclusion level range (%)[a]	Function
Butylparaben (CAS No. 94-26-8)	0.00000006-0.5	Fragrance ingredient; preservative
Isobutylparaben (CAS No. 4247-02-3)	0.00000006-0.3	Preservative
Sodium Methylparaben (CAS No. 5026-62-0)	0.000005-0.4	Preservative
Methylparaben (CAS No. 99-76-3)	0.000001-0.9	Fragrance ingredient; preservative
Ethylparaben (CAS No. 120-47-8)	0.00000032-0.65	Fragrance ingredient; preservative
Propylparaben (CAS No. 94-13-3)	0.00000014-0.7	Fragrance ingredient; preservative
Isopropylparaben (CAS No. 4191-73-5)	0.000005-0.32	Preservative

[a] Summary of information presented in Cosmetic Ingredient Review (25)

The wide-dispersive use of the methylparabens is generally captured in the CPDat databased, with >950 individual products identified, of which only 93 contain information with respect to the central tendency of inclusion. Nevertheless, the range of values is consistent with the data reported in the Cosmetic Ingredient Review, with inclusion levels ranging from between 0.01 and 1%, and a mean and median value of about 0.1%. The relatively narrow distribution of inclusion levels is also observed in estimates extrapolated from Euromonitor, with a range of inclusion of between 0.1 and 0.3%, and a mean and median value of 0.17% and 0.2%, respectively. Overall, the agreement between each of the methods is reasonably good.

Permethrin

Permethrin is a synthetic pyrethroid agent that is approved by the U.S. Food and Drug Administration for use at a maximum inclusion level of 5% in topical creams for use in treating scabies (26). When used to treat head-lice the maximum inclusion level approved by the U.S. Food and Drug administration is 1% in a liquid cream rinse and comb treatment, or at 0.5% in a spray used to treat inanimate objects (27).

Table 1: Summary of permethrin usage

Ingredient	Inclusion level range (%)	Function
Permethrin (CAS No. 52645-53-1)	0.5-5%	Insecticide

Data obtained from CPDat are limited to four individual products with a range of between 0.2-1.1%, consistent with use for treatment of head lice. Data extrapolated from Euromonitor results in an estimated use of 0.1%, which is seen to be representative of the lower inclusion levels used. Reasonably good agreement between CPDat and Euromonitor is thus observed.

Plant-derived fatty acid oils

There are hundreds of plant-derived fatty acid oils and their derivatives used in HPCPs, with a Cosmetic Ingredient Review reporting on 244 ingredients (28). Of the oils used, shea butter (not included in this exercise) is the most widely used of ingredients within this category. Many of the oils used can be present at inclusion levels up to 100%. Generally, the use of plant-derived fatty acid oils is as a skin-conditioning agent, occlusive, emollient, and moisturizer (28). Here coconut acid and a derivative is used here as an illustrative example for this group of complex ingredients.

Table 1: Summary of plant-derived fatty acid oil ingredients

Ingredient	Inclusion level range (%)[a]	Function
Coconut acid (CAS No. 61788-47-4)	0.03-14	Skin-conditioning agent, occlusive, emollient, and moisturizer
Sodium cocoate (CAS No. 61789-31-9)	1-52	skin-conditioning agent, occlusive, emollient, and moisturizer

[a] Summary of information presented in Cosmetic Ingredient Review (28)

Data obtained from CPDat for sodium cocoate indicate reported use in 60 individual products, with 14 reporting an inclusion level ranging from between 10-17%, whereas data extrapolated from Euromonitor for plant-derived fatty acids result in an estimate of between 0.1-2.7%. Both CPDat and Euromonitor appear to report values that underestimate inclusion levels reported in the Cosmetic Ingredient Review. With respect to Euromonitor, this can be anticipated based on the method used in extrapolating the inclusion level, i.e. the method relies on wide spread use across all products within a product category. The data obtained, while potentially useful in informing the relative release of these chemical ingredients resulting from use with different product categories to the environment, represents challenges when attempting to accurately estimate use for human exposure. In the instance of CPDat, again the relatively small number of products containing a chemical ingredient, such as sodium cocoate, can introduce challenges in evaluating inclusion for a chemical ingredient that may have a large range of inclusion. In this instance results from CPDat rely on the central tendency value, but it should be noted that the potential maximum inclusion levels reported range from 10-100%. These data, however, have been manually curated, and therefore uncertainty for this group of chemical ingredients is expected to be high regardless of method used in estimating use. In this instance, case-by-case analysis may be required, although since this group of chemicals are generally recognized as safe, priority for additional analysis may not necessarily be warranted.

Propellants (Butane / Propane)

Butane and propane are used as propellants in HPCPs. The maximum inclusion level of butane is reported at 92% in an underarm deodorant, whereas the maximum inclusion level of propane is 24% in nail-care products (29).

Table 1: Summary of propellant ingredients

Ingredient	Inclusion level range (%)[a]	Function
Butane (CAS No. 141-78-6)	1-92	Propellant
Propane (CAS No. 123-86-4)	0.2-24	Propellant

[a] Summary of information presented in Cosmetic Ingredient Review (29)

The range of uses for butane as reported in CPDat is consistent with the data reported in the Cosmetic Ingredient Review, with a range of between 0.4-100% extrapolated. Results obtained from

Euromonitor estimate an inclusion level of between 0.3-40.7%. All three sources of information in this instance imply a wide range of inclusion level use, largely influence by different inclusion levels associated with different product types. For instance, consistent with information reported in the Cosmetic Ingredient Review, the maximum inclusion level obtained from Euromonitor is associated with deodorant sprays, whereas the 100% inclusion level obtained from CPDat reported for a single deodorant spray product. Other deodorant sprays reported in CPDat imply inclusion levels of about 30%, with a few hair-spray products reporting 80% inclusion level. Consequently, consideration of the variance in use across product types suggest that consistency between each of the methods in extrapolating inclusion level information for propellants, such as butane.

Pyrithione

The chemical ingredient, zinc pyrithione, us typically used as an antidandruff active ingredient in shampoo (30). There is no cosmetic ingredient review publication for zinc pyrithione available, however, Tozer et al. (30) developed a probabilistic aggregate exposure model, using Crème Global software, to estimate consumer exposure from several rinse-off personal care products containing the antidandruff preservative. In their assessment, Tozer et al. (30) assume an inclusion level of 2% in shampoos and 0.5% in all other products, which is based on a review of regulatory criteria limiting use to a maximum inclusion of 2% by the US Food & Drug Administration.

Table 1: Summary of pyrithione usage

Ingredient	Inclusion level range (%)[a]	Function
Zinc pyrithione (CAS No. 13463-41-7)	0.5-2	Antidandruff active

[a] Summary of information presented in Tozer et al. (30)

Data obtained from CPDat report the use of zinc pyrithione in 94 individual products, with 36 providing inclusion level information, with values ranging from between 0.5-1.5%, consistent with the observations of Tozer et al. (30). Results extrapolated from Euromonitor (0.2-0.5%) are also observed to be generally consistent, although more representative of the lower end of the distribution.

It is notable that based on data obtained from Euromonitor that the zinc pyrithione dominates use as an antidandruff agent, however, climbazole is also known to be used in a small number of products at a maximum inclusion level of 2% (31), consistent with the data reported for zinc pyrithione. The tonnage of other antifungal ingredients reported in Euromonitor, however represent <0.01% of ingredient usage in shampoos. From CPDat 12 individual products are reported to include the use of climbazole, however, no inclusion level data are reported for any of these products. It is likely that inclusion in specific products will have a maximum of 2%, but that due to the niche use of climbazole in HPCPs, environmental releases will be relatively small and that human health assessment would require case-by-case evaluation.

Quaternary ammonium salts

Quaternary ammonium salts, including alkyl chain, alkanol, and polymer derivatives (trimoniums) are used in cosmetics as surfactant-cleansing agents, hair conditioning agents, and antistatic agents. Three straight-chain alkyl trimonium ingredients are commonly used, with cetrimonium chloride representing the most widely used of the three, with a range of inclusion levels of between 0.0008-

10% reported, followed by cetrimonium bromide (0.1-3%) and with limited use of steartrimonium chloride (0.06-4%) (32). These ingredients have a variety of functions, including as a biocide, hair-conditioning agent, antistatic agent, emulsifying agent, and surfactant-emulsifying agent.

Trimonium polymers (such as polyquaternium-37 and polyquaternium-47) are mostly used in hair and skin care products, with inclusion levels of between 0.04-10% in rinse-off products and 0.2-3% in leave-on products (32). These ingredients also provide a variety of functions, including as antistatic agents, hair fixatives, film formers, skin-conditioning agents, hair-conditioning agents, slip modifiers and surface modifiers (largely due to their positive charge).

Table 1: Summary of quaternary ammonium salt ingredients

Ingredient	Inclusion level range (%)[a]	Function
Cetrimonium chloride (CAS No. 112-02-7)	0.0008-10	Antistatic agent; cosmetic biocide; surfactant-emulsifying agent
Cetrimonium bromide (CAS No. 57-09-0)	0.1-3	Antistatic agent; cosmetic biocide; surfactant-emulsifying agent
Steartrimonium chloride (CAS No. 112-03-8)	0.06-4	Antistatic agent; hair-conditioning agent
Polyquaternium-37	0.2-3	Antistatic agents; film formers; hair fixatives
Polyquaternium-47	0.2-2	Film formers; hair fixatives; skin-conditioning agents-miscellaneous

[a] Summary of information presented in Cosmetic Ingredient Review (32)

Estimated use of the straight-chaing alkyl trimonium ingredients aligned to use as hair-conditioning agents results in an extrapolated inclusion level of between 0.1-1.8%, with results obtained from CPDat ranging between 0.03-5%, with both approaches being generally consistent for this group of chemicals. Results for the polyquaterniums, on the other hand, are more varied. The reporting of data from the Cosmetics Ingredient Review on various polyquaterniums suggests use to be generally <10%. The data obtained from CPDat are meant to represent all of the different polyquaterniums in the dataset, where several different ingredients are used, with polyquaternium-7 and polyquaternium-10 representing about half of all polyquaterniums reported in individual products. In three cases the inclusion level is reported to be >70%, representing extreme uses that are not reflected in the data reported in the Cosmetic Ingredient Review. The distribution of inclusion level use obtained is also significantly skewed, with a mean and median value of 13.19% and 1.25%, respectively, demonstrating the influence of the extreme values obtained. The data obtained from Euromonitor, on the other hand, are generally consistent with the lower range of inclusion levels reported in the Cosmetic Ingredient Review, with results suggesting use of between 0.1-0.6%. In this instance it seems reasonable that exclusion of the extreme values from the CPDat dataset would provide better agreement between information obtained from all three sources.

Silicone polymers

The majority of dimethicone and substituted-methicone polymers are used as skin and/or hair conditioning agents, with dimethicone being widely used, providing a variety of functions. This group of ingredients generally represent mixtures of siloxane polymers of varying chain length and substituents. For Dimethicone, the most widely used ingredient in this class, most silicone atoms in the polymer back bone have 2 methyl substituents. Between 1999 and 2019 there has been an observation of increased inclusion levels for dimethicone, increasing from 30% to 85% (33). Caprylyl methicone represents a chemical ingredient where an increase in use has been observed, with inclusion levels in eye lotions reported at 16%.

Table 1: Summary of silicone polymer ingredients

Ingredient	Inclusion level range (%)[a]	Function
Caprylyl methicone (CAS No. 17955-88-3)	0.075-16	Skin conditioning agent – occlusive
Dimethicone (CAS No. 141-62-8 ; 141-63-9 63148-62-9 ; 9006-65-9 ; 9016-00-6 ; 107-52-8)	0.0000014-85	Antifoaming agent ; Skin protectant ; Skin-conditioning agent—occlusive ; Solvent

[a] Summary of information presented in Cosmetic Ingredient Review (33)

Given the variation in use between caprylyl methicone and dimethicone, an attempt was made to separate and interpret results for each of these ingredients individually between CPDat and Euromonitor. Extrapolation of data to estimate inclusion levels of caprylyl methicone results in a range of between 0.2-1.7%, whereas the range of values obtained from CPDat are limited to data obtained from two individual products where a range of between 0-10% is reported. Consequently, the agreement among the different sources of information for caprylyl methicone is reasonable, although the Euromonitor data are not sufficient to match the maximum inclusion levels that have been reported.

For dimethicone there are a larger number of products from which use is reported, with CPDat returning >1550 individual products, although only 104 from which inclusion level data are extrapolated. The distribution of inclusion levels from CPDat imply a significantly skewed distribution, with the mean and median values of 4.27% and 2%, obtained respectively. The range of inclusion level obtained from CPDat is from between 0.2-99.9%, with a single product at 99.9% representing an extreme value in the distribution. Data extrapolated from Euromonitor, on the other hand, are limited to a narrow range of use from between 0.1-5.6%, which is generally consistent with the majority of data reported from CPDat, but due to the method of extrapolating an inclusion level is not sufficient to necessarily capture maximum inclusion levels at the individual product level.

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S3: Euromonitor chemical ingredient definitions

Ingredients

Included here are the individual ingredients used in the manufacture of products that are tracked in Packaged Food, Soft drinks, Hot Drinks, Alcoholic Drinks, Tobacco, Pet care, Beauty and Personal Care, and Home Care. Ingredients data published in the Ingredients system are separate from Key Functional Ingredients tracked within Health and Wellness.

Chemical ingredient groups

- **Abrasives/Inorganics**
  Abrasives are ingredients used for abrading, smoothing or polishing. An abrasive removes materials from various surfaces, aids mechanical tooth cleaning or improves gloss. Examples of abrasives are silica, alumina, crushed seeds, pumice, etc.
- **Nut Shells**
  Nut shells refers mainly to ground walnut shells that are used as an abrasive and filter in cleaning and polishing, and also as an ingredient in insecticide
- **Other Abrasives/Inorganics**
  This is a general category that includes any abrasives/inorganics that have not been specifically named within the abrasives/inorganics category. It is not possible to search 'Other abrasives/inorganics' to identify which abrasives/inorganics are included there.
- **Acidulants**
  Acids are added to foods in order to adjust or control pH levels. This can subsequently serve to adjust flavour or tartness or to help extend shelf-life by acting as an antimicrobial agent. They can also be used in conjunction with antioxidants to prevent rancidity or help to stabilise colour and enhance gelling.
- **Gluconates**
  Gluconic acid can be used in foods as a mild acid and chelating agent. Gluconate salts, such as calcium gluconate or potassium gluconate can be used for mineral fortification. Meanwhile, glucono-delta-lactone (produced through the fermentation of glucose) performs much the same functions in food as standard acids but without the acidic flavour. It is used as a curdling, ripening, leavening or preserving agent. In cosmetics and personal care products, gluconic acid and its derivatives may be used in the formulation of mouthwashes, bath products, cleansing products, skin care products and shampoo. The main functions in cosmetics are as chelating agent (Gluconic Acid, Calcium Gluconate, Potassium Gluconate, Sodium Gluconate) and biocide (Zinc Gluconate).
- **Other Acidulants**
  This is a general category that includes any acidulants that have not been specifically named within the acidulants category. It is not possible to search 'Other Acidulants' to identify which acidulants are included there.
- **Antifoams**
  Anti-foaming are chemical additives that reduce and retard the formation of foam. Generally, anti-foaming cosmetic chemicals are insoluble in the foaming medium and have surface active properties. An essential feature of a defoamer product is a low viscosity and a facility to spread rapidly on foamy surfaces. These defoamers have an affinity to the air-liquid surface where it destabilizes the foam and causes rupture of the air bubbles and breakdown of surface foam. They are mainly used in baby toiletries and laundry care products.

- **Paraffins (Antifoams)**
  INCI Name: Paraffin. CAS Number:8002-74-2. Paraffin is a solid mixture of hydrocarbons obtained from petroleum characterized by relatively large crystals used as emollient, antifoam and solvent in cosmetic products. In cosmetics and personal care products, these waxes are used in many types of products including lipsticks, baby products, eye and facial makeup, as well as nail care, skin care, suntan, sunscreen, fragrance, and non-coloring hair preparations.
- **Phosphate Esters (Antifoams)**
  Phosphate esters are anionic surfactants derived from phosphoric acid that are highly suitable to use as antifoaming agents. There are mono, di and tri-phosphates, the latest being the most common.
- **Silicones (Antifoams)**
  Silicones are inert synthetic compounds derived from silica. They are used as antifoams due to their low surface and interfacial tension properties. This category includes all silicones. Silicones are ingredients used in a wide range of products, from colour cosmetics and leave-on skincare products to all types of hair care products, but essentially they are mostly used in laundry care products.
- **Other Antifoams**
  This is a general category that includes any antifoams that have not been specifically named within the antifoams category. It is not possible to search 'Other Antifoams' to identify which antifoams are included there.
- **Antifungals**
  Antifungals are materials that destroy or inhibit the growth of fungi in non-food products. The majority of antifungals are used in shampoos and other hair care products.
- **Other Antifungals**
  This is a general category that includes any antifungals that have not been specifically named within the antifungals category. It is not possible to search 'Other Antifungals' to identify which antifungals are included there.
- **Antimicrobials**
  Antimicrobials are ingredients that kill microorganisms, or prevent or inhibit their growth and reproduction. Antimicrobials are used in food and cosmetics.
- **Chlorinated Phenols**
  Chlorinated phenols are preservatives for cosmetics mainly used in deodorants.
- **Metal Salts**
  Metal salts are antimicrobial ingredients highly used in oral care.
- **Polychlorophenols**
  Polychlorophenols are antimicrobial ingredients mainly used in liquid laundry detergents.
- **Quaternary Salts (Antimicrobials)**
  Quaternary ammonium compounds are salts of a quaternary ammonium with an anion. The quaternary ammonium cation is positively charged with a structure NR4+. Quaternary salts are alkylquats used in home care products.
- **Salicylic Acid and Its Salts**
  Salicylic acid and its salts - also known as salicylates. CAS Number:69-72-7/824-35-1/18917-89-0/59866-70-5/54-21-7/578-36-9/2174-16-5. Name of common ingredients: Salicylic acid/calcium salicylate/magnesium salicylate/mea-salicylate/sodium salicylate/potassium salicylate/tea-salicylate. These ingredients have many functions (anti-microbial, anti-acne, cosmetic biocide, exfoliant, hair conditioning agent, etc.) and they can be used in many types of cosmetics and personal care products including moisturizers, skin cleansing products, shampoos, as well as skin care, hair care, suntan and sunscreen products, as well as in mouthwashes and dentifrices.

- **Other Antimicrobials**
  This is a general category that includes any antimicrobials that have not been specifically named within the antimicrobials category. It is not possible to search 'Other Antimicrobials' to identify which antimicrobials are included there.
- **Antiperspirants**
  Antiperspirants are ingredients that are applied to the skin to reduce the production of perspiration at the site of application. They are mainly used in antiperspirant deodorants but are also found in laundry products.
- **Aluminum Chlorhydrates**
  INCI Name: Aluminum chlorohydrate. CAS Number:12042-91-0. IUPAC Name: Dialuminium chloride pentahydroxide. Aluminium Clorhydrates are ingredients that are applied to the skin to reduce the production of perspiration at the site of application, to induce a tightening or tingling sensation of the skin and to reduce or eliminate unpleasant odor and that protect against the formation of such odors on the skin.
- **Aluminium Zirconium Chlorhydrates**
  INCI Name: Aluminum Zirconium Trichlorohydrex GL Alumi. CAS Numer:134910-86-4. Aluminum Zirconium Tetrachlorohydrex GLY, Aluminum Zirconium Pentachlorohydrex GLY, and Aluminum Zirconium Octachlorohydrex GLY are ingredients used mainly in the formulation of personal cleanliness products. These ingredients are applied to the skin to reduce the production of perspiration at the site of application, to induce a tightening or tingling sensation of the skin and to reduce or eliminate unpleasant odor.
- **Other Antiperspirants**
  This is a general category that includes any antiperspirants that have not been specifically named within the antiperspirants category. It is not possible to search 'Other Antiperspirants' to identify which antiperspirants are included there.
- **Bleach Precursors**
  Materials that are converted to release a bleaching species
- **Other Bleach Precursors**
  This is a general category that includes any bleach precursors that have not been specifically named within the bleach precursors category. It is not possible to search 'Other Bleach Precursors' to identify which bleach precursors are included there.
- **Bleaching Agents**
  Materials that oxidise or reduce another material.
- **Oxygen Release Persalts (Bleaching Agents)**
  Oxygen bleaches are materials that release oxygen for cleaning and bleaching upon addition to water. There are two types of oxygen release persalts sold in the consumer market, sodium percarbonate persoxide (CAS Number:1 15630-89-4) used in a number of home and laundry cleaning products and, sodium perborate (CAS numer:15120-21-5/7632-04-4/11138-47-9) which occurs as white crystals and is used in the formulation of many laundry detergents, cleaning products, and laundry bleaches. It is used in body and hand products, hair dyes and colors, and hair bleaches and it is I also present in some tooth bleaching formulas
- **Other Bleaching Agents**
  This is a general category that includes any bleaching agents that have not been specifically named within the bleaching agents category. It is not possible to search 'Other Bleaching Agents' to identify which bleaching agents are included there.

- **Botanicals**
  Natural ingredients which derive from plants. They are commonly found in a range of hair care and skin care products and also in certain package food products such as tea.
- **Essential Oils**
  Volatile fragrant oils obtained from plants. Sources of oils vary from those extracted from flowers (rose), peel (citrus), roots, buds, leaves or oil (pine). They are used mainly in RTD tea, as well as in beauty and personal care products.
- **Plant Extracts**
  Plant extracts are materials extracted from plants that enhance the properties of a formulation. Extracts do not normally change the odour or colour of a formulation but add benefits, for example aloe vera. Key product categories include hot and soft drinks, hair care, skin care and sun care products.
- **Other Botanicals**
  This is a general category that includes any botanicals that have not been specifically named within the botanicals category. It is not possible to search 'Other Botanicals' to identify which botanicals are included here but an example is flax seed.
- **Carotenoids**
  Carotenoids are organic pigments that are found naturally in plants and in some algae, fungi and bacteria. There are two varieties - xanthophylls (e.g lutein, zeaxanthin) and carotenes (e.g. lycopene, carotene). As well as their colouring properties, they are increasingly finding favour as healthy functional ingredients in food, drink and supplements.
- **Other Carotenoids**
  This is a general category that includes any carotenoids that have not been specifically named within the carotenoids category. It is not possible to search 'Other Carotenoids' to identify which carotenoids are included there.
- **Cocoa Liquor**
  When cocoa beans are finely ground, they produce a thick liquid called cocoa liquor (also known as unsweetened chocolate or cocoa mass). The grinding process generates heat and the dry granular consistency of the cocoa is turned into a liquid as the high amount of fat contained in the cocoa nib melts. Cocoa liquor is used primarily in the production of chocolate and semi-finished chocolate ingredients.
- **Cocoa Powder**
  Cocoa powder is the cocoa solid that remains after cocoa butter is pressed out of cocoa liquor. As well as being used to make chocolate, cocoa powder is also used to flavour biscuits, ice cream and other bakery and dairy products. It is also used to make chocolate coatings and in the preparation of chocolate drinks.
- **Colours**
  Colours are ingredients that impart colour to food and cosmetics. Colours are added to food for a variety of reasons. They can increase the aesthetic appeal of foods and can enhance or replace the natural colour of a product that might be lost during processing.
- **Natural Colours**
  Natural food colours are dyes obtained from any vegetable, animal or mineral source. Key varieties include anthocyanins (from red, blue and purple fruits), betalains (primarily from beetroot), caramel (from modified sugar), carotenoids (from orange, yellow and red fruit, vegetables, flowers and seeds), chlorophylls (from green vegetables) and riboflavin (from milk). Key product categories include soft drinks, canned/preserved food, bakery products and pet food.

- **Permanent/Oxidative Hair Dyes**
  Permanent hair dyes change the colour of hair permanently by raising the cuticle of the hair fibre so that the tint or bleach can penetrate to the cortex of the hair. The hair is coloured permanently.
- **Semi-permanent Hair Dyes**
  Semi-Permanent hair dyes do not change temporary the colour of hair. They last for a few weeks and tend to fade progressively with shampooing. They don't contain amonia or bleaching ingredients. They are use in hair colourants
- **Synthetic Colours**
  Synthetic colours are manufactured chemically and are available as powders, pastes, granules and solutions. Common varieties include Allura Red, Amaranth, Black PN, Carmoisine, Erythrosine, Green S, Patent Blue V, Ponceau 4R, Quinoline Yellow, Red 2G, Sunset Yellow and Tartrazine. They are labelled as E numbers and key products include colour cosmetics, oral care, laundry care, packaged food and soft drinks.
- **Temporary Hair Dyes**
  Temporary hair dyes contain pigments that do not penetrate the cuticle of the hair. The pigment molecules are large and coat the hair. This can be removed by subsequent washing.
- **Other Colours**
  This is a general category that includes any colours that have not been specifically named within the colours category. It is not possible to search 'Other Colours' to identify which colours are included there.
- **Conditioning Agents (Skin, Hair, Fabric)**
  Materials that enhance the appearance and/or texture of a surface to which they are applied. Fabric may be softened or made easier to iron, hair may be made glossy, untangled, texturised, softened or bulked.
- **Phospholipids**
  INCI Name: Phospholipids. CAS Number:123465-35-0. Phospholipids are a class of lipids found in biological membranes. They are essential components of the human body and play a decisive role in health and nutrition due to their broad variety of different functions. They are skin conditioning agents that give the skin smoothness and elasticity. Phospholipid complexes are components of Personal Care products that nourish, cleanse, and condition skin and hair. Examples of phospholipids are Phosphatidylcholine (CAS:8002-43-5), Phosphatidylethanolamine (CAS:90989-93-8) and Phosphatidylglycerol
- **Silicones (Conditioning Agents)**
  Silicones are polysiloxanes inert synthetic compounds. They consist of an inorganic silicon-oxygen backbone with organic side groups attached to the silicon atoms, which are four-coordinate. They form a hydrophobic film around the hair that helps to untangle hair and imparts a smooth soft feel to the hair without greasiness. This sub-category aggregates all silicones. Silicones are ingredients in many conditioners and shampoos. Examples of silicones used as conditioning agents in cosmetics are Amodimethicones (CAS:71750-80-6), Dimethicone (CAS:63148-62-9/9006-65-9/9016-00-6) and PCA dimethicone (CAS:179005-03-9).
- **Amodimethicones**
  INCI Name: Amodimethicone. CAS Number:71750-80-6. Amodimethicones are amino-substituted silicones that act as hair conditioning agents. They reduce frizz and improve softness and feel of the hair. Key products for use include shampoos and conditioners.
- **Dimethicones (Conditioning agents)**
  INCI Name: Dimethicon. CAS Number:63148-62-9. IUPAC Name: Dimethicone. Also known as

polydimethylsiloxane, is a silicon-based polymer commonly used as hair and skin conditioner. It is used in the formulation of a wide range of cosmetics and personal care products including creams and lotions, bath soaps, shampoo and hair care products.

- **PCA Dimethicone**
  INCI Name: PCA Dimethicone. CAS Number:179005-03-9. PCA Dimethicone is an isomer of PCA (a natural moisturiser) grafted onto a silicone backbone. It gives emolliency and conditioning to the skin. It is essentially used in facial moisturisers.
- **Other Silicones**
  This is a general category that includes any silicones that have not been specifically named within the Silicones (Conditioning agents) sub-category. It is not possible to search 'Other Silicones' to identify which silicones are included there.
- **Other Conditioning Agents (Skin, Hair, Fabric)**
  This is a general category that includes any conditioning agents that have not been specifically named within the conditioning agents category. It is not possible to search 'Other Conditioning Agents' to identify which conditioning agents are included there.
- **Cultures**
  Culture is a generic name for a wide range of selected microorganisms having a history of use in the food industry. They are commonly referred to as lactic acid bacteria although other types of bacteria, as well as yeasts and moulds, are also covered in the cultures category.
- **Dairy Cultures**
  Dairy cultures are lactic acid bacteria, moulds, yeasts and other bacteria that are used for specific dairy applications. They perform a variety of functions, including acidification, texturising, flavouring, colouring and encouraging surface or internal growth of moulds in ripened cheeses. Please note that if a product lists 'yeast' explicitly within its ingredients list, this will be included within the 'Raising Agents' category under 'Yeast.'
- **Meat Cultures**
  Meat cultures are bacteria, yeasts and moulds that are used for specific meat applications. They perform a variety of functions, including improving taste, colour and texture, promoting flavour development and improving bacteriological safety.
- **Probiotic Cultures**
  Live microbial preparations that can benefit the recipient through restoring their intestinal microbial balance. The microorganisms most commonly used as probiotics are Lactobacilli, Bifidobacteria and Streptococci. Commonly used in yoghurts.
- **Other Cultures**
  This is a general category that includes any cultures that have not been specifically named within the cultures category. It is not possible to search 'Other Cultures' to identify which cultures are included there.
- **Emollients**
  Emollients are refatting agents added to a cosmetic formulation to provide the skin with the fat it needs. They prevent water loss and have a softening and soothing effect on the skin. They are used mainly in skin care products as well as air fresheners and insecticides. Examples of emollients are ingredients like cyclomethicone, dimethicones, emollient esters, emollient eters, hydrocarbon waxes, lanolin and derivatives, paraffin, petrolatum, plant oils and synthetic emollients hydrocarbons.
- **Emollient Esters**
  Emollient Esters such as isopropyl palmitate (CAS Number:142-91-6), or hexyl laurate (CAS

Number: 34316-64-8) exhibit emollient properties. Emollient esters are cosmetic ingredients that act as moisturizers, plasticizers and tactile modifiers when applied to skin. Examples of emollient esters include C12-15 Alkyl Benzoate, C18-36 Acid Triglyceride, Diethylhexyl Carbonate, Butylene Glycol Dicaprylate/Dicaprate, etc.

- **Emollient Ethers**
  A range of materials containing ether linkages. Often based on polyethylene glycol (PEG) such as PEG-25 Propylene Glycol Stearate, PEG-75 Propylene Glycol Stearate, PEG-120 Propylene Glycol Stearate, PEG-10 Propylene Glycol, PEG-8 Propylene Glycol Cocoate and PEG-55 Proplyene Glycol Oleate. In cosmetics and personal care products, these ingredients are used in the formulation of shampoos, bath products, personal cleanliness products and other skin and hair care products.
- **Hydrocarbon Waxes**
  Hydrocarbon waxes are hydrocarbon based solids that provide a coating to skin preventing evaporation of water. Examples of hydrocarbon waxes are Ozokerite (CAS:64742-33-2), Ceresin (CAS:8001-75-0) and Montan Wax (CAS:8002-53-7). In cosmetics and personal care products, these waxes are used in many types of products including lipsticks, baby products, eye and facial makeup, as well as nail care, skin care, suntan, sunscreen, fragrance, and non-coloring hair preparations.
- **Lanolin and Derivatives**
  INCI Names and CAS Numbres: Lanolin (CAS:8006-54-0), Lanolin Oil (CAS:70321-63-0/8038-43-5), Lanolin Wax (CAS:68201-49-0), Lanolin Acid (CAS:68424-43-1), Lanolin Alcohol (CAS:8027-33-6), Acetylated Lanolin (CAS:61788-48-5), Hydrogenated Lanolin (CAS:8031-44-5), and Hydroxylated Lanolin (CAS:68424-66-8). Lanolin and its related ingredients are widely used in the formulation of cosmetics and personal care products. These ingredients can be found in baby products, skin care, shaving, manicuring, hair care, suntan and sunscreen products, as well as eye, lip and facial makeup. Its composition and structure imitates the natural skin protective barrier. It forms a protective film, restores the hydrolipidic mantle and prevents dehydration.
- **Paraffins (Emollients)**
  INCI Name: Paraffin. CAS Number:8002-74-2. Paraffin is a solid mixture of hydrocarbons obtained from petroleum characterized by relatively large crystals used as emollient, antifoam and solvent in cosmetic products. In cosmetics and personal care products, these waxes are used in many types of products including lipsticks, baby products, eye and facial makeup, as well as nail care, skin care, suntan, sunscreen, fragrance, and non coloring hair preparations.
- **Plant Oils**
  Oils that are directly or indirectly derived from plants or plant extracts. Examples of plant oils are Coconut oil, Argan oil, Castor oil, Jojoba oil, Shea butter, Palm tree oil, etc.
- **Synthetic Emollient Hydrocarbons**
  Synthetic emollient hydrocarbons are synthetic oils used as emollients. Examples of Synthetic emollient hydrocarbons are Squalene (CAS:111-02-4), Squalane (CAS:111-01-3), Stearic Acid (CAS:57-11-4), Oleic Acid (CAS:112-80-1), Lauric Acid (CAS:143-07-7), Palmitic Acid (CAS:57-10-3) and Myristic Acid (CAS:544-63-8). In cosmetics and personal care products, Squalane and Squalene are used in the formulation of a wide variety of products including bath oils, hair products, eye makeup, makeup foundations, lipstick, suntan and sunscreen products, body powders, nail products and in cleansing, moisturizing, and skin care products. Stearic Acid, Oleic Acid, Lauric Acid, Palmitic Acid and Myristic Acid are used in a variety of cosmetic creams, cakes, soaps and pastes.
- **Other Emollients**
  This is a general category that includes any emollients that have not been specifically named within

the emollients category. It is not possible to search 'Other Emollients' to identify which emollients are included there.

- **Emulsifiers and Co-Emulsifiers**
  Emulsifiers are substances that facilitate the blending of two ingredients that would not normally mix (an emulsion), such as oil and water. The emulsifier keeps the mixture stable and prevents the emulsion from separating into two layers. Emulsifiers also have a big effect on the structure and texture of many foods and are used to aid in the processing of foods and to help maintain quality and freshness.
- **Alkoxylated Fatty Esters**
  Condensates of alkylene oxide with esters of fatty acids.
- **Alkyl Phosphates**
  Alkyl phosphates belong to a group of organic compounds called organophosphates are esters of phosphoric acid H3PO4 and corresponding alcohol. They are useful as cosmetic emulsifiers. Examples of alkyl phosphates containing different numbers of carbons in the alkyl chain are C20-22 Alkyl Phosphate, C9-15 Alkyl Phosphate, Potasium C11-15 Alkyl Phosphate, Potasium C12-13 Alkyl Phosphate, Potasium C12-14 Alkyl Phosphate, Potasium C15-19 Alkyl Phosphate, TEA-C12-13 Alkyl Phosphate, TEA-C12-14 Alkyl Phosphate and TEA-C8-10 Alkyl Phosphate.
- **Citric Acid Esters of Monoglycerides**
  Citric acid esters of monoglycerides are emulsifiers produced from monoglycerides reacted with citric acid where the citric acid is bound with monoglyceride and the obtainable products are mixtures containing a few monoglycerides. They are most widely used in margarines, meat products and, as an alternative to lecithin, in chocolate. An example of Citric Acid Ester of Monoglycerides is Monoglyceride Citrate (CAS:36291-32-4)
- **Diacetyl Tartaric Acid Esters of Monoglycerides**
  INCI Name: DATEM. IUPAC Name: Diacetyl tartaric acid fatty acid mono-, diglyceride ester. The diacetyl tartaric acid is bound with monoglyceride. An emulsifier that is dispersible in cold and hot water, and soluble in fats and oils. As it is a hydrophilic emulsifier and acid resistant, it is used for emulsification and foaming of margarine, mayonnaise and dressing. Also, it can act on starch and protein, thus it is used as a dough conditioner. They are most widely used in baked goods, biscuits, beverage whiteners and dressings.
- **Egg Yolk**
  Egg yolk was probably the first emulsifier ever used in foods. It serves as an emulsifier thanks to the presence of the phospholipid lecithin. Egg yolk is mainly used in mayonnaise and other sauces, as well as frozen processed food.
- **Ethoxylated Fatty Acids**
  Condensates of ethylene oxide with fatty acids. They have general formula RCOO(CH2OCH2)n-H. Key product categories include bath foam/shower gel, liquid soap and other beauty and personal care and home care products. Examples of Ethoxylated Fatty Acids are of the popular variants of ethoxylated fatty acid formulations used in industries are coconut fatty acid ethoxylate, lauric acid ethoxylate, oleic acid, myristic acid ethoxylates.
- **Ethoxylated Fatty Amides**
  Ethoxylated Fatty Amides are condensates of ethylene oxide with fatty amides. They have general formula RCON-C2H4OH.CH2(CH2OCH2)n-CH2OH. The majority of ethoxylated fatty amides are used in hair care colorants.
- **Ethoxylated Glyceryl Esters**
  Ethoxylated Glyceril Ester are condensates of ethylene oxide and esters of glycerol. They are mainly

used as styling agents in hair care and in skin care products. Examples of Ethoxylated Glyceril Esters include PEG-60 hydrogenated castor oil, PEG-7 Glyceryl cocoate; PEG-30 Glyceryl laurate, etc.

- **Ethoxylated Oils**
  Condensates of oils with ethylene oxide.
- **Ethoxylated Sorbitan Esters**
  Ethoxylated Sorbitan Esters are condensates of ethylene oxide and esters of sorbitan. They are used mainly in baby care toiletries. An example is Pyoxyethylene 20 or Sorbitan Monooleat (CAS: 9005-64-5).
- **Fatty Alcohols**
  Aliphatic alcohols derived from fats and oils. They are used in a wide range of products including hair care, skin care and home care mainly in the production of detergents and surfactants. Examples of Fatty Alcohols are Lauryl Alcohol (CAS:112-53-8), Stearyl Alcohol (CAS:112-92-5) and Oleyl Alcohol (CAS:143-28-2/593-47-5).
- **Fatty Acid Esters**
  Emollient esters are cosmetic ingredients that act as moisturizers, plasticizers and tactile modifiers when applied to skin. Examples of emollient esters include C12-15 Alkyl Benzoate, C18-36 Acid Triglyceride, Diethylhexyl Carbonate, Butylene Glycol Dicaprylate/Dicaprate, etc. Fatty acid esters such as isopropyl palmitate (CAS Number:142-91-6), or hexyl laurate (CAS Number: 34316-64-8) also exhibit emollient properties.
- **Lactic Acid Esters of Monoglycerides**
  Lactic Acid Esters of Monoglycerydes are emulsifiers produced from monoglycerides reacted with lactic acid. They are most widely used as whipping agents and to provide improved aeration and stability of certain food products, including ice cream and baked goods. An example of Lactic Acid Esters of Monoglycerides is Monoglyceride Lactate.
- **Mono- and Diglycerides of Fatty Acids**
  Mono- and diglycerides of fatty acids (E471) are glycerides (esters from glycerol and fatty acids) consisting of one or two fatty acid chains covalently bonded to a glycerol molecule through an ester linkage. They are common food additive used as emulsifiers and can be sourced from vegetable oils and animal fats whose triglycerides are broken down by natural lipase enzymes. They are used in bakery products, ice cream, margarine, savoury snacks and skin care.
- **Polyglycerol Esters**
  Polyglycerol esters (PGE) are emulsifiers produced from esterification of polyglycerols with fatty acids. They are most widely used in bakery products, chocolate, margarines and spreads.
- **Polyglycerol Polyricinoleate**
  Polyglycerol polyricinoleates (PGPR) are emulsifiers produced from esterification of polyglycerols with polymerised ricinoleic acid. They are most widely used in chocolate, margarines and spreads.
- **Polyoxyethylene Sorbitan Fatty Acid Esters**
  Polyoxyehylene Sorbitan Fatty Acid Esters (Polysorbates) are surfactants that are produced by the reaction of polyol, sorbitol, with ethylene oxide. The number in the name of the Polysorbate indicates the average number of moles of ethylene oxide that has been reacted per mole of sorbitol. The polyoxyethylenated sorbitan is then reacted with fatty acids obtained from vegetable fats and oils such as lauric acid, palmitic acid, stearic acid and oleic acid. Polysorbates function to disperse oil in water as opposed to water in oil. The Polysorbate ingredients help other ingredients to dissolve in a solvent in which they would not normally dissolve. They also help to form emulsions by reducing the surface tension of the substances to be emulsified. The Polysorbates are used in a

variety of products including skin fresheners, skin care products, skin cleansing products, makeup bases and foundations, shampoos, permanent waves and fragrance powders.

- **Sorbitan Esters of Fatty Acids**
  Sorbitan is produced through a dehydration process of sorbitol and this intermediate is then esterified with a fatty acid to produce the emulsifiers, sorbitan esters. Depending on the degree of esterification, either Sorbitan Monostearate (SMS) or Sorbitan Tristearate (STS) is produced. They are most widely used in bakery mixes, margarines and spreads and chocolate. In cosmetics and personal care products, Sorbitan Esters are used in a variety of products including skin care products, skin cleansing products, moisturizers, eye makeup and other makeup. Examples of Sorbitan Esters of Fatty Acids are Sorbitan stearate (CAS:1338-41-6), Sorbitan Laurate (CAS:1338-39-2), Sorbitan Oleate (CAS:1338-43-8), Sorbitan Tristearate (CAS:26658-19-5), Sorbitan Palmitate (CAS:26266-57-9), etc.
- **Stearoyl Lactylates**
  Sodium and calcium stearoyl lactylates (SSL and CSL) (CAS:25383-99-7/18200-72-1 and CAS:5793-94-2) fatty acids are produced from lactic acid with fatty acids. SSL is neutralised with sodium while CSL is neutralised with calcium. They are used as emulsifiers in foods, with primary applications including bread (as anti-staling agents or volume enhancers), beverage whiteners and low-fat spreads.
- **Sucrose Esters of Fatty Acids**
  Sucrose esters of fatty acids, also called sucrose ester or sugar ester, are a complex of sucrose and fatty acids. They are prepared from sucrose with methyl and ethyl esters of food fatty acids or by extraction from sucroglycerides. As emulsifiers in food, they are most widely used in ice cream, baked goods, beverage whiteners, beverage mixes, sauces and confectionery.
- **Other Emulsifiers**
  This is a general category that includes any emulsifiers that have not been specifically named within the emulsifiers category. It is not possible to search 'Other Emulsifiers' to identify which emulsifiers are included there.
- **Enzyme stabilisers**
  Enzyme stabilisers protect enzymes against denaturation caused by thermal stress, proteolysis, and changes in pH or salt concentration.
- **Enzymes**
  Enzymes are organic biocatalysts that occur in all living things. They are used in food processing to speed up rates of reaction in certain processes and are suitable for a multitude of different applications.
- **Carbohydrases**
  Carbohydrases are enzymes that promote hydrolysis or synthesis of a carbohydrate. They are most widely used in starch processing, baking, fruit processing, detergents, brewing and wine making.
- **Amylases**
  INCI Name: Amylase. CAS Number:9000-92-4. They are carbohydrase enzymes used to promote hydrolysis or synthesis of a carbohydrate. They are most widely used in starch processing, baking, fruit processing, detergents, brewing and wine making.
- **Cellulases**
  INCI Name: Cellulase. CAS Number:9037-40-5/9012-54-8. Cellulases are carbohydrase enzymes used to promote hydrolysis or synthesis of a carbohydrate. They are most widely used in baking, starch processing, fruit processing, detergents, brewing and wine making.

- **Mannanases**
  Mannanases are Enzymes that breaks down compounds known as mannanes. These polysaccharides are constructed from the simple sugar mannose and are found widely in nature. In many plants (and, for example, in their seeds), mannanes serve as carbohydrate reserves.Mannanases are used foremost as additives in feed that contains soya and maize and that is intended for broiler hens and swine.In laundry agents, mannanases are used in combination with other enzymes as an effective medium against soil from food products such as ice cream, tomato sauce or salad dressing that contain guar gum.
- **Xylanases**
  Xylanases are enzymes that break down components of the cell wall matrix of plants. They are mainly used baking enzymes to improve dough qualities. They are also used in the production of alcoholic drinks, fruit juices and beverages.
- **Other Carbohydrases**
  This is a general category that includes any carbohydrases that have not been specifically named within the carbohydrases category. It is not possible to search 'Other Carbohydrases' to identify which carbohydrases are included there.
- **Lipases**
  Lipases (CAS: 9001-62-1) are water-soluble enzymes that catalyze the hydrolysis of ester bonds in water–insoluble, lipid substrates. They can be used in the fermentation of yoghurt and cheese as well as in baking, oils and fats modification, egg processing, milk products, brewing and flavour production.
- **Proteases**
  Proteases (CAS:9001-92-7) are enzymes that begin protein catabolism by hydrolysis of the peptide bonds that link amino acids together in the polypeptide chain. In foods, they are most widely used in cheese production, brewing, baking, detergents, protein modification and yeast processing.
- **Other Enzymes**
  This is a general category that includes any enzymes that have not been specifically named within the enzymes category. It is not possible to search 'Other Enzymes' to identify which enzymes are included there.
- **Fats and Oils**
  Fats and oils represent a wide group of compounds that are generally soluble in organic solvents and largely insoluble in water. Chemically, fats are generally triesters of glycerol and fatty acids. They may be either solid or liquid at normal room temperature, depending on their structure and composition, with the term 'oil' generally used to refer to fats in liquid state.
- **Animal Fat**
  Animal fats are fats derived from animal sources, e.g. lard (pork fat) and tallow (beef fat). The main two product categories are dairy products and pet food.
- **Animal Oils**
  Animal oils are oils derived from animal sources, e.g. cod liver oil.
- **Cocoa Butter**
  Cocoa butter is the edible natural fat of the cocoa bean, extracted from cocoa liquor during the process of making cocoa powder. Cocoa butter has only a mild chocolate flavor and aroma and is one of the ingredients used to make real chocolate. It can also be used in non-food products, including soaps and lotions.
- **Fatty Acids**
  Fatty acids are oleochemicals produced by the hydrolysis of the ester linkages in a fat or biological

oil (both of which are triglycerides), with the removal of glycerol. They generally occur in two varieties: saturated fatty acids and unsaturated fatty acids. This latter category also includes the two essential fatty acids, linoleic acid and alpha-linolenic acid, which cannot be made in the body and must be supplied by food.

- **Hydrogenated Vegetable Fat**
  Vegetable fats can be transformed through partial or complete hydrogenation (the addition of hydrogen) into fats with a higher melting point. Hydrogenated fats are a source of saturated trans fats, with are associated with raising cholesterol. They have recently been removed from many products but key product categories include baked goods and dairy products.
- **Hydrogenated Vegetable Oil**
  Vegetable oils can be transformed through partial or complete hydrogenation (the addition of hydrogen) into oils with a higher melting point. Hydrogenated fats are a source of saturated trans fats, with are associated with raising cholesterol. They have recently been removed from many products but hydrogenated vegetable oil is still used for cooking.
- **Long Chain Omega-3 Fatty Acids**
  Long chain omega-3 fatty acids are essential fatty acids with a double carbon bond located at the third carbon from the methyl end of the chain. They are more than 18 carbons long and main forms include eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). EPA and DHA are beneficial for heart and cognitive health and are added to products to increase their nutritional content. Fish oils are the main source of omega-3 fatty acids, with technology able to reduce the smell and flavour of fish. Extractions from plant sources are also available and suitable for vegetarians and vegans. Key product categories include baby food, breads, milk and drinking yoghurts.
- **Milk Fat**
  Milk or butter fat is the fatty portion of milk. Milk and cream products are often sold according to the amount of milk fat that they contain. The main product categories for milk fat are butter and frozen processed foods. They can also be used as added ingredient.
- **Powdered Fats**
  Powdered and flaked fats can be used as fat ingredients in bakery mixes, baked goods, vegetarian foods, soups and sauces, coatings and sweet spreads.
- **Short Chain Omega-3 Fatty Acids**
  Short chain omega-3 fatty acids are essential fatty acids with a double carbon bond located at the third carbon from the methyl end of the chain and are 18 carbons long or less, the most important being a-linolenic acid which is essential and is sourced from vegetable oil. They are not associated with such beneficial health claims as long-chain omega-3 fatty acids but key products include breads and spreadable oils and fats.
- **Stanol/Sterol Esters**
  Stanol and sterol esters are a group of chemical compounds known to reduce the level of low-density lipoprotein (LDL) cholesterol in blood when ingested. The starting materials are sterols and phytosterols, respectively, which are then esterified with a mixture of fatty acids derived from plants. They are naturally occurring in small quantities in fruits, vegetables, nuts, seeds, cereals, legumes, and vegetable oils.
- **Vegetable Fat**
  Vegetable fats are fats derived from plant sources. Vegetable fat is used mainly in baked goods, such as bread, biscuits and cakes, but also in margerine and spreads.

- **Vegetable Oil**
  Vegetable oils are oils derived from plant sources. It is found in a wide range of products including baked goods and drinking milk products.
- **Waxes**
  The definition of waxes originally referred to beeswax and was a substance similar in composition and physical properties to beeswax. The term is now used for a variety of commercial products of mineral, marine, plant and insect origin that contain fatty materials of various kinds and find applications in cosmetics, lubricants, polishes, surface coatings, etc.
- **Other Fats and Oils**
  This is a general category that includes any fats and oils that have not been specifically named within the fats and oils category. It is not possible to search 'Other Fats and Oils' to identify which fats and oils are included there.
- **Flavours**
  Flavours improve the taste and aroma of products. They are generally classified as natural, nature-identical or synthetic.
- **Food/Beverage Flavours**
  Flavours enhance the taste of foods and drinks and can also improve the aroma of products. They are generally classified as natural, nature-identical or synthetic.
- **Oral Care Flavours**
  Flavours mainly used in toothpaste and other oral care products.
- **Other Flavours**
  This is a general category that includes any flavours that have not been specifically named within the flavours category. It is not possible to search 'Other Flavours' to identify which flavours are included there.
- **Flavour Enhancers**
  Flavour enhancers are used to bring out the flavour in a wide range of foods without adding a flavour of their own.
- **Nucleotides**
  Nucleotides are monomers of nucleic acid. They are used as flavour enhancers in food. The varieties most widely used include disodium 5'-inosinate (IMP), disodium 5'-guanylate (GMP), calcium 5'-ribonucleotides and disodium 5'-ribonucleotides. They are used mainly in sweet and savoury snacks including crisps/chips, nuts and pretzels.
- **Hydrolysed Vegetable Protein**
  Produced by boiling vegetable matter in hydrochloric acid and then neutralising with sodium hydroxide, hydrolysed vegetable protein or HVP contains glutamic acid and can, therefore, be used as a flavour enhancer in food. It is used mainly in noodles and other packaged food products.
- **Yeast Extract**
  Yeast extract is derived from fresh yeast and contains a mix of amino acids, carbohydrates, vitamins and minerals that impart taste to savoury products. It is used principally as a flavour enhancer.
- **Other Flavour Enhancers**
  This is a general category that includes any flavour enhancers that have not been specifically named within the flavour enhancers category. It is not possible to search 'Other Flavour Enhancers' to identify which flavour enhancers are included there.
- **Flours**
  Flours are fine powders made through the milling of cereals or other starchy food sources. It is most commonly made from wheat, but also from corn, rye, barley, and rice, as well as other cereals, plus

- **Other Lacquers**
  This is a general category that includes any lacquers that have not been specifically named within the lacquers category. It is not possible to search 'Other Lacquers' to identify which lacquers are included there.
- **Milk**
  Milk is an opaque white liquid produced by the mammary glands of female mammals. The milk used in foods comes primarily from cows, although goat, sheep and buffalo milks are also used.
- **Cheese Powder**
  Cheese is a made by curdling milk using a combination of rennet and acidification (from acids or bacteria). In powdered form, it can be added to processed foods to add cheese flavour.
- **Cream**
  Cream is a dairy product that is composed of the higher-butterfat layer skimmed from the top of milk. It can be used as an ingredient in a variety of foods, including ice cream, soups, sauces, cakes and desserts.
- **Full Cream Milk Powder**
  Whole milk or full cream milk powder is the powder that results from the removal of water from milk. It contains the lactose, milk proteins, milk fat, and milk minerals in the same relative proportions as in fresh milk. It can be used as an ingredient in bakery, confectionery, dairy products, sports and nutrition foods, infant formulas and various other foods.
- **Full Cream Sweetened Condensed Milk**
  Sweetened condensed milk is cow's milk from which water has been removed and to which sugar has been added, thus creating a very thick, sweet product. As an ingredient, it can be used in confectionery, toppings and bakery products.
- **Semi-Skimmed Milk**
  Liquid milk which has had half of its fat content removed. Usually this results in milk with a fat content of 2.5% or less
- **Skimmed Milk**
  Milk from which the cream has been removed. Usually comprises milk with a fat content of 0.1% or less.
- **Skimmed Milk Powder**
  Skimmed milk powder is the powder that results from the removal of water from non-fat milk. It can be used as an ingredient in bakery, confectionery, dairy products, sports and nutrition foods, infant formulas and various other foods.
- **Whey Powder**
  Whey powder is obtained by drying whey produced from milk during the cheese making process. Typical composition of whey powder is: Protein 9-14%, Lactose 63-75%, Fat 1-1.5%, Ash 8.2-8.8%, Moisture 3.5-5%. Different types of whey powder are available, including Sweet whey powder, Acid whey powder, Demineralised whey powder and they are widely used in the food, beverage and nutrition industries.
- **Whole Milk**
  Whole milk refers to liquid milk that has a minimum fat content of 3.5%. The majority of whole milk is consumed as fresh drinking milk, but other uses include cheese and yoghurt. For powdered whole milk, see ‘Full Cream Milk Powder’.
- **Other Milk-Based Products**
  This is a general category that includes any milk-based products that have not been specifically

named within the milk-based products category. It is not possible to search 'Other Milk-based Products' to identify which milk-based products are included there.

- **Minerals**
  Minerals are essential nutrients that your body needs in small amounts to work properly. They are found in varying amounts in a wide range of different foods. Those most widely added to fortify foods include calcium, iron and magnesium.
- certain legumes and nuts. Flours are used primarily in the production of bread and other baked goods but can also be used in sauces and puddings.
- **Wheat Flour**
  Flours are fine powders made through the milling of cereals or other starchy food sources. Wheat flour is made from wheat.
- **Wholemeal Flour**
  Flours are fine powders made through the milling of cereals or other starchy food sources. Wholemeal flour is made from the entire cereal grain, including the bran, endosperm and germ.
- **Rye Flour**
  Flours are fine powders made through the milling of cereals or other starchy food sources. Rye flour is made from rye.
- **Soya Flour**
  Flours are fine powders made through the milling of cereals or other starchy food sources. Soya flour is made from soya beans and also includes textured soy flour. Soy flour typically contains around 50% soy protein. Key product categories include bakery products, soy milk and baby food.
- **Other Flours**
  This is a general category that includes any acidulants that have not been specifically named within the flours category. It is not possible to search 'Other Flours' to identify which flours are included there.
- **Fluorescers**
  Fluorescers absorb short-wavelength light and re-emit it at a higher wavelength. It is used mainly in laundry detergents but also some salad dressings.
- **Fragrances**
  The natural and synthetic ingredients that create scent in consumer goods including perfumes, other cosmetics and toiletries and household care products.
- **Humectants**
  Humectants are hygroscopic substances that absorb water from the air. They include a wide range of ingredients that help retain moisture in food and non-food products.
- **Other Humectants**
  This is a general category that includes any humectants that have not been specifically named within the humectants category. It is not possible to search 'Other Humectants' to identify which humectants are included there.
- **Insect Repellents**
  Insect repellents keep insects away but do not necessarily kill the insect.
- **Insecticides**
  Insecticides are used to control insects by killing them or preventing them from acting in an undesirable way. They do not necessarily repel insects. There are 5 main heterocyclic derivatives used as pesticides: methylisothiazolinone, chloromethylisothiazolinone, benzylisothiazolinone, octylisothiazolinone, dichloromethylisothiazolinone.

- **Other Insecticides**
  This is a general category that includes any insecticides that have not been specifically named within the insecticides category. These might include chlorinated hydrocarbons, organophosphorus compounds, carbamates, phenothiazine, pyrethroids, plant toxins. However, it is not possible to search 'Other Insecticides' to identify which insecticides are included there.
- **Lacquers**
  A Lacquer is a clear coating that dries through solvent evaparation into a continuous surface.
- **Other Minerals**
  This is a general category that includes any minerals that have not been specifically named within the minerals category. It is not possible to search 'Other Minerals' to identify which minerals are included there.
- **Modified Flour**
  Modified flours are produced through the physical or chemical modification of basic flours.
- **Modified Corn Flour**
  Modified corn flours are produced through the physical or chemical modification of basic corn flours.
- **Other Modified Flour**
  This is a general category that includes any modified flour that have not been specifically named within the modified flour category. It is not possible to search 'Other Modified Flour' to identify which modified flours are included there.
- **pH Control/salts**
  The regulation of acidity/alkalinity level (pH) of a formulation. pH is adjusted by the addition of acids or alkalis and the creation of salts. They are used in a wide range of products, from laundry detergent to bread.
- **Alkanolamines**
  Triethanolamine (TEA)(CAS:102-71-6) is a common pH balancer in formulations particularly in cosmetic and personal care products. Triethanolamine is used in makeup products such as eyeliners, mascara, eye shadows, blushers, make-up bases and foundations, as well as in fragrances, hair care products, hair dyes, wave sets, shaving products, sunscreens, and skin care and skin cleansing products. Some common products in which triethanolamine is found are liquid laundry detergents, dishwashing liquids, general cleaners and hand cleaners.
- **Carbonates**
  Carbonates are salts of carbonic acid. Examples of carbonates are Calcium Carbonate (CAS:471-34-1), Sodium Carbonate (CAS:497-19-8), Magnesium Carbonate (CAS:546-93-0), Potassium Carbonate (CAS:584-08-7) and Zinc Carbonate (CAS:3486-35-9). All of these ingredients are white powders. These carbonate salts are used in bath products, makeup products, personal cleanliness products, shaving products, oral care products and skin and hair care products. Certain carbonates, including calcium carbonate, can be also used as a means of fortifying foods.
- **Citrates (pH Control)**
  Citrates are salts of citric acid that can be added as buffering agents to cosmetics to help adjust the acid/base balance. Examples of Citrates are: 1,2,3-Propanetricarboxylic acid, 2-hydroxy (CAS:460-890-5), Diammonium Citrate (CAS:3012-65-5) and Potassium Citrate (CAS:866-84-2). ls.
- **Hydroxides**
  Hydroxides are used to control the pH of cosmetics and personal care products. Examples of Hydroxides are Sodium Hydroxide (CAS:1310-73-2), Calcium Hydroxide (CAS:1305-62-0), Magnesium Hydroxide (CAS:1309-42-8) and Potassium Hydroxide (CAS:1310-58-3). Sodium

hydroxide (NaOH) is the commonest hydroxide used to control pH. It is a very strong alkali and is used as either solid or as a solution. Magnesium Hydroxide is also used as an absorbant.

- **Lactates**
  Lactates are the salts of lactic acid, most often produced by the fermentation of corn starch or beet sugar. Examples of lactates are Ammonium Lactate (515-98-0), Calcium Lactate (CAS:814-80-2), Potassium Lactate (CAS:996-31-6/85895-78-9), Sodium Lactate (CAS:72-17-3/867-56-1) and TEA-Lactate (CAS:20475-12-1) and lactate and diacetate blends. They are most widely used in meat products to extend shelf life, as well as sweet and savoury snacks and some beauty and personal care products.
- **Phosphates (pH Control/salts)**
  Phosphates are salt of phosphoric acid. In cosmetic and personal care products they can be used as buffering agents to control the pH. Examples of Phosphates are Ammonium Phosphate (CAS:7722-76-1), Diammonium Phosphate (CAS:7783-28-0), Calcium Phosphate (CAS:7758-23-8/10103-46-5), Disodium Phosphate (CAS:7558-79-4/7782-85-6), Trisodium Phosphate (CAS:7601-54-9), etc.
- **Silicates**
  Silicates can be used to control the pH of the finished product. An example is Sodium silicate (CAS:1344-09-8) also called liquid glass, produced through a reaction of silica sand and sodium carbonate, which it is used in the manufacture of soaps and detergents, where it provides a constant pH value.
- **Other pH Control/Salts**
  This is a general category that includes any Ph control/salts that have not been specifically named within the Ph control/salts category. It is not possible to search 'Other Ph Control/Salts' to identify which Ph Control/Salts are included there.
- **Polysaccharides and Oligosaccharides**
  This category encompasses ingredients that can assist with the thickening, setting, gelling, suspending and stabilising of food and drink products. In so doing, they also contribute to texture and mouthfeel. (Polysaccharides are relatively complex carbohydrates comprising polymers of many joined monosaccharides; oligosaccharides are polymers of a smaller number of monosaccharides).
- **Agar**
  Obtained from red seaweed, agar is most widely used as a gelling agent in foods. The most common use is in confectionary, but it is also found in a wide range of dairy products.
- **Alginates**
  Derived from brown seaweed, alginates are used as thickening and gelling agents in foods. Key products include ice cream, bread and snack bars.
- **Beta-Glucan**
  Beta-glucans are natural gum polysaccharides found in the bran of cereal grains, primilary barley and oats but also to a lesser degree in rye and wheat. They can be used in foods as texturing agents or as a way to add soluble fibre. It is mainly found in bread.
- **Carboxymethyl Cellulose**
  A derivative of cellulose, carboxy methyl cellulose (CMC) is used as a thickener and stabiliser including soft drinks, packaged food and laundry care products.
- **Carrageenans**
  Carrageenans are natural polymers extracted from Rhodophyceae (red seaweeds) and are highly sulphated galactans. They are water soluble, have high levels of viscosity and are thermally reversible. The term carrageenans refers to the fully refined type, which are colourless, and labelled

as E407. They are used as thickening, gelling and stabilising agents and are found as an ingredient in packaged foods, beauty and personal care products and soft drinks.

- **Carrageenans (Semi-Refined)**
  Carrageenans are natural polymers extracted from Rhodophyceae (red seaweeds) and are highly sulphated galactans. They are water soluble, have high levels of viscosity and are thermally reversible. Semi-refined carrageenans are not as processed as extracted carrageenans and are therefore less expensive, but add cloudiness to a product. Semi-refined carrageenans are used as thickening, gelling and stabilising agents and are found as an ingredient primarily in pet food but they are also permitted for human consumption. They are also known as Processed Cucheuma Seaweed and labelled as E407a.
- **Cellulose Esters**
  Cellulose ingredients are used in both cosmetics and personal care and home care products including hair products, deodorants, colour cosmetics, skin care products and fabric softeners. These ingredients can play different roles in the formulations such as film forming agents, thickeners and stabilisers. In food products cellulose ingredients are used to add fibre and for thickening or emulsifying.
- **Cellulose Ethers**
  Derived from cellulose, the most widely used cellulose ethers are methyl cellulose and hydroxypropyl methyl cellulose. They are used as thickeners and emulsifiers in foods.
- **Galactooligosaccharides**
  Galactooligosaccharides are a group of prebiotics; that is they are non-digestible carbohydrates that are fermented by bacteria in the gut and are believed to have beneficial health effects. They are synthesised in the industry from lactose using the enzyme ß-galactosidase. Galactooligosaccharides are added to products such as infant formulas, yoghurt drinks and snack bars.
- **Gellan Gum**
  Gellan gum is a water soluble polysaccharide composed of glucose, rhamnose and gluronic acid. It is produced by the bacterium Pseudomonas elodea and used by the ingredients industry as a thickener, emulsifier and stabiliser. It is labelled as E418 and is used mainly in dairy products such as flavoured milk drinks and yoghurt, but also in dips and condiments.
- **Guar Gum**
  Guar gum is a polysaccharide formed mainly of galactomannans formed when grinding the seeds of the guar plant, grown principally in India. The seeds are crushed and de-husked to reveal the endosperm, which is ground to form guar gum. It is used as a thickening, gelling and stabilising agent and is found in a wide range of products including soft drinks, dairy, pet food and hair care products.
- **Gum Arabic**
  Gum arabic is a natural gum obtained from acacia trees. It performs thickening, stabilising and emulsifying functions in food and drinks. A large proportion is used in sugar confectionary, with other products including snack foods and soft drinks.
- **Inulin**
  Inulins belong to the class of carbohydrates known as fructans. Derived from a variety of plants, they are used in foods as a soluble fibre supplement or as a prebiotic to stimulate the growth of benefical bacteria in the gut. They are used mainly in dairy products, but also in baked goods and meal replacements.
- **Konjac**
  A natural derivative of the konjac plant, this ingredient can be used as a jelly or flour and serves as a

texturising agent in food, or as a vegetarian alternative to gelatin. Its key product category is sweet and savoury snacks.

- **Locust Bean Gum**
  This is a natural seed gum of the galactomannans family. It is derived from the carob or locust bean tree and is used as a thickener and gelling agent in foods. It is commonly used in ice cream, dairy products and pet food.
- **Maltodextrin**
  This is a moderately sweet oligosaccharide produced from crops. It is used as a thickening or binding agent in hot and soft drinks and processed food, including dessert mixes.
- **Microcrystalline Cellulose**
  A derivative of cellulose, microcrystalline cellulose (MCC) is used as a binding agent in foods and pharmaceuticals. Key product categories include ice-cream, dairy products and snack bars.
- **Modified Starch**
  Modified starches, also known as starch derivatives, are produced through the physical or chemical modification of base starches. They are used in the thickening, binding and stabilisation of textures or to replace milk or fat solids. Examples include dextrin (E1400), oxidised starch (E1404) and monostarch phosphate (E1410). Key product categories include confectionary, canned/preserved food, dried processed food and soup.
- **Oligofructose**
  Oligofructose or fructooligosaccharides, are oligosaccharides extracted from various fruit and vegetables. They are used as sweetening agents in foods or as soluble fibre or prebiotic ingredients to aid intestinal health. Key product categories include dairy products and RTD tea.
- **Pectins**
  Extracted from fruit solids, pectins are used in the stabilising and thickening of foods, primarily fruit-based preparations.
- **Polydextrose**
  Synthesised from dextrose, polydextrose is commonly used to replace sugar, starch and fat in food products. It can also serve as a stabilising or thickening agent. It is mostly used in ice cream and chocolate confectionary.
- **Propylene Glycol Alginate**
  Propylene glycol alginate is an ester of alginic acid which is derived from the seaweed kelp. It is used as a thickener, stabiliser and emulsifier in a wide range of food products and labelled E405.
- **Quaternised Cellulose Derivatives**
  Quaternised cellulose derivaties are ingredients used in hair care products for conditioning and thickening. As cationic polymers hinder the drainage of the lamellar liquid; cellulose cationic derivatives like these are extensively used in this field of personal care.
- **Quaternised Guar Derivatives**
  Quaternised guar derivaties are ingredients used in hair care products for conditioning and thickening. As cationic polymers hinder the drainage of the lamellar liquid; guar cationic derivatives like these are extensively used in this field of personal care.
- **Starch**
  Starch is a white, solid and tasteless carbohydrate consisting mainly of amylose and amylopectin. Base starches are extracted and refined from corn, wheat and potato, although tapioca, rice, arrowroot and barley are also used on a smaller scale. They are used in the thickening, binding and stabilisation of textures or to replace milk or fat solids. Key product categories include baked goods, dried processed food and sweet and savoury snacks.

- **Xanthan Gum**
  Obtained from the fermentation of the bacterium Xanthomonas campestris, xanthan gum is used as a thickening agent in categories such as soft drinks, sauces, dressings and condiments and bath and shower products.
- **Other Polysaccharides and Oligosaccharides**
  This is a general category that includes any polysaccharides and oligosaccharides that have not been specifically named within the polysaccharides and oligosaccharides category. It is not possible to search 'Other Polysaccharides and Oligosaccharides'to identify which polysaccharides and oligosaccharides are included there.
- **Phytoestrogens**
  Phytoestrogens are plant derived compounds used in packaged foods. They mimic the action of the hormone estrogen at low doses and block its effects at high doses. Phytoestrogens have antioxidant properties and are associated with reducing the risk of certain cancers. They are usually found in foods with a high fibre content.
- **Isoflavones**
  Isoflavones are a group of compounds found primarily in soybeans. They are considered to have oestrogenic and antioxidant effects and are associated with a number of health benefits including protection against heart disease and some hormone related cancers. They are added mainly to health food products, including drinking yoghurts and speciality soft drinks.
- **Other Phytoestrogens**
  This is a general category that includes any phytoestrogens that have not been specifically named within the phytoestrogens category. It is not possible to search 'Other Phytoestrogens' to identify which phytoestrogens are included there.
- **Preservatives/Antioxidants**
  A preservative is a natural or synthetic chemical that is added to food to prevent spoilage, whether from microbial growth or undesirable chemical changes. Not only do they help protect consumers from food poisoning but they also extend shelf-life. They can be broadly divided into anti-microbial preservatives, which function by inhibiting the growth of bacteria and fungi, and antioxidants, which inhibit the oxidation of foods and prevent rancidity.
- **Ascorbic Acid and Derivatives (Preservatives/Antioxidants)**
  Ascorbic acid is a form of vitamin C, used as an antioxidant additive to prevent fats, colours and flavours being oxidised and is often labelled as E300. It can also be used to increase the nutritional content of a product. The ultimate raw material for industrial production is corn or wheat, before being converted to glucose via starch, then to sorbitol, and finally ascorbic acid. Key products include alcoholic drinks, bakery products and chilled meat.
- **Benzoic Acid/Benzoate**
  Benzoic acid and its benzoate salts are used as food preservatives as they inhibit the growth of mould, yeast and some bacteria. They are used most widely in soft drinks and pickles.
- **Isothiazolinones**
  Isothiazolinones are comprised of 5-cholro-2-methyl-4-thiazoline-3-ketone and 2-methyl-4-thiazoline-3-ketone and efficiently inhibit the growth of microbes. Isothiazolinones are frequently used in personal care products such as shampoos and other hair care products, as well as certain home care product formulations. Examples of Isothiazolinones are Methylisothiazolinone (MIT, MI), chloromethylisothiazolinone (CMIT, CMI, MCI), benzisothiazolinone (BIT), octylisothiazolinone (OIT), dichlorooctylisothiazolinone (DCOIT) and Butylbenzisothiazolinone (BBIT)

- **Nitrates/Nitrites**
  Nitrates (salts of nitric acid) and nitrites (salts of nitrous acid) are antimicrobial preservatives and are most widely used in meat products and cheese. Four main types are used in food - potassium nitrite, sodium nitrite, potassium nitrate and sodium nitrate.
- **Parabens**
  A group of preservatives, including butylparaben, propylparaben, methylparaben, and ethylparaben that are widely used in hair care, skin care and body care products.
- **Rosemary Extract**
  Rosemary extract is the essential oil extracted from the plant Rosmarinus officinalis. It is used as a flavouring in food and as a fragrance in beauty and personal care products including shampoos and bath foams. More recently it has been used as natural preservative and has antimicrobial activity.
- **Sorbic Acid/Sorbate**
  Sorbic acid and its sorbate salts are antimicrobial agents used as preservatives in food and drinks to prevent the growth of mould, yeast and fungi. They are mainly used in bakery products, beverages, cheese and other dairy products, and meat products.
- **Sulphites/Metabisulphites**
  Sulphites are chemical compounds that are used as antimicrobial preservatives in food. There are six main varieties used - sodium sulphite, sodium bisulphite, sodium metabisulphite, potassium sulphite, potassium bisulphite and potassium metabisulphite. Key applications include soft drinks, alcoholic drinks, dried fruit and vegetables, meat products, jam and biscuits.
- **Tocopherols**
  Tocopherols are a fat soluble group of chemical compounds that are forms of vitamin E. They are labelled E306, E307, E308 and E309 and the most common type is a-tocopherol. Their antioxidant properties mean they are used as a preservative to prevent fats and oils from turning rancid, often as a natural alternative to BHA and BHT. They are used in beauty and personal care products as well as in meat and poultry and pet food products.
- **Other Preservatives/Antioxidants**
  This is a general category that includes any preservatives/antioxidants that have not been specifically named within the preservatives/antioxidants category. It is not possible to search 'Other Preservatives/Antioxidants' to identify which preservatives/antioxidants are included there.
- **Propellants**
  In aerosols, a propellant is a pressurised vapour in equilibrium with it''s liquid. As some propellant is released by use, more liquid evaporates to maintain an even pressure. Main uses are in deodorants, air care and insecticides.
- **Fluorocarbons**
  Chlorofluorohydrocarbons (CFC) are the most widely known of these compounds which are generally alkanes linked to at least one halogen. The most common CFC are dichlorodifluoromethane (CAS Number : 75-71-8), trichlorofluoromethane (CAS Number : 75-69-4) and trichlorotrifluoroethane (CAS Number : 76-13-1). CFC have been used in deodorant sprays as propellants because of their low price, low toxicity, low reactivity and low flammability properties. However, their manufacture has been phased out by the Montreal Protocol because they contribute to ozone depletion.
- **Hydrocarbons**
  Propane and butane are the main hydrocarbons used as propellants.
- **Other Propellants**
  This is a general category that includes any propellants that have not been specifically named

within the propellants category. It is not possible to search 'Other Propellants' to identify which propellants are included there.

- **Proteins**
  Along with carbohydrates and fats, proteins are one of the three types of nutrients used as energy sources by the body. The proteins used as food ingredients are generally sourced from fish, meat, milk, egg, gelatin, soya and gluten.
- **Animal Derived Proteins**
  Aggregation of specific proteins tracked by Euromonitor International which are wholly derived from animal sources. Please note that this category is not all inclusive as animal derived proteins may be used in the more ambiguous categories ‘Hydrolysed Keratins,’ ‘Protein Hydrolysates’ and ‘Other Proteins,’ as in these cases it is not always conclusively clear whether a protein is animal derived or not.
- **Albumin**
  Albumin refers generally to any protein with water solubility, which is moderately soluble in concentrated salt solutions, and experiences heat coagulation (protein denaturation). Substances containing albumin, such as egg white, are called albuminoids. It is used primarily in food products such as confectionary, bakery products and ice-cream.
- **Casein**
  Casein is the primary protein found in milk. It is insoluble and precipitated from skimmed milk by acid, microbes or enzymes (e.g. rennet). It is used as an emulsifying protein, thickening agent, foaming agent and stabiliser. It also adds nutritional value to a food or beverage product. Key product categories include bakery and sweet and savoury snacks
- **Caseinates**
  Caseinates are water soluble, neutralised (salt) forms of casein with the most common being sodium caseinate and calcium caseinate. They are used as emulsifiers, thickening agents, foaming agents and stabilisers as well as adding nutritional value to a product. Key product categories include yoghurts, desserts and meal replacement.
- **Egg White**
  Egg white, or albumen, is the clear or white liquid contained within an egg and refers mainly to that in a chicken egg. It is made up of around 10% proteins, with the remainder being water. Unlike the yolk it contains no lipids and very little carbohydrate. Main product categories include frozen processed foods (mainly desserts), noodles and soups.
- **Gelatin**
  Gelatin is a protein-based ingredient extracted from animal skin and bone. It is used as a gelling agent in foods, mainly confectionary and dairy products.
- **Milk Protein Concentrate**
  Milk protein concentrate is formed from fresh skimmed milk by a series of processes including ultrafiltration, evaporation and drying. Milk protein concentrate contains 40-90% milk proteins: whey protein and casein. Because of its low concentration of carbohydrate (lactose) and high levels of protein, key milk protein concentrate products include processed foods and meal replacements.
- **Milk Protein Isolate**
  Milk protein isolate is a concentrated milk protein source containing 80-95% casein with the remainder being whey protein. It is formed from fresh skimmed milk and has a low concentration of carbohydrate (lactose) and a large proportion of branched chain amino acids. Key products include protein supplements and processed foods.

- **Whey Protein Concentrate**
  Whey protein concentrate is obtained from whey and can contain from 30% to 80% protein. Whey proteins are used in sports foods and supplements and are finding increased favour as protein ingredients in other food and drinks.
- **Whey Protein Isolate**
  Whey protein isolate is a concentrated product isolated from milk. It is around 90% protein by weight, a source of branched chain amino acids and low in fat and carbohydrate. It is often used as a protein supplement and key products include baby formula and energy and nutrition bars.
- **Hydrolysed Keratins**
  Hydrolysed keratin is the hydrolysed form of keratin, a fibrous protein, found in hair, feathers, wool and nails. Hydrolysed keratins are included in haircare products as they help hair retain moisture, increase strength and lead to smooth and shiny hair.
- **Non-Animal Derived Proteins**
  Aggregation of specific proteins tracked by Euromonitor International which are wholly derived from sources which are not animal based in any way. Please note that this category is not all inclusive as non-animal derived proteins may be used in the more ambiguous categories 'Hydrolysed Keratins,' 'Protein Hydrolysates' and 'Other Proteins,' as in these cases it is not always conclusively clear whether a protein is animal derived or not. Typically, these proteins come from plant, pulse or cereal sources.
- **Gluten**
  Gluten is a protein found in certain cereals. In dried, milled form, it can be added to normal flour to alter the texture of baked goods. It can also be added to pet foods to increase protein content.
- **Pea Protein**
  Protein derived from pea sources, including but not limited to isolates and concentrates. Please note that if a product listing declares inclusion of 'Pea Flour,' this will be tracked in 'Other Flours,' not 'Pea Protein.'
- **Soy Protein Concentrate**
  Soy protein concentrate includes ingredients described as soy protein concentrate, textured soy concentrate, textured soy. Soy protein concentrate ingredients typically have a protein content of 65-72%. Key product categories include Asian speciality drinks, chilled processed meat and dried processed food.
- **Soy Protein Isolate**
  Soy protein isolate includes ingredients described as soy protein isolate and typically contains around 90% protein. Key product categories include chilled processed meat, soy drinks and meal replacement products.
- **Vegetable Proteins**
  Vegetable proteins are proteins derived from plant sources. Soya protein is one of the most widely used in food applications and it is widely used in pet food. Please note only soy protein with a protein content less than 60% or declared as 'soy protein' with no reference to protein percentage is included here. Soy protein with higher protein contents are found in 'Soy Protein Concentrate' and 'Soy Protein Isolate'
- **Protein Hydrolysates**
  Protein hydrolysates are a solution of amino acids that are prepared from meat, fish, milk, soy and wheat gluten proteins using acid or enzymatic hydrolysis. They are used as an enhancer in beauty and personal care products as well as in foods including baby milk formula, noodles and savoury snacks.

- **Other Proteins**
  This is a general category that includes any proteins that have not been specifically named within the proteins category. It is not possible to search 'Other Proteins' to identify which proteins are included there.
- **Raising Agents**
  A raising or leavening agent is a substance used in doughs and batters to cause a foaming action. It reacts with moisture, heat, acidity or other triggers to produce gas that becomes trapped as bubbles within the dough. When a dough or batter is baked, it sets and the holes left by the gas bubbles remain, giving breads, cakes, and other baked goods their textures.
- **Baking Powder**
  Baking powder is a chemical raising agent. Baking powder can be composed of a number of consistuents, but usually these comprise a base, an acid and a bulking agent. It is commonly used in flat baked goods
- **Yeast**
  This category includes instances where 'Yeast' is explicitly declared on the ingredients lists of food and beverage products. The principal product categories are bakery, where it is used as a leavening/raising agent, and alcoholic drinks, where it is used in alcohol fermentation. The most commonly used form is compressed (i.e. ‘ wet’ or ‘fresh’) across both bakery and alcoholic drinks. Please note that if specific bacterial strains are declared rather than the term 'yeast,' these will be included within the 'Cultures' category.
- **Other Raising Agents**
  This is a general category that includes any raising agents that have not been specifically named within the raising agents category. It is not possible to search 'Other Raising Agents' to identify which raising agents are included there.
- **Reducing Agents**
  A material that gains electrons in a redox reaction. In a redox reaction a reducing agent is oxidised and reduces another material.
- **Thioglycollates**
  Thioglycollates are ammonium, calcium or sodium salts of thioglycolic acid. The ammonium form has a strong unpleasant odor. Thioglycollates have the properties to reduce the disulfide cystine bonds in the cortex of the hair. They are therefore used in hair care products such as relaxants/permanents but also in personal care products such as hair removers.
- **Other Reducing Agents**
  This is a general category that includes any reducing agents that have not been specifically named within the reduing agents category. It is not possible to search 'Other Reducing Agents' to identify which reducing agents are included there.
- **Skin Benefit Agents**
  Materials that when applied to the skin provide a range of benefits.
- **Amino acids**
  Amino acids are building blocks of peptides and proteins. They all have a carbon backbone with at least one amino and one carboxyl groups attached. Amino acids such as serine, threonine alanine and pyroglutamic acid are popular because they are key components of the natural moisturizing factor. Tyrosine and its derivatives are used as melanin precursors in tanning accelerators.
- **Collagen**
  Collagen is the triple helix protein found in fibrous tissues in mammals, fish and plants including skin, tendons and cartilage. Main sources of collagen include fish, animal (mainly beef) and plant.

Collagen is hydrolysed and added to beauty care products as a skin benefiting agent to prevent aging. Collagen added to food is called gelatin, which is a separate ingredient.

- **Hyaluronic acid and its salts**
  Hyaluronic acid or hyaluronate is an anionic, nonsulfated glycosaminoglycan. The presence of hyaluronic acid in epithelial tissue has been shown to promote keratinocyte proliferation, increase the presence of retinoic acid, drive collagen synthesis and therefore causing skin hydration. These benefits make hyaluronic acid a very effective topical humectant.
- **Hydroxy Acids**
  Alpha hydroxy acids (AHA) have been used for many years as skin rejuvenating products. They are derived from fruit and milk sugars. The five major types are : glycollic acid (sugar cane), Lactic acid (milk), Malic acid (Apples/pears), citric acid (lemons), and tartaric acid (grapes). There is one beta hydroxy acid - salicylic acid.
- **Peptides**
  Peptides are chains of at least two amino acids linked by eponymous peptide bond between the carboxyl group of one and the amide group of the following amino acid. Beyond 100 amino acids and a molecular weight of approximately 10,000 Daltons, the term protein is preferred over peptide. In the body, peptides regulate the activity of many systems by interacting with target cells. Some peptides have hormonal activity, others have immune activity and some have functions of cell-communication. In skin care, most of peptides have cell-communicating ability and are used for their anti-ageing properties.
- **Other Skin Benefit Agents**
  This is a general category that includes any skin benefit agents that have not been specifically named within the skin benfit agents category. It is not possible to search 'Other Skin Benefit Agents' to identify which skin benefit agents are included there.
- **Skin Lighteners**
  Materials used to lighten skin. In general they disrupt the melatonin. Found in skin care products.
- **Other Skin Lighteners**
  This is a general category that includes any skin lighteners that have not been specifically named within the skin lighteners category. These include hydroquinone, various extracts (licorice, mulberry, pomegranate) and tretinoin. However, it is not possible to search 'Other Skin Lighteners' to identify which skin lighteners are included there.
- **Skin Tanning Agents**
  Materials which when applied to skin either cause darkening themselves or result in darkening when exposed to UV.
- **Other Skin Tanning Agents**
  This is a general category that includes any skin tanning agents that have not been specifically named within the skin tanning agents category. It is not possible to search 'Other Skin Tanning Agents' to identify which skin tanning agents are included there.
- **Solvents**
  A liquid that dissolves a solid, liquid or gas. Water is the most common solvent. Solvents should not react with the material which is being dissolved.
- **Alcohol**
  Alcohol is a term for a wide range of materials that are excellent solvents. All contain the alcohol group -OH. Examples are ethanol, methanol, isopropanol. Major use is in alcoholic drinks, but other products include colour cosmetics, fragrances and hair care.

- **Esters** Includes ethyl acetate, isobutyl acetate. All have characteristic odours. They are used in nail products, hair care and baby care products.
- **Paraffins (Solvents)**
  INCI Name: Paraffin. CAS Number:8002-74-2. Paraffin is a solid mixture of hydrocarbons obtained from petroleum characterized by relatively large crystals used as emollient, antifoam and solvent in cosmetic products. It is used as a solvent in a range of products including home care and beauty and personal care products.
- **Other Solvents**
  This is a general category that includes any solvents that have not been specifically named within the solvents category. It is not possible to search 'Other Solvents' to identify which solvents are included there.
- **Sunscreens**
  A sunscreen is a lotion, spray or cream that protects the skin from UV radiation. It contains materials that absorb or block the harmful radiation.
- **Benzophenones**
  INCI Name : Benzophenone / CAS Number : 119-61-9 Benzophenone is an organic compound also known as Oxybenzone. Its UV absorber properties make it a useful ingredient in sun protection and also an antioxidant in hair care, men’s grooming and facial cleansers.
- **Other Sunscreens**
  This is a general category that includes any sunscreens that have not been specifically named within the sunscreens category. It is not possible to search 'Other Sunscreens' to identify which sunscreens are included there.
- **Surfactant Cleansers and Adjuvants**
  Materials that effect surface tension in such a way as to cause a reduction and allow the removal of soils from a surface. They are used in laundry care, dishwashing and hair care products.
- **Amphoteric surfactants**
  Amphoteric surfactants have both cationic and anionic centers attached to the same molecule. They are very mild and have their high biological compatibility and low toxicity, making them particularly suited for use in cosmetics.
- **Alkyl Amido Alkyl Betaines**
  Amphoteric surfactant of general formulation RCONHC3H6N(CH3)2CH2COO
- **Amino Acid Derivatives**
  Amino Acid derivatives are mild surfactants with high biodegradability, low toxicity and excellent emulsifying, detergency and surface active properties that form fine lather and high water tolerance.They are mainly used in personal care products such as shampoos. Other uses includes skin care and sun care products.
- **Amphodiacetates**
  Amphodiacetates are mild surfactant liquids used in beauty and personal care products. They also have mild anti-microbial action, combatting dandruff. They are used in a wide range of beauty and personal care products including baby care, home care and skin care.
- **Amine Oxides**
  A group of amphoteric surfactants that contain the fuctional group R3N+O- (sometimes denoted as R3N=O).
- **Taurates**
  Taurates are anionic acylamino alkane surfactants. Taurates are considered as high foaming and

high lather ingredients and are used to increase the viscosity in a surfactant mix. They are essentially used in bath salts and powders and also in shampoo and facial cleansers.

- **Anionic surfactants**
  Anionic surfactants contain anionic functional groups at their head, such as sulfate, sulfonate, phosphate, and carboxylates. They are the most commonly used surfactants.
- **Alkane Sulphonates**
  Alkane sulphonates (C13-17 or C14-18) are anionic surfactants used in detergent products. Commercially, secondary alkane sulphonates are used almost exclusively and can be found in home care products including dishwashing liquids and toilet care products.
- **Alkene Sulphonates**
  Anionic surfactant based on sulphonated n-paraffins with general formula R- SO3M where R is an alkene and M is normally sodium.
- **Alkyl Ether Sulphates**
  Anionic surfactant based on sulphated fatty alcohol and ethylene oxide. General formula is R(CH2OCH2)nOSO3
- **Alkyl Isethionates**
  Amphoteric surfactant with a general formula of CH3(CH2)nCH2COOC2H4SO3Na
- **Alkyl Sulphates**
  Alkyl Sulphates are anionic surfactants used in soaps and detergents. They have the general chemical formula R-OS3Na
- **Linear Alkylbenzene Sulphonate**
  Salts of Alkyl Benzene Sulphonic Acid are surfactants. Their amphiphilic properties are then widely used in detergents : Linear Alkylbenzene Sulphonates are the largest consumed synthetic surfactant in terms of volume.
- **Phosphate Esters (Surfactants)**
  Complex mixtures of mono and di phosphate esters of alkyl alcohol or alkyl ethoxylates with a general formula of ROPO(OH)2
- **Sarcosinates**
  N-acyl sarcosinates and salts are mild biodegradeable anionic surfactants having a general structure R.CO.NCH3.CH2 COONa.
- **Soaps**
  Derived from fats and oils, soaps are surfactants used in conjunction with water for washing and cleaning.Soaps are also found in the formulations of chewing gums.
- **Cationic surfactants**
  Cationic surfactants contain cationic functional groups, most often of the halogen type. A very large proportion of this class corresponds to nitrogen compounds such as fatty amine salts and quaternary ammoniums, with one or several long chain of the alkyl type, often coming from natural fatty acids.
- **Alkylamidopropylamines**
  Alkylamidopropylamines are anionic compounds with wetting and dispersing properties. They are used as a conditioning agent for the hair, with key products being shampoo and conditioners.
- **Dialkyl Quats**
  Dialkyl quats are quaternary ammonium compounds. The quaternary ion is positively charged and has very strong affinity for both organic and inorganic surfaces. This category regroup all alkylquats having two or more long chain alkly groups, normally C12 - C18. They are used as antistatic agents

in conditioners and colourants. Indeed, they are natural wetting agents and absorb moisture from the air.

- **Ester Quats**
  Ester Quats or quaternary ammonium compounds are cationic surfactants widely used in liquid fabric softeners
- **Monoalkyl Quats**
  Monoalkyl quats are quaternary ammonium compounds. The quaternary ion is positively charged and has very strong affinity for both organic and inorganic surfaces. Monoalkyl quats have one long chain alkly groups, normally C12 - C18. They are used as antistatic agents in conditioners and colourants. Indeed, they are natural wetting agents and absorb moisture from the air.
- **Non ionic surfactants**
  Nonionic Surfactants do not ionize in aqueous solution, because their hydrophilic group is of a nondissociable type, such as alcohol, phenol, ether, ester, or amide.
- **Alkanolamides**
  Nonionic surfactant with general formula for monoalkanolamides of RCONHC2H4OH and for dialkanolamides RCON(C2H4OH)2
- **Alkyl Polyglucosides**
  Alkyl Polyglucosides are mild non-ionic surfactants derived from sugar and alcohol. They are composed of a glycosyl moiety (one or more units) linked to the hydroxyl group of a fatty alcohol.
- **Alkoxylated Fatty Alcohols**
  A group of nonionic surfactants based on fatty alcohol condensed with ethylene oxide. They have a general formula of R(CH2OCH2)nOH. Where R is an alkyl group and n can vary from 1 to 100. The physical and solubility properties vary dramatically depending on the alkyl group and the degree of ethoxylation.
- **Ethylene Oxide/Propylene Oxide Block Copolymers**
  Ethylene oxide/propylene oxide block copolymers are non-ionic surfactants mainly found in Liquid/Cream/Gels/Bars Cleansers, Automatic dishwashing tablets, and Mouthwashes/dental rinsers.
- **Other Surfactant Cleansers and Adjuvants**
  This is a general category that includes any surfactant cleansers and adjuvants that have not been specifically named within the surfactant cleansers and adjuvants category. It is not possible to search 'Other Surfactant Cleansers and Adjuvants' to identify which surfactant cleansers and adjuvants are included there.
- **Sweeteners**
  Sweeteners are used to adjust the sweetness of food and drinks. They come in two main types - nutritive and non-nutritive, also known as bulk (as they contribute to the bulk and texture of foods) or high intensity.
- **Sugars and Bulk Sweeteners**
  These are the nutritive or bulk sweeteners, which add bulk and texture to food and drink as well as sweetening capability. The category includes simple sugars (monosaccharides), processed sugars and syrups and sugar alcohols (derived from the hydrogenation of sugar and syrups).
- **Brown Sugar**
  Brown sugar is a sucrose product with a distinctive brown colour due to the presence of molasses (3.5% to 6.5%). It is either unrefined or partially refined soft sugar with some residual molasses content or produced by the addition of molasses to refined white sugar. Key product categories include confectionary, baked goods and alcoholic drinks.

- **Dextrose**
  Dextrose, an isomer of glucose, is a simple and naturally occurring sugar and one of the main two sugars found in honey. It is produced commercially by the enzymatic hydrolysis of starch. Main product categories include soft drinks, baked goods and snack bars.
- **Erythritol**
  A natural sugar alcohol, erythritol has a strong cooling effect so is often used in conjunction with other sweeteners to minimise this effect where it is not wanted. Erythritol is 0.6 times as sweet as sugar and most commonly used in chocolate tablets.
- **Fructose**
  A simple sugar (monosaccharide) found in honey, fruits and vegetables.
- **Glucose/Corn Syrup**
  A naturally occurring, simple sugar (monosaccharide), glucose is produced commercially through enzymatic hydrolysis of starch. As corn syrup, it is most widely used as a thickener or humectant and is also used in conjunction with high intensity sweeteners. Key product categories include confectionary, dairy products and ice cream.
- **Glucose/Fructose Syrup**
  A naturally occurring, simple sugar (monosaccharide), glucose is produced commercially through enzymatic hydrolysis of starch. As fructose syrup, it is most widely used as a replacement for sugar in dairy products, ice cream and biscuits.
- **High Fructose Corn Syrup**
  This is derived from corn syrup that has been enzymatically treated by the enzyme glucose isomerase to increase the fructose content before being mixed with pure corn syrup (100% glucose). This process increases sweetness and HFCS has the same sweetness as sugar. It is mainly used in soft drinks, but also dairy products and jams and preserves.
- **Inositol**
  Naturally occurring in various cereals, nuts, beans and fruit, inositol is a kind of sugar alcohol that is also classified as a B vitamin (often referred to as vitamin B8).
- **Invert Sugar**
  Invert sugar, usually used as syrups, are sucrose-based syrups treated with the glycoside hydrolase enzyme invertase, and/or an acid, which splits each sucrose molecule into one glucose and one fructose molecule. It is sweeter than an equivalent sucrose solution by weight and is also more hygroscopic, so it can be used to make a product that stays moist longer compared to sucrose. This property is particularly valued by bakers and is found mainly in baked goods and confectionary as well as tobacco products.
- **Isomalt**
  This sugar alcohol has only a minimal cooling effect. It has a similar taste profile to sucrose but has half the calories and is kind to teeth. It is 0.5 to 0.6 times as sweet as sugar. Key products categories are confectionary and ice cream.
- **Isomaltulose**
  Isomaltulose is a disaccharide produced by enzymatic arrangement of sucrose. It is non-cariogenic and often replaces sucrose in products, being safer for people with diabetes to consume than sucrose and maltose. Key products include sports drinks, diabetic alternatives and confectionary.
- **Lactitol**
  Derived from the hydrogenation of lactose or milk sugar, this is one of the less sweet of the sugar alcohols, being just 0.3 to 0.4 times as sweet as sugar. It is mainly used in ice cream.

- **Lactose**
  Lactose is the natural sugar found in milk, making up around 2% to 8% of the solids in milk. It is a disaccharide with one unit each of glucose and galactose.
- **Maltose Syrup**
  Maltose syrup is a general term used for syrups containing high maltose levels and is made by enzymic hydrolysis of corn starch.
- **Maltitol**
  Maltitol is a sugar alcohol, or polyol, derived from the hydrogenation of maltose from starch, before being dried into a powdered form. It is one of the sweetest sugar alcohols and is 0.8-0.9 times as sweet as sugar and can therefore be used to directly replace sugar. Maltitol is mainly used in chewing-gum and chocolate confectionery.
- **Maltitol syrup**
  Maltitol syrup formed from the hydrogenation of high-maltose glucose syrup, with the resulting mixture comprised mainly of maltitol. It is one of the sweetest sugar alcohols, or polyols, and is 0.8-0.9 times as sweet as sugar. Maltitol syrup is mainly used in meal replacement products and snack bars.
- **Mannitol (Sweetener)**
  Occurring naturally in certain trees and mushrooms, mannitol is commercially produced through the hydrogenation of fructose or fructose syrups. It is 0.5 times as sweet as sugar. Mannitol is nonhygroscopic, i.e. does not pick up moisture, so it is often used as a dusting powder for chewing gum to prevent the gum from sticking to manufacturing equipment and wrappers, therefore the key product category is gum.
- **Molasses**
  Molasses or treacle is a thick syrup by-product from the processing of sugar cane or sugar beet into sugar. Molasses is commonly used in baking but its main use is in alcoholic drinks.
- **Sorbitol (Sweetener)**
  INCI Name: Sorbitol. CAS Number:50-70-4. IUPAC Name: D-Glucitol. Sorbitol is produced by the catalytic hydrogenation of D-glucose and used as a bulk sweetener. is a sugar alcohol used as a sugar replacement in foods such as reduced sugar bakery, confectionary products and chewing gum.
- **Sucrose**
  Sucrose or table sugar is a disaccharide extracted from sugar cane or sugar beet. It is still the most widely used sweetener in the food and drinks industry, with key product categories including soft drinks, confectionary and baked goods.
- **Treacle**
  Treacle or molasses is a thick syrup by-product from the processing of sugar cane or sugar beet into sugar. It is mostly used for sugar confectionary, more specifically liqourice.
- **Xylitol (Sweetener)**
  INCI Name: Xylitol. CAS Number:87-99-0. It is naturally occurring in the fibres of certain fruit and vegetables, xylitol is mainly extracted from corn. It has the same sweetness as sugar so can be used as a direct replacement. It has a cooling effect, making it popular in mint -flavoured products. It is also said to contribute to the prevention of dental caries. It is therefore found in a wide range of gum products and tooth paste.
- **High Intensity Sweeteners**
  These high-intensity or non-nutritive sweeteners tend to be synthesised chemicals. In contrast to bulk or nutritive sweeteners, they generally have a sweetening power far higher than sugar and are, therefore, used in much smaller quantities.

- **Other Sweeteners**
  This is a general category that includes any sweeteners that have not been specifically named within the sweeteners category. It is not possible to search 'Other Sweeteners' to identify which Sweeteners are included there.
- **Synthetic Polymers, Homopolymers and Copolymers**
  Materials that are synthetic that usually have a high molecular weight having linked repeat units of much smaller molecules.
- **Poly(acrylates)**
  Poly(acrylates) are synthetic polymers made from acrylate monomers. Types of poly(acrylates) are Poly(carboxylates), Poly(acrylamides) and Poly(vinylpyrrolidone).
- **Poly(carboxylates)**
  Poly(carboxylates) are usually water soluble copolymers (especially at acid pH) that contain a significant number of carboxylate groups. They have many uses including thickeners, dispersants, co-builders, anti-re-deposition agents, polyelectrolytes, surface treatments, etc. They are used in beauty and personal care products and in lower extent in laundry detergents.
- **Poly(acrylamides)**
  Poly(acrylamides) are made by polymerizing the vinyl monomer acrylamide. It is used as a synthetic polymer in beauty and personal care products such as nourishes and anti-aging products.
- **Poly(vinylpyrollidones)**
  Vinylpyrollidones/Acetates are synthetic polymers which are soluble in water and in some organic solvants (acetone, toluene, ethanol). They are found in hair care products such as shampoo and hair gels, in sun protection products, in laundry detergent tablets and toothpaste. They are also part of adhesives, of inks and of UV lacquers which are involved in the production process of contact lenses.
- **Other Poly(acrylates)**
  This is a general category that includes any mpoly(acrylate) polymer that has not been specifically named within the poly(acrylate) category. t is not possible to search 'Other Poly(acrylates)' to identify which specific poly(acrylates) ingredients are included.
- **Poly(alkylene Glycols)**
  Polyethylene glycols and polypropylene glycol are polymers composed or repeat subunits of ethylene glycol or ethylene oxide. PEG has a formula $C_{2n}H_{4n+2}O_{n+1}$.
- **PolyQuaterniums**
  Quaternised synthetic polymers are cationic compounds containing a quaternised nitrogen. They are often named polyquaterniums by INCI. This category groups all cationic polymers except acrylamides, ester quats and cellulose derivatives.
- **Other Synthetic Polymers, Homopolymers and Copolymers**
  This is a general category that includes any synthetic polymers that have not been specifically named within the synthetic polymers category. It is not possible to search 'Other Synthetic Polymers' to identify which Synthetic Polymers are included there.
- **Thickeners/Structurants**
  A synthetic polymer of acrylic acid, used as stabiliser and thickening agents. There are a range of polymers with differing properties.
- **Bentonites**
  INCI Name : Bentonite / CAS Number : 1302-78-9 Bentonite is a hydrated magnesium aluminium silicate consisting mostly of montmorillonite. There are different types of bentonite : potassium, sodium, calcium and aluminium. The calcium and sodium ones are the most important for industrial

purposes. Its protein absorbent properties in aqueous solutions are used in detergents. Bentonite is also the E558 food additive, used as an emulsion stabilizing agent.

- **Cross-linked Synthetic Polymers**
  Carbomers are high molecular weight polmers based on acrylic acid. There are a range of materials with awide variety of thickening properties.
- **Hectorites**
  INCI Name : Hectorite / CAS Number : 12173-47-6 Hectorite is a trioctohedral clay mineral of the montmorillonite group composed of hydrated silicate of magnesium and lithium. Its absorbent and viscosity controlling properties are useful in colour cosmetics, deodorant sprays, body, facial and sun care.
- **Kaolins**
  Natural claylike mineral (silicate of aluminum) that is used in cosmetics for its absorbent properties.
- **Magnesium Aluminium Silicate**
  INCI Name: Magnesium aluminosilicate. CAS Number:1327-43-1. IUPAC Name: Silicic acid, aluminium magnesium salt. It is clay like material used as an absorbent, anticaking, opacifying and viscosity controlling agent in bath products, makeup and skin care products.
- **Polyethylene Beads (Thickeners/Structurants)**
  Polyethylene Beads are little plastics ingredients used to boost the viscosity of the formulations.
- **Silica (Thickeners)**
  Silica (silicon dioxide) is a mineral thickener used to boost the viscosity in formulations. It is used in a wide range cosmetics and personal care products including bath products, eye makeup, hair care products, makeup, nail care products, oral hygiene products and skin care products.
- **Other Thickeners/Structurants**
  This is a general category that includes any thickeners/structurants that have not been specifically named within the thinkeners/structurants category. It is not possible to search 'Other Thickeners/Structurants' to identify which thickeners/structurants are included there.
- **Tooth Care**
  Products for the care and protection of teeth. Includes toothpaste, mouthwash and various specialist products such as whitening products.
- **Pyrophosphates**
  Calcium pyrophosphate is used as an abrasive, tetrapotassium pyrophoshate is used for tartar control.
- **Strontium Salts**
  Strontium chloride (CAS Number : 10476-85-4) is used as a desensitising and reducing tooth sensitivity agent. Indeed, it forms a barrier to nerve endings contained in the dentin.
- **Other Tooth Care**
  This is a general category that includes any tooth care that has not been specifically named within the tooth care category. It is not possible to search 'Other Tooth Care' to identify which tooth care is included there.
- **Vitamins and Derivatives**
  Vitamins are organic compounds required in tiny amounts for essential metabolic reactions in living things. They are essential nutrients found naturally in many foods but are also manufactured commercially and used as nutritional additives.
- **Pro-Vitamin B (Panthenol)**
  Panthenol is the alcohol analog of pantothenic acid (vitamin B5), and is thus a provitamin of B5. It is

used mainly as a humectant, emollient and moisturiser in cosmetics, primarily hair care products and ointments.

- **Vitamin A and derivatives**
  Vitamin A and derivatives is a group of nutritionally unsaturated hydrocarbons, which include retinol, retinal, retinoic acid, retinyl palmitate and several provitamin A carotenoids, among which beta-carotene is the most important. Vitamin A or retinol is a fat-soluble vitamin that is most widely used in the food industry. In addition to applications as a vitamin, beta-carotene also finds use as a food colouring. Retinyl palmitate is a pre-formed version of vitamin A used most widely as a vitamin supplement but also commonly added to reduced-fat milk.
- **Vitamin B Group**
  The B vitamins are eight water-soluble vitamins that play important roles in cell metabolism. The eight recognised B vitamins are thiamine (B1), riboflavin (B2), niacin (B3 or vitamin P or PP), pantothenic acid (B5), pyridoxine (B6), biotin (B7 or vitamin H), folic acid (B9 or vitamin M) and cyanocobalamine (B12). They are used to fortify foods or dietary supplements so as to prevent harmful deficiencies.
- **Vitamin C**
  Vitamin C or L-ascorbate is a water-soluble vitamin. It is used not only for fortification purposes in food and drink but can also act as a preservative or acidity regulator.
- **Vitamin D**
  Vitamin D is a fat-soluble vitamin whose main use in food and drinks is for fortification purposes or to help the absorption of calcium through use in calcium-fortified products.
- **Vitamin E**
  Vitamin E or tocopherols are fat-soluble vitamins. They are used not only for fortification purposes but are also popular as antioxidant ingredients.
- **Vitamin K**
  Vitamin K is a fat-soluble vitamin needed most to promote blood-clotting in the body. Fortification with vitamin K is mostly focused on dietetic foods and baby foods.
- **Other Vitamins and Derivatives**
  This is a general category that includes any vitamins and derivatives that have not been specifically named within the vitamins and derivatives category. It is not possible to search 'Other Vitamins and Derivatives' to identify which vitamins and derivatives are included there.
- **Water Softeners/Chelators**
  Substance used to reduce hardness of water by removing calcium, magnesium and other metal ions. The resulting soft water is more compatible with soap and a better formation of suds. Water softeners/Chelators condition the water for the detergents to be active and stabilise bleaching systems.
- **Carboxylates**
  Carboxylates are salts of carboxylic acid. They are weak complexing agents.
- **Citrates (Chelator)**
  Citrates are salts of citric acid. Citric acid acts as a mild chelating agent and is frequently used in laundry detergents together with other complexing agents. Diammonium Citrate (CAS:3012-65-5) and Potassium Citrate (CAS:866-84-2) salts help preserve cosmetics and personal care products by chelating (complexing) metals.
- **Ethylenediamine Tetraacetic Acid and Salts**
  Better known as EDTA, Ethylenediamine tetraacetic acid is formed of four carboxylic acid groups

attached to two nitrogen atoms. EDTA is powerful chelating agent and can sequester six metal ions or minerals.

- **Phosphates (Water softeners/chelators)**
  Phosphates are salts of phosphoric that can act as chelators to form complexes with metal ions which could affect stability and / or appearance of cosmetic products. Examples of phosphates are Trisodium Phosphate (CAS:7601-54-9), Tetrapotassium Pyrophosphate (CAS:7320-34-5), Tetrasodium Pyrophosphate (CAS:7722-88-5), etc.
- **Phosphonates**
  Phosphonates are organic compounds containing C-PO(OH)2 or C-PO(OR)2 groups (where R=alkyl, aryl). Phosphonates bind tightly to di- and trivalent metal ions and act as stabilisers for bleaching agents. Phosphonates also scale formation on the suface of teeth.
- **Sodium Triphosphate**
  Sodium triphosphate is the sodium salt of triphosphoric acid produced industrially by heating a mixture of disodium phosphate and monosodium phosphate. It is used mainly in detergents as a chelating agent and is found predominantly in laundry care but also toothpastes.
- **Zeolite**
  Zeolites are aluminosilicate minerals. Their microporous structure can accommodate a wide variety of cations, such as sodium, potassium, calcium and magnesium. Zeolites are then used as water softeners/chelators and in particular as ion-exchange beds in domestic and commercial water purification and powder detergents. Zeolites may also be used as abrasive agents.
- **Other Water Softeners/ Chelators**
  This is a general category that includes any water softeners/chelators that have not been specifically named within the water softeners/chelators category. It is not possible to search 'Other Water Softeners/Chelators' to identify which water softeners/chelators are included there.
- **Miscellaneous Ingredients**
  A group of ingredients that do not fit into any of the other ingredient categories in the Ingredients System.
- **Caffeine**
  Caffeine added to FMCG products, mainly beverages, to act as a stimulant.
- **Chewing Gum Base**
  Chewing gum base is the non-digestible, water-insoluble, non-nutritive masticatory substance used to carry flavours and sweeteners in chewing gum. It is made up of raw materials including elastomers, resins, plasticisers, fillers and antioxidants. Key product categories include chewing gum and bubble gum.
- **Malt Extract**
  Malt extract is obtained by water extraction of germinated barley and other cereal grains. Malt syrup is included in the term malt extract.
- **Soy Extract**
  Soy extract includes ingredients described as soy extract, hulled soya beans and whole soya beans. Key product categories include soy milk and speciality drinks.
- **Taurine**
  Taurine is an organic acid that is found naturally occurring in animal tissues and is involved in the function of the central nervous system and the heart. It is produced synthetically from isethionic acid and is used widely in energy drinks and infant formula.
- **Other Miscellaneous Ingredients**
  This is a general category that includes any miscellaneous ingredient that has not been specifically

named within the Miscellaneous ingredients category. It is not possible to search 'Other Miscellaneous Ingredients' to identify which specific miscellaneous ingredients are included.

- **Commodities**
  The following commodities are included in this category: aqua/water, cereals, egg, fish, fruit, fruit juice, herbs, honey, meat, potato products, vegetables, vinegar.
- **Adjunct**
  Adjuncts are unmalted grains (e.g. corn, rice, rye, oats, barley and wheat) or grain products that are used in brewing beer. In effect, an adjunct is a non-malt source of fermentable sugars and it supplements the main mash ingredient, such as malted barley.
- **Cereals**
  Any edible grain, including rice, millet, corn and wheat.
- **Coconut Water**
  Coconut water is the clear liquid derived from coconuts
- **Egg**
  Egg refers to whole egg in all of its forms - whether it be fresh, liquid, dried or frozen. It is used mostly in bakery products and chilled and frozen processed foods. It does not include egg white or egg yolk, which are defined separately.
- **Fish**
  Aggregation of usage of all types of fish which are added directly to products in the eight industries tracked by Euromonitor's Ingredients system.
- **Fruit**
  Fruit refers to any generally recognised fruit added as an ingredient in a packaged food, beverage or pet food product. This excludes fresh fruit.
- **Fruit Juice**
  Fruit juice is the product of mechanically squeezing a fruit. As an ingredient it is mostly used in soft drinks, but also in dairy products, ice cream, confectionery and canned/preserved food. It includes juice in all forms: 100% fresh, not from concentrate and concentrate.
- **Herbs/Spices**
  This is the amalgamation of all types of herbs and spices, including pepper and chilli powder in all forms – dried, powdered, concentrated extracts or fresh. Salt is tracked separately as sodium chloride. Please note that it does not include fresh herbs sold as a fresh food, only those added to packaged products as an ingredient.
- **Honey**
  Honey is a sweet viscous substance which has traditionally been used as a sweet spread but is increasingly being used to sweeten food and beverage products
- **Hops**
  Hops are plant derivatives which are used for their flavouring and antibacterial properties in brewing. This includes hop flowers and processed hops.
- **Malt**
  Malt refers to any cereal grains which have undergone the process of malting.
- **Meat**
  Aggregation of usage of all types of meat which are added directly to products in the eight industries tracked by Euromonitor's Ingredients system.
- **Nuts**
  Nuts are either fruits or seeds found as large, edible kernels within a hard shell. This is an

amalgamation of all types of nuts used in culinary applications and tobacco products. Common examples include hazelnuts, almonds, walnuts and peanuts.

- **Potato Products**
  Potato products includes potato added as an ingredient in a packaged food product, but excludes fresh potato. Potato products refers to potato in any form, including fresh, dehydrated (powder) or frozen. The major use of potato is for frozen processed food.
- **Tea**
  Aggregation of usage of all types of tea which are added directly to products in the eight industries tracked by Euromonitor's Ingredients system.
- **Vegetables**
  Vegetables refers to any generally recognised vegetable added as an ingredient in a packaged food, beverage or pet food product. This excludes fresh vegetables.
- **Vinegar**
  Vinegar is a solution of acetic acid, produced from the fermentation of ethanol. All types of vinegar are included, for example malt vinegar, balsamic vinegar, wine vinegar as well as both dried (vinegar powder) and liquid forms. It is most commonly used in dressings, condiments and sauces, as well as chilled processed food, noodles and bakery. Please note 'Acetic Acid' is included as a separate ingredient within the acidulants category.
- **Other Commodities**
  This is a general category that includes any commodities that have not been specifically named within the commodities category. It is not possible to search 'Other Commodities' to identify which commodities are included there.

Specific chemical ingredients

- **Alumina**
  INCI Name: Alumina. CAS Number:1344-28-1. IUPAC Name: Aluminium oxide (Al2O3). It is an inorganic compound consisting of oxygen and aluminium that occurs naturally as corundum. In cosmetic and personal care products, it is used in cleansing products, lipsticks, blushers and other products.
- **Calcium Carbonate**
  INCI name: Calcium carbonate. CAS number:471-34-1. IUPAC name: calcium carbonate (CaCO3). It is an inorganic salt of carbonic acid in the form of white powder occurring in nature in various forms including calcite, chalk, limestone and marble. It is an oral care opacifying bulking buffering abrasive. Calcium carbonate (food grade) is also used in package food such as biscuits, bread or still wine and is also used in pet food.
- **Crushed Seeds**
  Ground seeds, generally from fruit such as grapefruit and apricot. Mainly used as natural care exfoliant in personal care applications such as facial scrubs. Crushed seeds are also used in package food.
- **Dicalcium Phosphate Dihydrate**
  INCI Name: Dicalcium phosphate dehydrate. CAS number:7757-93-9/7789-77-7. IUPAC Name: Calcium hydrogenorthophosphate. It is a white, odorless, tasteless powder used in cosmetic as abrasive, opacifying and oral care agents.
- **Mica**
  INCI Name: Mica. CAS Number:12001-26-2. IUPAC Name: Mica-group minerals (CI 77019). It is s a

naturally occurring group of silicate minerals. In cosmetics and personal care products, it is used as opacifying agent in the formulation of a wide variety of product types, including makeup, nail products and skin care products.

- **Polyethylene Beads (Abrasives/Inorganics)**
  Small beads of polyethylene (a polymer made of repeating ethylene units). It is used for a variety of purposes in cosmetics and personal care products such as cleansers and skin care products as well as in many makeup products such as eyeliners, mascara, eye shadows, eyebrow pencils, lipstick, blushers, face powders and foundations.
- **Pumice**
  INCI Name: Pumice. CAS Number:1332-09-8. It is a substance of volcanic origin consisting chiefly of complex silicates of aluminium and alkali metals. It is used as an abrasive, bulking and viscosity controlling agent in cosmetic soaps, shower and body gels and scrubs.
- **Silica (Abrasives)**
  INCI Name: Silica. CAS Number:7631-86-9/112945-52-5/60676-86-0. IUPAC Name: Silicon dioxide. A mineral found abundantly in sandstone, clay, and granite. It is the principal ingredient of glass. It is used in a wide range of cosmetics and personal care products including bath products, eye makeup, hair care products, makeup, nail care products, oral hygiene products and skin care products. It can act as an abrasive, absorbent, anticaking, bulking, opacifying or viscosity controlling agent in cosmetic formulations.
- **Talc**
  INCI Name: Talc. CAS Number:14807-96-6. IUPAC Name: Talc (Mg3H2(SiO3)4) (CI 77718).It is a powdered hydrous magnesium silicate sometimes containing a small amount of aluminium silicate. It is a naturally occurring whitish-grey mineral. In cosmetics and personal care products, it is used in the formulation of makeup, baby powder, body powder and deodorizing powder. It has abrasive, absorbent, opacifying and skin protective properties.
- **Acetic Acid**
  INCI Name: Acetic acid. CAS Number:64-19-7. IUPAC Name: Acetic acid serves primarily as a pickling agent in foods. It is best known for giving vinegar its sour taste and distinctive aroma. Vinegar is essentially a solution of 5-10% acetic acid in water. Key product categories include laundry detergents, dried processed food and sauces, dressings and condiments. In cosmetics and personal care products, acetic acid is used in the formulation of hair conditioners, shampoos, hair rinses, wave sets and other hair care products. It is also used in mouthwashes and breath fresheners.
- **Citric Acid**
  INCI Name: Citric acid. CAS Number:77-92-9/5949-29-1. IUPAC Name: 2-Hydroxy-1,2,3-propanetricarboxylic acid. One of the most widely used acidulants, citric acid is a weak organic acid found in citrus fruits. It can enhance flavour and help inhibit microbial growth and spoilage through adjusting pH levels. It also has antioxidant properties to help prevent rancidity. Key product categories include soft drinks (non-cola carbonates) and packaged food (canned preserved food and ready meals). It is also used in all types of cosmetic products including, baby products, make-up, lipstick, bath products, soaps and detergents, hair dyes and colors, and hair and skin care products.
- **Etidronic Acid**
  INCI Name: Etidronic acid. CAS Number:2809-21-4. IUPAC Name: Phosphonic acid, (1-hydroxyethylidene)bis-. Etidronic acid is a bisphosphonate and chelating agent used as a water softener and peroxide stabiliser and dye-fixing agent in detergents. It can be found in cosmetic and

personal care products, such as body washes, hair color and bleaching products, bar soaps, tooth whitening products, polish removers, and body sprays.

- **Fumaric Acid**
  INCI Name: Fumaric acid. CAS Number:110-17-8. IUPAC Name: Fumaric acid. It is found naturally in many plants but is generally produced commercially from maleic acid. It has a fruit-like taste and is most often used to complement the acidity of other acids. In cosmetics it can be used as buffering agent in bath products, hair and skin care products, and makeup.
- **Lactic Acid**
  INCI Name: Lactic acid. CAS Number:50-21-5. IUPAC Name: Propanoic acid, 2-hydroxy-. Lactic acid or milk acid performs various functions in food, including flavouring, pH regulation and preservation. It can be fermented from lactose but, on a commercial level, it is generally derived from the fermentation of non-dairy carbohydrates. The majority of lactic acid is used in soy-based sauces. In cosmetics and personal care products, these ingredients are used in the formulation of moisturizers, cleansing products, and other skin care products, as well as in makeup, shampoos, hair dyes and colors and other hair care products. The main functions in cosmetics are buffering, humectant and skin conditioning.
- **Malic Acid**
  INCI Name: Malic acid. CAS Number:97-67-6. IUPAC Name: Butenedioic acid, hydroxy-, (2S)-. Malic acid occurs naturally in fruits, such as apples, peaches, cherries, quinces and melons. On a commercial level, it is generally manufactured from maleic anhydride. It is used to provide acidity in food and drinks and can also be used to mask the bitter after-taste associated with some artificial sweeteners. A large proportion of malic acid is used in soft drinks, with the remainder used in boiled sweets and sweet and savoury snacks. It can be also found in a wide range of cosmetics and personal care products primarily to control the pH of cosmetic products (buffering).
- **Phosphoric Acid**
  INCI Name: Phosphoric acid. CAS Number:7664-38-2. IUPAC Name: Orthophosphoric acid. It is used to add a tart, acidic flavour to products, phosphoric acid is the only inorganic acid to be widely used in food and drink. It is perhaps best known for its role in acidifying cola beverages. Its phosphate salts have a variety of uses, including a role in maintaining colour and texture in meats, as emulsifiers and stabilisers in dairy products and as raising agents in baked goods. It is also used in the formulation of a wide variety of cosmetic products, including bath products, cleansing products, fragrances, hair care products, hair dyes and colors, makeup, mouthwashes, nail products and skin care products to control the pH (buffering agent)
- **Tartaric Acid**
  INCI Name: Tartaric acid. CAS Number:133-37-9/147-71-7/87-69-4. IUPAC Name: 2,3-Dihydroxybutanedioic acid. It Occurs naturally in various plants, including grapes, bananas and tamarinds, tartaric acid is also a by-product of wine production. As an acidulant, it can be used to balance naturally occurring malic and tartaric acid levels in wine and is popular in grape-flavoured beverages as it blends better with grape flavours than with citrus. In cosmetics and personal care products, it is used in soaps, skin care products, suntan products and hair care products as buffering and masking agents.
- **Piroctone Olamine**
  INCI Name: Piroctone Olamine. CAS Number:68890-66-4. IUPAC Name: 1-Hydroxy-4-methyl-6-(2,4,4-trimethylpentyl)pyridin-2(1H)-one, compound with 2-aminoethanol (1:1). It is used as an antidandruff agent in shampoos. It also has a wide range of antibacterial and antifungal action and it has been used in soap, cream to eliminate body offensive smell, or to replace preservative.

- **Pyrithiones**
  Zinc pyrithione (CAS Number:13463-41-7) is an antifungal ingredient mainly used in Leave-on hair care products. It inhibits the growth of fungi, gram positive and gram negative bacteria.
- **Tea Tree Oil**
  Tea tree oil is an essential oil which has antiseptic, antifungal and antibaterial properties. It is used in hair care and skin care products such as anti-acne cleansers.
- **Nisin**
  INCI Name: NISIN. CAS Number:1414-45-5. Nisin is a polypeptide produced by the fermentation of Lactococcus lactis. It is an antibacterial agent primarily used in processed cheese production to extend shelf-life. Other applications include other pasteurised dairy and egg products, canned vegetables, meat products, sauces and dressings and beer. It is also used in cosmetics and beauty products.
- **Triclosan**
  INCI Name: Triclosan. CAS Number:3380-34-5. IUPAC Name:5-Chloro-2-(2,4-dichlorophenoxy) phenol. It is an anti-bacterial (microbicide) ingredient that can be found in a wide variety of home care products such as detergents and dish soaps, personal care products such as anti-acne cleansers, deodorants, hand soaps, cosmetics, lotions, creams, toothpastes, mouthwashes, and first aid creams.
- **Zinc Phenolsulphonate**
  INCI Name: Zinc Phenolsulfonate. CAS Number:127-82-2. IUPAC Name: Zinc bis(4-hydroxybenzenesulphonate). In cosmetics and personal-care products, Zinc Phenolsulfonate is used in the formulation of underarm deodorants, aftershave lotions, skin fresheners, body and foot powders and astringent creams and lotions. It prevents or inhibits the growth and reproduction of microorganisms. When used in the formulation of skin-care products, it induces a tightening or tingling sensation of the skin.
- **Tetraacetyl Ethylenedimanine**
  INCI Name: TAED. CAS Number:10543-57-4. IUPAC Name: N,N'-Ethylenebis[N-acetylacetamide]. It has a formula (CH3C(O))2NCH2CH2N(C(O)CH3)2. It is an important component of laundry detergents and bleaches, where it is used as an activator for "active oxygen" bleaching agents such as sodium perborate. Peroxide released by the bleaching agent reacts with TAED to release peracetic acid. It is only found in home care products, including laundry detergents, dishwashing and toilet care products.
- **Hydrogen Peroxide**
  INCI name: Hydrogen peroxide. CAS number:7722-84-1. IUPAC Name: Hydrogen peroxide (H2O2). It is a clear, colorless liquid which is added to cosmetics and personal care products due to its strong oxidising and antiseptic properties. It acts as a bleaching agent in laundry care, toilet care and home care products. In cosmetics and personal care applications is used in a variety of hair care products such as hair dyes, hair bleaches, conditioners, shampoos and rinses. It is also used in tooth whitening products.
- **Sodium Hypochlorite (Bleaching Agents)**
  INCI Name: Sodium hypochlorite. CAS Number:7681-52-9. IUPAC Name: Hypochlorous Acid, Sodium Salt. It is used as an oxidising or as an antimicrobial agent. It is the main active material in household bleach.
- **Sodium Sulphite (Bleaching Agents)**
  INCI Name: Sodium Sulfite. CAS Number:7757-83-7. Sodium Sulphite is a soluble, white and non-stable compound of sodium which reacts with oxygen to form sodium sulphate. It is used as a food preservative to prevent spoilage and discoloration. In cosmetics and personal care products, these

ingredients are used in the formulation of permanent waves, hair bleaches, hair dyes, colors and tints, and in some bath and skin care products as a reducing agent.

- **Beta-Carotene**
  Beta-carotene is an orange photosynthetic pigment important for photosynthesis and responsible for the orange colour of the carrot and many other fruits and vegetables. It is the carotenoid form of vitamin A and can be used in foods as a functional antioxidant food ingredient as well as a colouring. In cosmetics and personal care products, Beta-Carotene is used in the formulation of aftershave lotions, bath products, cleansing products, makeup, hair conditioners, shampoos, skin care products and suntan products to impart orange color and enhance the appearance of dry or damaged skin by reducing flaking and restoring suppleness.
- **Lutein**
  Lutein is a naturally occurring xanthophyll carotenoid found in green leafy vegetables such as spinach and kale. Used mainly as a natural orange-red colouring, lutein has also been found to offer health benefits for the eyes and is finding increasing favour as a functional food ingredient. It is used in bottled water. It is used in skin conditioning products.
- **Lycopene**
  INCI Name: Lycopene. CAS Number:502-65-8. IUPAC Name: (all-E)-2,6,10,14,19,23,27,31-Octamethyl-2,6,8,10,14,16,18,20,22,24,26,30-Dotriaconatridecaene. It is a bright red carotenoid pigment, found in tomatoes and other red fruits. As well as being used as a colouring, lycopene has been found to offer various health benefits and is, therefore, starting to find use as a functional antioxidant food ingredient. It is used widely in fruit/vegetable juice. In cosmetic is used as antioxidant and cosmetic colorant.
- **Titanium Dioxide (Colours)**
  INCI Name: Titanium dioxide. CAS Number:13463-67-7. It is an extremely opaque white mineral with UV resistant and absorbent properties used as an opacifying agent, colorant and sunscreen agent in food and cosmetic products. It protects skin from the sun's harmful ultraviolet radiation. It is also used as a colorant to make cosmetics and personal care products that are applied to the skin (including the eye area), nails, and lips white in color. It helps to increase the opaqueness, and reduce the transparency of product formulas. Titanium dioxide also absorbs, reflects, or scatters light (including ultraviolet radiation from the sun). As a pigment, titanium dioxide is an FDA-approved food additive classified as the food colouring agent E171 that is used to enhance the white color of certain foods, such as dairy products and candy, and to add brightness to toothpaste and some medications. It is also used as a flavor enhancer in a variety of non-white foods, including dried vegetables, nuts, seeds, soups, and mustard, as well as beer and wine.
- **Cyclomethicone**
  INCI Name: Cyclomethicone. CAS Number:69430-24-6/556-67-2/541-02-6/540-97-6. Cyclomethicone is a mixture of low molecular weight volatile cyclic siloxanes, the principal ingredients of which are octamethylcyclotetrasiloxane (D4), decamethylcyclopentasiloxane (D5) and dodecamethylcyclohexasiloxane (D6), in varying proportions. It leaves a silky-smooth feel when sprayed on the skin and improves wet combing. As it is volatile, Cyclomethicone is also used to help other conditioning agents to disperse. It is essentially used in deodorants.
- **Dimethicones (Emollients)**
  INCI Name: Dimethicon. CAS Number:63148-62-9. IUPAC Name: Dimethicone. It is also known as polydimethylsiloxan. It is a silicon-based polymer with emollient properties. An incredibly popular ingredient in products used to combat dry skin and prevent its return such as moisturizers. It is also used in 2-In-1 shampoo products and hair conditioners to make the hair strands silkier.

- **Petrolatum**
  INCI Name: Petrolatum. CAS Number:8009-03-8. Petrolatum is a complex combination of hydrocarbons obtained as a semi-solid from dewaxing paraffinic residual oil. It consists predominantly of saturated crystalline and liquid hydrocarbons having carbon numbers predominantly greater than C25. It is a colorless or pale yellow semisolid insoluble in water. In cosmetics and personal care products, Petrolatum is used as an emollient in the formulation of a variety of product types, including bath products, cleansing products, skin care products, makeup, shampoos, permanent waves, hair conditioners, shaving products, and suntan products. It temporarily protects injured or exposed skin from harmful or annoying stimuli and may provide relief to such skin. It also slows the loss of water from the skin by forming a barrier on the skin's surface. Petrolatum enhances the appearance and feel of hair, by increasing hair body, suppleness, or sheen, or by improving the texture of hair that has been damaged physically or by chemical treatment. Petrolatum is also known as the E905b food additive used as antifoam and glazing agent.
- **Lecithin**
  Lecithin is a phospholipid that can be isolated from egg yolk or soya beans (from which it is mechanically or chemically extracted using hexane). It serves as a natural emulsifier or lubricant in foods and is most widely used in margarine, dressings, chocolate confectionery, powdered foods and baked goods.
- **Monosodium Glutamate**
  Monosodium glutamate or MSG is a sodium salt of glutamic acid. It stimulates the taste known as 'umami', one of five basic tastes, which can also be described as 'savoury' or 'meaty'. Sodum glutamate is also used in beauty and personal care products where it can act as a fragrance ingredient or as skin and hair conditioning agent.
- **Butylene Glycol**
  INCI Name: BUtylene GLycol. CAS Number:107-88-0. IUPAC Name:Butane-1,3-diol (C4H10O2). It is a common humectant and solubiliser used in cosmetic and food preparations. It is used in the formulation of hair and bath products, eye and facial makeup, fragrances, personal cleanliness products, and shaving and skin care products.
- **Glycerol (Humectant)**
  INCI Name: Glycerine. CAS Number:56-81-5. IUPAC Name: Glycerol. It is a chemical compound with very strong hygroscopic properties. It is used in food and non-food products as a humectant but also as a moisturiser, sweetener or preservative and is used in the production of certain emulsifiers. It is used in some cosmetic and personal care products such as soaps, toothpaste, shaving cream, and skin and hair care products.
- **Sorbitol (Humectant)**
  INCI Name: Sorbitol. CAS Number:50-70-4. IUPAC Name: D-Glucitol. It is a humectant alcohol that helps retain moisture which is commonly used in cosmetics and toiletries and oral care including aftershave lotions, baby shampoos and hair grooming aids.
- **Mannitol (Humectant)**
  INCI Name: Manitol. CAS Number:69-65-8. IUPAC Name: D-Mannitol. It is a sugar alcohol primarily used in cosmetics and beauty products as a humectant. It is also used in food application such as sweetener for people with diabetes, in chewing gums and chewy sweets.
- **Propylene glycol (Humectant)**
  INCI Name: Propylene Glycol. CAS Number:57-55-6. IUPAC Name: Propane-1,2-diol. Propylene glycol is used in numerous food items such as beer, packaged baked goods, frozen dairy products like ice cream, margarine, coffee, nuts and nut products, and soda. It attracts water and functions as

a humectant; found in moisturizers to enhance the appearance of skin by reducing flaking and restoring suppleness. A large proportion is used in tobacco, with other products in laundry care and surface care.

- **Urea**
  INCI Name: Urea. CAS Number:57-13-6. Urea, sometimes referred to as carbamide, is synthesized in the body of many organisms as part of the urea cycle, either from the oxidation of amino acids or from ammonia. Urea is a humectant. Its amines groups are hydrophilic and can form hydrogen bonds with molecules of water. In cosmetics and personal care products, Urea can be found in many product types including skin care, coloring and non-coloring hair care products, and eye makeup. Urea is also used as an additive in the cigarette industry.
- **Xylitol (Humectant)**
  INCI Name: Xylitol. CAS Number:87-99-0. It is a sugar alcohol used as humectant in cosmetic formulations.
- **Permethrin**
  Common synthetic insecticide belonging to the pyrethroid group. It functions as a neurotoxin affecting the neuron membranes. 3-phenoxybenzyl(1RS)-cis,trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate
- **Nitrocellulose**
  Cellulose nitrate, a highly flammable compound formed by reacting cellulose with nitric acid. Can be used in nail varnish.
- **Calcium**
  Calcium is one of the most important minerals found in food. It helps to build strong teeth and bones, regulates muscle contraction (including the heartbeat) and makes sure that blood clots normally. It can be used as a fortifying ingredient in products, including beverages, baby food and dairy products.
- **Iron**
  Iron is an important mineral found naturally in foods. It fulfils a number of important roles in the body, including assisting in the production of red blood cells, which carry oxygen around the body. It can be used as a fortifying ingredient in foods, including breakfast cereals and baby food.
- **Magnesium**
  Magnesium is a mineral found naturally in foods. It serves several important functions in the body, including the regulation of blood pressure, energy metabolism and nerve conduction. Food sources include green vegetables, nuts and whole grains, and magnesium can be used as a fortifying ingredient in baby foods, energy and nutrition bars and meal replacement products.
- **Zinc**
  Zinc is an essential element that is naturally present in some foods, including seafood, meat, beans and nuts. It plays an important role in cellular metabolism, immune function and DNA and protein synthesis. It is added as a fortifying ingredient by the food industry, including to meal replacement products, snack bars and baby food. All forms of zinc are covered here, including zinc sulphate.
- **Ammonia**
  INCI Name: Ammonia. CAS Number:7664-41-7. It is an alkaline material which can be used to increase the pH of formulations. It is used in used in a large variety of products including hair dyes, hair bleaching products, shaving cream and hair grooming products.
- **Magnesium Sulphate**
  INCI Name: Magnesium sulphate. CAS Number:7487-88-9. Magnesium Sulfate ($MgSO4$), also called epsom salt, is a white crystalline compound. In cosmetics and personal care products, Magnesium

Sulfate is used in the formulation of a wide variety of product types, including bath products, skin fresheners and cleansers, shampoos, hair products, suntan products, makeup and skin care products.

- **Potassium Chloride**
  INCI Name: Potassium Chloride. CAS Number:7447-40-7. It is an inorganic salt that used in cosmetics and personal care products in the formulation of bath products, cleansing products, eye makeup, skin care products, personal cleanliness products and hair care products.
- **Sodium Acetate**
  INCI Name: Sodium Acetate. CAS Number:127-09-3. (CH3COONa). Sodium Acetate is the sodium salt of acetic acid. It is found naturally occurring in fruit, but is produced commercially from sugar, molasses, alcohol or acetaldehyde. Also known as E262, it is used to control pH and to impart a salty flavour. Most common uses included bakery products, snacks and cheese.
- **Sodium Chloride**
  INCI Name: Sodium Chloride. CAS Number:7647-14-5. Sodium Chloride, or table salt, is a white crystalline solid. In cosmetics and personal care products, Sodium Chloride is used in the formulation of oral hygiene products, shampoos, fragrance, skin, hair, nail, cleansing, suntan, makeup and bath products. Sodium Chloride polishes the teeth, reduces oral odor, or otherwise cleanses or deodorizes the teeth and mouth. Sodium Chloride also imparts a flavor or a taste to a product. It can also increase the thickness of the aqueous (water) portion of cosmetics and personal care products.
- **Sodium Sulphate**
  INCI Name: Sodium Sulfate. CAS Number:7757-82-6. Sodium Sulphate is the sodium salt of sulfuric acid also known as Glaubers salt when hydrated (CAS:7727-73-3). It is a cheap, soluble, and very stable source of sodium. It is used essentially in powder detergents. In cosmetics and personal care products, Sodium Sulfate is used in the formulation of cleansers, bath soaps and detergents, and skin care preparations. Sodium Sulfate increases the thickness of the aqueous (water) portion of the finished product.
- **Bronopol**
  Bronopol is the trade name for 2-bromo-2nitropropane-1,3-diol a highly effective low toxicity preservative. It is used in body care and facial care products.
- **Butylated Hydroxylanisole (BHA)**
  Butylated hydroxyanisole or BHA is a mixture of two organic compounds. It is a waxy solid that can be used as an antioxidant in foods, with particular applications in fats and oils, baked goods, pet foods and vitamins.
- **Butylated Hydroxyltoluene (BHT)**
  Butylated hydroxytoluene (BHT) is a fat-soluble organic compound that can be used as an antioxidant in foods. It is used primarily in meat, fish and bone meals, tallow, fats and oils and cereals.
- **Calcium Propionate**
  Calcium propionate is a calcium salt of propionic acid and inhibits the growth of mould. It is used as a preservative in bread and other bakery products.
- **Formaldehyde**
  Formaldehyde is the simplest aldehyde H2CO. It is a highly effective preservative which has been used for many years. More recently concerns on carcinogenicity and toxicity have resulted in a sharp decrease in it''s use in formulations. It is used in laundry detergents and colour cosmetics.

- **Hydantoin**
  A range of preservatives based on hydantoin (also known as glycolurea) or imidazolidine-2,4-dione. Hydantoin preservatives include DMDM hydantoin,DEDM hydantoin and mixtures with other preservatives. It is used mainly in beauty and personal care in products such as shampoo and body wash/shower gel.
- **Phenoxyethanol**
  2-Phenoxy-1-ethanol often used in cationic situations and mainly in Personal Care products.
- **Potassium Sorbate**
  A mild action preservative with the chemical formula C6H5O2K. It is used mostly in baked goods and other packaged foods, but also in alcoholic drinks, pet care and baby care products.
- **Propyl Gallate**
  Propyl gallate, an ester formed by the condensation of gallic acid and propanol, is an antioxidant that is used in fat- and oil-based foods.
- **Sulphur Dioxide**
  Sulphur dioxide is a chemical compound used as an antimicrobial preservative in certain food and drinks, including alcoholic drinks and dried fruit.
- **Tertiary Butyl Hydroquinone (TBHQ)**
  Tertiary butyl hydroquinone (TBHQ) is an organic compound that can be used as an antioxidant in unsaturated vegetable oils and many edible animal fats.
- **Dimethyl Ether**
  Commonly known as DME, it is a colourless gas with a characteristic "ether" odour. It is often used in combination with propane. Formula C2H6O
- **Ammonium Bicarbonate**
  Ammonium bicarbonate is a chemical raising agent primarily used in flat baked goods, particularly biscuits
- **Ammonium Carbonate**
  Ammonium carbonate is a chemical raising agent primarily used in smokeless tobacco
- **Disodium Diphosphate**
  Disodium diphosphate is a chemical raising agent, primarily used in baked goods
- **Monocalcium Phosphate**
  Monocalcium phosphate is a fast acting chemical raising agent, primarily used in baked goods
- **Sodium Bicarbonate**
  Sodium bicarbonate is a multi-function chemical, used as a raising agent in baked goods, but used widely in a number of products across food and beverage, beauty and personal care and home care. Note that volume consumption of sodium carbonate as part of baking powder will be recorded under baking powder
- **Sodium Metabisulphite**
  INCI Name : Sodium Metabisulfite / CAS Number : 7681-57-4 Sodium Metabisulphite is a reducing agent. It releases sulphur dioxide in the presence of water. It is also known as the E223 food additive used as a preservative and antioxidant. It can be found in dog food, biscuits, snacks, table sauces, canned/processed food and dried processed food.
- **Sodium Sulphite (Reducing Agents)**
  INCI Name : Sodium Sulfite / CAS Number : 7757-83-7 Sodium Sulphite is a soluble compound of sodium. It is a white, non-stable powder, which reacts with oxygen to form sodium sulphate. It is used as a food preservative to prevent spoilage and discoloration. It can also be found in hair care products as a reducing agent.

- **Pyrollidone Carboxylic Acid (PCA)**
  A naturally occuring compound found in human skin. Helps keep skin soft and wrinkle free, it works by helping to keep the skin hydrated at a cellular level.
- **Arbutin**
  Hydroxymethyl-6-(4-hydroxyphenoxy)oxane-3,4,5-triol. It inhibits the formation of melanin and is used as a skin lightening agent.
- **Ascorbic acid and derivatives**
  Include ascorbic acid and all derivatives of vitamin C. They inhibit the production of melanin and have antioxidant properties, protecting the skin from UV damage. It is used as a skin lightener in skin care products including moisturisers.
- **Kojic Acids**
  C6H6O4, 5-hydroxy -2-(hydroxy methyl)-4-pyrone is a chelating agent and an inhibitor to the production of melanin.
- **Niacinamide**
  Niacinamide is a water soluble compound belonging to the B vitamin group, also known as vitamin B3. It is used in skin care products as an anti-aging ingredient.
- **Dihydroxy Acetone**
  1,3-dihydroxy-2-propanone. A carbohydrate derived from sugar which is used in sunless tan products.
- **Erythrulose**
  Erythrulose is a tetrose carbohydrate with a ketone group. Erythrulose is a natural-based keto-sugar that reacts with the amino acids in the keratin protein on the outer or dead surface layer of the skin This reaction produces a temporary browning effect similar to the Maillard reaction. It is used in some self-tanning cosmetics, in general combined with dihydroxyacetone (DHA). Erythrulose produces a lighter and slower-developing tan, taking 24 to 48 hours to complete development.
- **Acetone**
  CAS Number:67-64-1A Acetone is a strong solvent that is used to remove nail polish.
- **Butyrolactone**
  Known as GBL (gamma-butyrlactone) or Dihydrofuran-2(3H)-one. It is a realatively common solvent which can be used as a stain remover and is used in nail polish remover.
- **Glycerol (Solvent)**
  INCI Name: Glycerine. CAS Number:56-81-5. IUPAC Name: Glycerol. It can be used as a solvent.
- **Propylene glycol (Solvent)**
  INCI Name: Propylene Glycol. CAS Number:57-55-6. IUPAC Name: Propane-1,2-diol. It is used as a solvent and a carrier for fragrances. A large proportion is used in tobacco, with other products in laundry care and surface care.
- **Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine**
  INCI Name : Bis-ethylhexyloxyphenol Methoxyphenyl Triazine / CAS Number : 187393-00-6 Also known as Bemotrizinol, Bis-ethylhexyloxyphenol Methoxyphenyl Triazine is an oil soluble organic compound.Its broad spectrum of UVB and UVA rays absorption and its high photostability make it a UV absorber and filter agent in baby sun care and sun protection.
- **Butylmethoxy Dibenzoylmethane**
  INCI Name : Butyl Methoxydibenzoylmethane / CAS Number : 70356-09-1 Butyl Methoxydibenzoylmethane is also known as Avobenzone, Parsol, Eusolex and Escalot. It is a oil soluble broad spectrum UV absorber. Its significant degradation in light can be reduced by using a

photostabilizer. Its properties are used in baby sun care, nourishers/anti-agers and sun protection products.

- **Diethylhexyl Butamido Triazone**
  An UV absorber particularly for UVB.
- **Ethylhexyl Dimethyl Paba**
  Ethylhexyl dimethyl Paba [2-Ethylhexyl 4-(dimethylamino)benzoate] is an ester formed from the condensation of 2-ethylhexanol and dimethylaminobenzoic acid. It is an active ingredient used in cosmetic formulations to absorb UV rays. It prevents sunburn and other UV skin damage and is therefore found in sun care products.
- **Ethylhexyl Methoxycinnamate**
  Ethylhexyl methoxycinnamate (2-Ethylhexyl 4-methoxycinnamate) is an ester formed from methoxycynammic acid and 2-ethylhexanol. It is an active ingredient that absorbs, reflects and scatters UV rays. It is added to skin care products including sun care and bath and shower products to protect the skin, but also to prevent the product from deteriorating on exposure to UV rays.
- **Ethylhexyl Salicylate**
  Ethylhexyl salicylate (2-Ethylhexyl salicylate) is an ester formed from salicylic acid and 2-ethylhexanol. Its UVB absorption and emollient properties means it is added to sun protection products to prevent skin damage.
- **Ethylhexyl Triazone**
  C48H66N6O 2ethylhexyl 4-((4,6bis((2ethylhexoxycarbonyl) phenyl)amino)-1,3,5-triazin-2-yl)amino)benzoate.
- **Homosalate**
  Homosalate (2-hydroxy-3,3,3,5-trimethylcyclohexyl ester) is an ester formed from salicylic acid and 3,3,5-trimethylcyclohexanol. It absorbs UV rays and therefore is added to sun protection products to prevent skin damage.
- **Octocrylene**
  INCI Name : Octocrylene / CAS Number : 6197-30-4 Octocrylene is water resistant and absorbs UVB and short-wave UVA. It is then used as a UV filter and absorber in sun protection and facial care products. Its utilisation is now in question as Octocrylene can penetrate the skin and increase production of free radicals involved in malignant melanoma.
- **Phenyl Benzimidazole Sulphonic Acid**
  C13H10N2O3S a UVB protecting agent.
- **Terepthalylidene Dicamphor Sulphonic Acid**
  INCI Name : Terephthalylidene Dicamphor Sulfonic Acid / CAS Number : 90457-82-2 Terephthalylidene Dicamphor Sulphonic Acid, also Known as Ecamsule and Mexoryl SX (the trade name), is a benzylidene camphor derivative. It has the property to filter out UVA rays while being photostable. Terephthalylidene Dicamphor Sulphonic Acid is then used in sunscreens.
- **Titanium Dioxide (Sunscreens)**
  INCI Name:Titanium dioxide. CAS Number:13463-67-7. Titanium dioxide is an extremely opaque white mineral with UV resistant and absorbent properties.Titanium Dioxide is used as an opacifying agent, colorant and sunscreen agent in food and cosmetic products. It protects skin from the sun's harmful ultraviolet radiation.It is also used as a colorant to make cosmetics and personal care products that are applied to the skin (including the eye area), nails, and lips white in color. It helps to increase the opaqueness, and reduce the transparency of product formulas. Titanium dioxide also absorbs, reflects, or scatters light (including ultraviolet radiation from the sun). As a pigment, titanium dioxide is an FDA-approved food additive that is used to enhance the white color of certain

foods, such as dairy products and candy, and to add brightness to toothpaste and some medications. It is also used as a flavor enhancer in a variety of non-white foods, including dried vegetables, nuts, seeds, soups, and mustard, as well as beer and wine.

- **Zinc Oxide**
  Zinc Oxide (ZnO) is a white pigment used to block UV rays.
- **Acesulfame K**
  INCI Name : Potassium Acesulfame / CAS Number : 55589-62-3 Acesulfame K or Ace K is used as a high intensity sweetener. Acesulfame K is 200 times sweeter than sucrose and, as many others sweeteners, it has a bitter aftertaste. Acesulfame K is mostly used in the soft drinks industry even if it can be found in confectioneries and toothpastes.
- **Aspartame**
  Aspartame is the methyl ester of the dipeptide of the amino acids aspartic acid and phenylalanine. It has a less bitter after-taste than some of the other low-calorie sweeteners. It is 200 times sweeter than sugar.
- **Saccharin**
  This is the oldest known high intensity sweetener, initially used as a preservative, but now an important sweetener. It is 300 times sweeter than sugar but has a bitter after-taste in higher concentrations.
- **Stevia**
  Stevia refers to the sweet compounds - glycosides - that are extracted from the leaves of the Stevia rebuadiana plant. The most common glycosides include rebaudioside A (reb A) and stevioside. Purity standards for these extracts are territory specific, but stevia extracts are generally 95% pure. Stevia extracts are generally 250 times sweeter than sugar, have no calories and do not negatively affect blood glucose concentrations, insulin levels or blood pressure. Only stevia used as a sweetener, and not the dietary supplement, is tracked. Key product categories include soft drinks, dairy and confectionery. Table top sweeteners are excluded.
- **Sucralose**
  Sucralose has only recently come to the fore as a food additive but is growing in popularity. It is 600 times sweeter than sugar and is derived from sugar through a multi-step process that substitutes three chlorine atoms for three hydrogen-oxygen groups on the sugar molecule.
- **Cyclamate**
  One of the less intense of the high intensity sweeteners, cyclamate is just 30 times sweeter than sugar. As a result, it is often used in conjunction with other sweeteners.
- **Sodium Fluoride**
  INCI Name : Sodium Fluoride / CAS Number : 7681-49-4 Sodium Fluoride is an ionic compound. It is commonly used to deliver fluoride, useful in the formation of fluorapatite, to the tooth surface to prevent decay. Indeed, as fluorapatite is a component of enamel, fluoride remineralises and strengthens teeth. Sodium Fluoride also inhibits bacterial growth. Its properties are used essentially in toothpastes but also in dental floss and mouthwashes/dental rinses. It is classified as very toxic by both inhalation and ingestion. It can also cause dental fluorosis therefore its concentration must not exceed 0.15% in oral care products and it is not advised for children.
- **Sodium Monofluorophosphate**
  Sodium monofluorophosphate Na2PO3F is an additional source of fluorine in toothpaste.
- **Aqua/Water**
  INCI Name: Aqua. CAS Number:7732-18-5. Aqua also known as water is primarily used as a solvent in cosmetics and personal care products in which it dissolves many of the ingredients that impart

skin benefits, such as conditioning agents and cleansing agents. Water also forms emulsions in which the oil and water components of the product are combined to form creams and lotions. These are sometimes referred to as oil-in-water emulsions or as water-in-oil depending on the ratios of the oil phase and water phase. Water is used in the formulation of virtually every type of cosmetic and personal care product. It can be found in lotions, creams, bath products, cleansing products, deodorants, makeup, moisturizers, oral hygiene products, personal cleanliness products, skin care products, shampoo, hair conditioners, shaving products, and suntan products.