Supplementary Material

First insights into the occurrence of pesticide residues in edible insects from Sub-Saharan African countries

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Table S1. Details on standard, chemical and material purchasing.

Item	Supplier
Individual standards of OCPs	AccuStandard (New Haven, CT, USA)
Individual standards of CUPs	Merck (Darmstadt, Germany)/ Toronto Research Chemicals (Canada)
CB-207, CB-143, 13C-HCB	Dr. Ehrenstorfer Laboratories (Augsburg, Germany)
13C-Fipronil (500 pg/µL)	Merck (Darmstadt, Germany)
D4-Imidacloprid (500 pg/µL)	Merck (Darmstadt, Germany)
D3-DDCA (500 pg/µL)	Cambridge Isotope (USA)
D10-Chlorphyrifos (500 pg/µL)	Merck (Darmstadt, Germany)
13C-TCBY (500 pg/µL)	Cambridge Isotope (USA)
D9-Tebuconazole (500 pg/µL)	Merck (Darmstadt, Germany)
D6-Deltamethrin (500 pg/µL)	Toronto Research Chemicals (Canada)
13C-3-PBA (500 pg/µL)	Merck (Darmstadt, Germany)
D5-Atrazine (1000 pg/µL)	Merck (Darmstadt, Germany)
D6-Diuron (1000 pg/µL)	Merck (Darmstadt, Germany)
D6-Isoproturon (1000 pg/µL)	Merck (Darmstadt, Germany)
Polypropylene (PP) tubes	Greiner Bio-one (Belgium)
Sodium chloride (NaCl)	Sigma-Aldrich (St. Louis, MO, USA)
Sorbents C18 and primary-secondary amine (PSA)	Supelco (Bellefonte, PA, USA)
Centrifugal filters (nylon membrane, 0.2 µm)	VWR International (Leuven, Belgium)
Empty PP cartridges (25 mL)	Agilent Technologies (Santa Clara, CA, USA)
Standard reference material SRM 1945	US National Institute of Standards and Technology (NIST; Gaithersburg, MD, USA)
Hexane (hex)	Acros Organics (Belgium)
Ethyl acetate (EtAc), dichloromethane (DCM), iso-octane, acetone, acetonitrile (ACN), toluene, and concentrated sulfuric acid (H2SO4, 98%)	Merck (Darmstadt, Germany)
Methanol (MeOH)	Sigma-Aldrich (Bornem, Belgium)
LC-grade ultrapure water (UPW)	PURELAB Flex system (Tienen, Belgium)
Formic acid (FA)	Biosolve Chimie (France)

Table S2. List of targeted compounds and main use, analytical instruments, relative limits of quantification (LOQs, ng/g dw), and accuracy (%).

Compound	Abbreviation	Main use	Instrument	LOQ (ng/g dw)	Accuracy (%) SRM 1945	Accuracy (%) QC
Legacy pesticides (organochlorine pesticides, OCPs)						
Oxychlordane	OxC	Insecticide	GC-ECNI/MS	0.10	67	-
Trans-nonachlor	TC	Insecticide	GC-ECNI/MS	0.10	-	-
Cis-nonachlor	CC	Insecticide	GC-ECNI/MS	0.10	-	-
Trans-chlordane	TN	Insecticide	GC-ECNI/MS	0.10	74	-
Cis-chlordane	CN	Insecticide	GC-ECNI/MS	0.10	89	-
Dichlorodiphenyldichloroethylene	pp-DDE	-	GC-ECNI/MS	0.50	103	-
Dichlorodiphenyldichloroethane	pp-DDD	-	GC-ECNI/MS	1.50	-	-
Dichlorodiphenyltrichloroethane	pp-DDT	Insecticide	GC-ECNI/MS	0.20	152	-
Hexachlorobenzene	HCB	Fungicide	GC-ECNI/MS	0.40	91	-
α-Hexachlorocyclohexanes	a-HCH	Insecticide	GC-ECNI/MS	0.20	107	-
β-Hexachlorocyclohexanes	b-HCH	Insecticide	GC-ECNI/MS	0.40	-	-
γ-Hexachlorocyclohexanes	g-HCH	Insecticide	GC-ECNI/MS	0.30	78	-
Current-use pesticides (CUPs)						
Fenpyroximate		Acaricide	LC-MS/MS	0.3	-	102
Metalaxyl		Fungicide (acylalanine)	LC-MS/MS	0.3	-	107
Boscalid		Fungicide (carboxamide)	LC-MS/MS	0.3	-	96
Myclobutanil		Fungicide (triazole)	LC-MS/MS	0.3	-	101
Tebuconazole		Fungicide (triazole)	LC-MS/MS	0.3	-	97
Diuron		Herbicide (arylurea)	LC-MS/MS	0.1	-	94
Isoproturon		Herbicide (phenylurea)	LC-MS/MS	0.1	-	93
Atrazine		Herbicide (triazine)	LC-MS/MS	0.1	-	89
Prometryn		Herbicide (triazine)	LC-MS/MS	0.1	-	115
Propazine		Herbicide (triazine)	LC-MS/MS	0.1	-	97
Sebuthylazine		Herbicide (triazine)	LC-MS/MS	0.1	-	92
Simazine		Herbicide (triazine)	LC-MS/MS	0.1	-	90
Terbuthylazine		Herbicide (triazine)	LC-MS/MS	0.1	-	94

Terbutryn	Herbicide (triazine)	LC-MS/MS	0.1	-	108
Novaluron	Insect growth regulator	LC-MS/MS	1.4	-	104
Spirotetramat	Insecticide	LC-MS/MS	0.3	-	71
Aldicarb	Insecticide (carbamate)	LC-MS/MS	0.3	-	74
Carbofuran	Insecticide (carbamate)	LC-MS/MS	0.3	-	76
Methiocarb	Insecticide (carbamate)	LC-MS/MS	0.3	-	92
Methomyl	Insecticide (carbamate)	LC-MS/MS	0.3	-	91
Oxamyl	Insecticide (carbamate)	LC-MS/MS	1.4	-	124
Propoxur	Insecticide (carbamate)	LC-MS/MS	0.3	-	75
Acetamiprid	Insecticide (neonicotinoid)	LC-MS/MS	0.3	-	91
Dinotefuran	Insecticide (neonicotinoid)	LC-MS/MS	0.3	-	103
Imidacloprid	Insecticide (neonicotinoid)	LC-MS/MS	0.3	-	111
Thiacloprid	Insecticide (neonicotinoid)	LC-MS/MS	0.3	-	91
Thiamethoxam	Insecticide (neonicotinoid)	LC-MS/MS	0.3	-	118
Chlorpyrifos	Insecticide (organophosphate)	LC-MS/MS	0.3	-	97
Diazinon	Insecticide (organophosphate)	LC-MS/MS	0.3	-	132
Dichlorvos	Insecticide (organophosphate)	LC-MS/MS	1.4	-	36
Dimethoate	Insecticide (organophosphate)	LC-MS/MS	0.3	-	103
Ethoprophos	Insecticide (organophosphate)	LC-MS/MS	0.3	-	96
Malathion	Insecticide (organophosphate)	LC-MS/MS	0.3	-	77
Phosmet	Insecticide (organophosphate)	LC-MS/MS	1.4	-	108
Fipronil	Insecticide (phenylpyrazole)	LC-MS/MS	0.3	-	93
Bifenthrin	Insecticide (pyrethroid)	LC-MS/MS	0.3	-	100
Cyfluthrin	Insecticide (pyrethroid)	LC-MS/MS	1.4	-	157
Cypermethrin	Insecticide (pyrethroid)	LC-MS/MS	0.6	-	137
Deltamethrin	Insecticide (pyrethroid)	LC-MS/MS	1.4	-	122
Permethrin	Insecticide (pyrethroid)	LC-MS/MS	2.9	-	191
Flonicamid	Insecticide (pyridine)	LC-MS/MS	0.3	-	100
Chlorantraniliprole	Insecticide (ryanoid)	LC-MS/MS	0.3	-	101
Piperonyl butoxide	Pesticide synergist	LC-MS/MS	0.3	-	116
Paclobutrazol	Plant growth retardant; fungicide (triazole)	LC-MS/MS	0.3	-	87

S1. CUPs – Instrumental analysis and quantification method

Analysis of targeted CUPs was carried out using an Agilent 1290 Infinity liquid chromatography system coupled to an Agilent 6460 Triple Quadrupole mass spectrometer (LC-MS/MS, Agilent, Santa Clara, USA) equipped with an electrospray ionization (ESI) source operated in positive and/or negative ionization. Sheath gas temperature was set at 300 °C at a flow of 11 L/min, nebulizer pressure was set at 30 psi, and capillary and nozzle voltage were set at 4000/-4000 V and 500/-500 V, for positive and negative ionization modes respectively.

The separation was achieved using a Phenomenex Kinetex XB-C18 column (4.6 x 100 mm, 2.6 µm, Phenomenex, Torrace, USA) using ultrapure water and MeOH, both containing 5 mM ammonium formate, as mobile phases. The column heater was set at 40 °C, and the injector was set at 1 µL. Chromatographic parameters are reported in Table S3.

Table S3. Unified LC gradient in all injections. (Solvent A: Water with 5 mM ammonium formate, Solvent B: MeOH with 5mM ammonium formate). Method pressure limit was set at 400 bar.

Time (min)	A (%)	B (%)	Flow
0	95	5	
2	95	5	
6	15	85	
18	5	95	0.4 mL/min
18.1	5	95	
19	95	5	
22	95	5	

For each sample, 3 MS methods were applied for the quantification process using the same LC method (elution pattern and mobile phases). This is because our standards were in mixtures. Data acquisition was carried out in dynamic multiple reaction monitoring (dMRM). Information concerning the dMRM parameters of all three MS methods is provided in Table S4-S6. Quantification of targeted CUPs was performed using a 8-point calibration, evaluating the signal using peak area. The coefficients of determination of the calibration curves were all above 0.99. The instrumental LOQ was set at the lowest quantifiable calibration concentration. All calibrations curves were done in Agilent MassHunter Quantitative Analysis (10.0), by the setting of “Linear”, “Forced Origin” and “None” in weight.

Table S4. MS parameters for method 1. The retention time (RT) window for dMRM in this method was set at 0.8 min. (Q: Parent ion, q: fragment ion, Frag: fragmentation voltage, CE: collision energy; * Internal standard).

Compound	MRM1				MRM2				RT (min)	Polarity
	Q	q	Frag (V)	CE (V)	Q	q	Frag (V)	CE (V)		
Dinotefuran	203.1	129.1	115	12	203.1	114.0	115	12	6.52	(+)
Oxamyl	237.1	90.1	133	12	237.1	72.1	133	12	6.72	(+)
Flonicamid	230.1	203.1	110	16	230.1	174.1	110	16	6.98	(+)
Methomyl	163.1	88.0	110	8	163.1	58.2	120	15	6.98	(+)
Thiamethoxam	292.0	211.0	110	20	292.0	131.9	120	35	7.01	(+)
D4-Imidaclorprid*	260.0	213.1	110	15	260.0	179.0	110	15	7.22	(+)
Imidacloprid	256.1	209.0	110	16	256.1	175.0	110	28	7.35	(+)
Acetamiprid	223.1	125.9	125	16	223.1	89.9	125	36	7.60	(+)
Dimethoate	230.0	125.0	100	15	230.0	47.0	115	35	7.64	(+)
Thiacloprid	253.0	126.1	110	20	253.0	90.1	120	35	7.79	(+)
Aldicarb	208.1	116.0	75	8	208.1	89.0	75	12	8.14	(+)
Dichlorvos	221.0	109.1	115	16	221.0	79.1	105	28	8.33	(+)
Propoxur	210.1	111.1	110	12	210.1	65.1	115	40	8.37	(+)
Carbofuran	222.1	165.1	110	8	222.1	123.0	122	20	8.38	(+)
13C4-Fipronil*	438.9	334.1	115	10	438.9	282.0	115	20	8.72	(-)
Chlorantraniliprole	484.0	452.9	110	20	484	286.1	115	20	8.75	(+)
Metalaxyl	280.2	220.1	100	12	280.2	160.2	100	24	8.82	(+)
D6-Isoproturon*	213.2	171.1	120	20	213.2	78.0	120	40	8.83	(+)
Phosmet	318.0	159.9	110	16	318.0	133.0	125	35	8.85	(+)
D5-Atrazine*	221.2	179.2	105	22					8.86	(+)
D6-Diuron*	239.1	78.0	122	30					8.87	(+)
Boscalid	343.0	307.0	120	20	343.0	140.0	110	20	9.01	(+)
Methiocarb	226.1	169.2	110	6	226.1	121.0	110	16	9.07	(+)
Malathion	331.1	127.1	110	8	331.1	125.1	115	35	9.11	(+)
Paclobutrazol	294.1	125.1	125	35	294.1	70.1	110	16	9.11	(+)
Myclobutanil	289.1	125.1	120	35	289.1	70.2	120	24	9.15	(+)
Spirotetramat	374.2	302.2	120	20	374.2	216.1	120	35	9.36	(+)
Ethoprophos	243.1	131.1	120	20	243.1	97.1	120	32	9.63	(+)
Tebuconazole	308.1	124.9	115	35	308.1	70.0	115	20	9.83	(+)
Diazinon	305.1	169.1	105	20	305.1	97.1	115	35	10.07	(+)
Novaluron	493.0	158.0	115	20	493.0	141.0	135	35	10.07	(+)
D9-Prothioconzoale*	317.3	125.0	115	40	317.3	70.2	115	20	10.20	(+)
Piperonyl butoxide	356.2	177.1	120	32	356.2	119.1	120	35	11.67	(+)
D10-Chlorpyrifos*	360.0	198.9	115	20	360.0	99.0	115	35	12.20	(+)
D6-Deltamethrin*	529.0	287.0	105	9	529.0	178.0	115	20	12.90	(+)
Fenpyroximate	422.2	366.1	115	16					12.93	(+)

Table S5. MS parameters for method 2. The retention time (RT) window for dMRM in this method was set at 1 min. (Q: Parent ion, q: fragment ion, Frag: fragmentation voltage, CE: collision energy; * Internal standard).

Compound	MRM1				MRM2				RT (min)	Polarity
	Q	q	Frag (V)	CE (V)	Q	q	Frag (V)	CE (V)		
D4-Imidaclorprid*	260.0	213.1	110	15	260.0	179.0	110	15	7.42	(+)
Imidacloprid	256.0	209.1	110	10	256.0	175.1	110	20	7.42	(+)
Acetamiprid	223.1	126.0	100	10	223.1	56.2	100	10	7.67	(+)
Thiachloprid	253.0	126.0	100	20	253.0	90.2	100	40	7.85	(+)
Malathion	331.0	127.0	80	5	331.0	124.8	80	30	9.17	(+)
13C4-Fipronil*	438.9	334.1	115	10	438.9	282.0	115	20	9.34	(-)
Fipronil	434.9	329.9	115	10	434.9	277.9	115	20	9.34	(-)
D9-Prothioconzoale*	317.3	125.0	115	40	317.3	70.2	115	20	9.91	(+)
Diazinon	305.0	169.1	100	15	305.0	153.1	100	15	10.17	(+)
Chlorpyrifos	350.0	198.0	100	10	350.0	124.9	100	20	12.01	(+)
D10-Chlorpyrifos*	360.0	198.9	115	20	360.0	99.0	115	35	12.01	(+)
D6-Deltamethrin*	529.0	287.0	105	9	529.0	178.0	115	20	12.88	(+)
Deltamethrin	522.9	505.8	140	3	522.9	280.6	140	10	13.13	(+)
Cypermethrin	433.0	191.0	110	5	433.0	127.0	110	15	13.18	(+)
Cyfluthrin	434.0	191.0	130	20	434.0	127.0	130	5	13.19	(+)
Permethrin	183.0	167.9	110	20	183.0	153.1	110	15	14.43	(+)
Bifenthrin	440.2	181.0	100	8	440.2	166.2	100	40	15.97	(+)

Table S6. MS parameters for method 3. The retention time (RT) window for dMRM in this method was set at 1.2 min. (Q: Parent ion, q: fragment ion, Frag: fragmentation voltage, CE: collision energy; * Internal standard).

Compound	MRM1				MRM2				RT (min)	Polarity
	Q	q	Frag (V)	CE (V)	Q	q	Frag (V)	CE (V)		
Atrazine-deisopropyl	174.1	104	135	30	174.1	68.0	135	42	7.47	(+)
Atrazine-desethyl	188.1	146.1	105	22	188.1	104.1	105	35	7.99	(+)
Simazine	202.1	124.1	105	24	202.1	104.1	105	35	8.52	(+)
Isoproturon-D6*	213.2	171.1	120	20	213.2	78.0	120	40	8.83	(+)
Isoproturon	207.2	165.1	120	20	207.2	72.0	120	40	8.85	(+)
Atrazine	216.1	174.2	105	22	216.1	104.0	105	40	8.86	(+)
Atrazine-D5*	221.2	179.2	105	22					8.86	(+)
Diuron-D6*	239.1	78.0	122	30					8.87	(+)
Diuron	233.1	72.0	122	30					8.88	(+)
Sebuthylazine	230.1	174.1	105	24	230.1	104.1	105	43	9.19	(+)
Terbuthylazine	230.1	174.1	105	24	230.1	104.1	105	43	9.55	(+)
Propazine	230.0	188.1	105	31	230.0	145.9	105	31	9.22	(+)
Prometryn	242.0	200.0	126	17	242.0	158.2	126	21	9.67	(+)
Terbutryn	242.0	186.0	105	17	242.0	91.0	105	29	9.77	(+)

Table S7. Individual concentrations (ng/g dw) of OCPs in edible insects from Uganda and Nigeria. In bold, values > LOQs.

Compound	UGD-01	UGD-02	UGD-03	UGD-04	UGD-05	NGR-01	NGR-02	NGR-03	NGR-04
OxC	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ
TC	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ
CC	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ
TN	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ
CN	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ
pp-DDE	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ
pp-DDD	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ
pp-DDT	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ
HCB	**0.62**	< LOQ	< LOQ	< LOQ	**0.87**	< LOQ	**0.45**	< LOQ	< LOQ
a-HCH	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ
b-HCH	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ
g-HCH	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ	< LOQ

Table S8. Individual concentrations (ng/g dw) of CUPs in edible insects from Uganda and Nigeria. In bold, CUPs with df > 30%.

Compound	UGD-01	UGD-02	UGD-03	UGD-04	UGD-05	NGR-01	NGR-02	NGR-03	NGR-04
Fenpyroximate	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	0.9	<LOQ	<LOQ	<LOQ
Metalaxyl	2.9	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Boscalid	<LOQ	<LOQ	<LOQ	<LOQ	2.8	<LOQ	<LOQ	<LOQ	<LOQ
Myclobutanil	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Tebuconazole	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	1.2	2.8	<LOQ	<LOQ
Diuron	<LOQ	<LOQ	0.7	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Isoproturon	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Atrazine	<LOQ	<LOQ	<LOQ	0.5	<LOQ	<LOQ	<LOQ	<LOQ	1.0
Prometryn	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Propazine	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Sebuthylazine	<LOQ	<LOQ	<LOQ	<LOQ	0.4	<LOQ	2.4	<LOQ	<LOQ
Simazine	**0.6**	**3.9**	**17**	**22**	**15**	**<LOQ**	**<LOQ**	**<LOQ**	**0.8**
Terbuthylazine	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	1.7	<LOQ	<LOQ
Terbutryn	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Novaluron	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Spirotetramat	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Aldicarb	**17**	**3.1**	**2.3**	**15**	**15**	**<LOQ**	**118**	**8.9**	**<LOQ**
Carbofuran	**<LOQ**	**<LOQ**	**<LOQ**	**<LOQ**	**<LOQ**	**<LOQ**	**<LOQ**	**<LOQ**	**<LOQ**
Methiocarb	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Methomyl	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Oxamyl	**1.7**	**2.9**	**<LOQ**	**<LOQ**	**<LOQ**	**<LOQ**	**2.5**	**<LOQ**	**16**
Propoxur	**1.2**	**1.2**	**<LOQ**	**1.7**	**<LOQ**	**<LOQ**	**327**	**1.5**	**1.4**
Acetamiprid	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Dinotefuran	**<LOQ**	**<LOQ**	**<LOQ**	**<LOQ**	**<LOQ**	**1.0**	**1.2**	**1.3**	**1.5**
Imidacloprid	**0.3**	**<LOQ**	**<LOQ**	**<LOQ**	**<LOQ**	**<LOQ**	**0.3**	**<LOQ**	**0.4**
Thiacloprid	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Thiamethoxam	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Chlorpyrifos	**8.8**	**1.6**	**3.7**	**2.6**	**2.9**	**2.6**	**156**	**1.1**	**1.4**
Diazinon	0.3	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Dichlorvos	**13**	**3.0**	**5.0**	**8.3**	**5.1**	**2.6**	**26**	**3.4**	**<LOQ**
Dimethoate	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Ethoprophos	1.8	<LOQ	<LOQ	<LOQ	1.9	<LOQ	1.5	<LOQ	<LOQ
Malathion	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Phosmet	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Fipronil	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Bifenthrin	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Cyfluthrin	**13**	**2.0**	**<LOQ**	**4.5**	**7.7**	**<LOQ**	**27**	**6.8**	**<LOQ**
Cypermethrin	**69**	**<LOQ**	**<LOQ**	**72**	**17**	**<LOQ**	**57**	**1.7**	**28**
Deltamethrin	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Permethrin	**22**	**<LOQ**	**<LOQ**	**<LOQ**	**<LOQ**	**<LOQ**	**7.5**	**11**	**<LOQ**
Flonicamid	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Chlorantraniliprole	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ
Piperonyl butoxide	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	1.1	1.9
Paclobutrazol	**3.0**	**<LOQ**	**8.6**	**5.2**	**7.7**	**1.4**	**14**	**<LOQ**	**<LOQ**

Table S9. Spearman's correlations between the concentrations of pesticides in edible insects. From left to right: Spearman's correlation coefficients, and right to left: the two-tailed significance of the correlation. (In bold: significant correlations).

Spearman's Rho		Simazine	Aldicarb	Oxamyl	Propoxur	Dinotefuran	Imidacloprid	Chlorpyrifos	Dichlorvos	Ethoprophos	Cyfluthrin	Cypermethrin	Permethrin	Paclobutrazol	Hexachlorobenzene	
Simazine	Spearman's correlation coefficient		.948	.632	.562	**.049**	.367	.795	.828	.837	.502	.757	.092	.532	.837	Significance (2-tailed)
Aldicarb		-.026		.963	.115	.459	.636	.066	**.000**	.055	**.000**	**.037**	.083	.144	.055	
Oxamyl		-.186	-.018		.408	.401	**.020**	.889	.673	.978	.924	.703	.846	.408	.978	
Propoxur		-.224	.562	.316		.252	.198	.965	.277	.898	.188	**.040**	.209	.965	.898	
Dinotefuran		**-.669**[a]	-.284	.320	.427		.151	.217	.284	.462	.775	.c	.595	.325	.462	
Imidacloprid		-.342	.184	**.748**[a]	.473	.521		.538	.741	.491	.531	.167	.360	.938	.491	
Chlorpyrifos		.102	.636	-.055	.017	-.456	.238		**.007**	.056	.146	.347	.521	**.002**	.056	
Dichlorvos		.085	**.946**[b]	-.164	.407	-.402	.129	**.817**[b]		.056	**.006**	.071	.156	**.021**	.056	
Ethoprophos		-.081	.656	.011	-.050	-.282	.265	.653	.653		**.014**	.269	.294	.167	.c	
Cyfluthrin		-.259	**.936**[b]	.037	.483	-.111	.242	.525	**.831**[b]	**.775**[a]		.097	**.034**	.291	**.014**	
Cypermethrin		.121	**.698**[a]	.149	**.690**[a]	.c	.504	.356	.627	.413	.586		.309	.502	.269	
Permethrin		-.594	.607	.076	.463	.206	.347	.248	.515	.394	**.705**[a]	.383		.979	.294	
Paclobutrazol		.241	.528	-.316	.017	-.371	.030	**.881**[b]	**.746**[a]	.504	.397	.259	.010		.167	
Hexachlorobenzene		-.081	.656	.011	-.050	-.282	.265	.653	.653	.c	**.775**[a]	.413	.394	.504		

a. Correlation is significant at the 0.05 level (2-tailed).
b. Correlation is significant at the 0.01 level (2-tailed).
c. Not available due to insufficient data variation

Figure S1. Edible insect from Nigeria. A. Adults of short-horned grasshopper (*photo by James Habila and Elaoyi Paul*); B. Larvae of rhinoceros beetle and African palm weevil (*photo by Rasak Rabiu*).

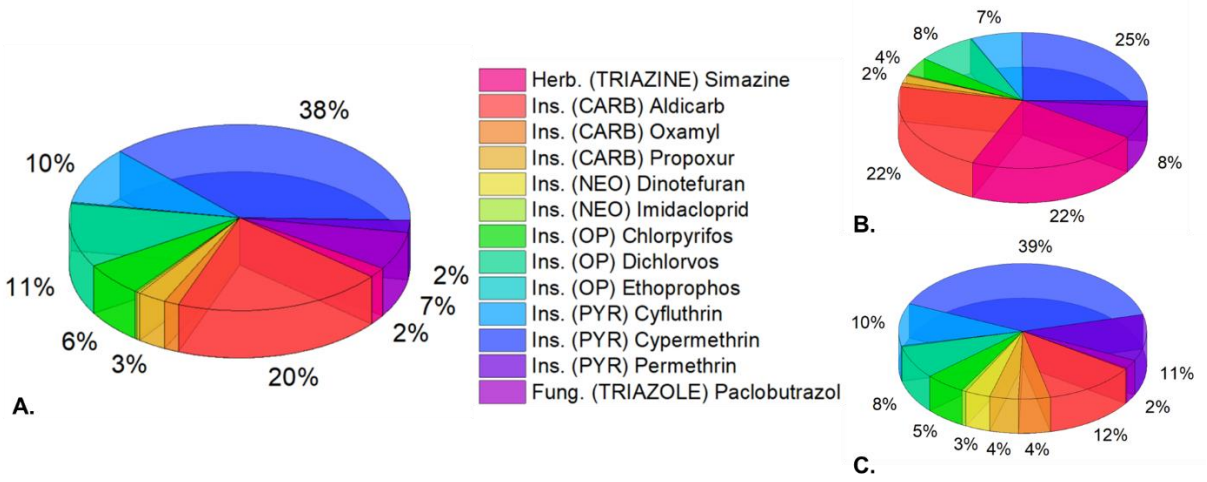

Figure S2. Percentage contribution to the median CUP contamination in A. all edible insects, B. edible insects from Uganda, C. edible insects from Nigeria. Only CUPs with df higher than 30% are displayed.