

Supplement

Table S1. Urinary metabolites of pesticide and polycyclic aromatic hydrocarbon exposures ($\mu\text{g/L}$)

Metabolites	LOD	Historic (n=266)					Current (n=259)				
		Detected n (%)	Min	75 th	Max	Highly exposed count	Detected n (%)	Min	75 th	Max	Highly exposed count
Pesticides											
ETU	0.08	266 (100)	0.059	4.341	107.67	68	256 (99)	0.079	3.519	57.71	70
TCP	0.05	266 (100)	0.176	2.469	62.96	66	258 (99.6)	0.060	2.360	16.41	63
2,4-D	0.02	266 (100)	0.040	0.490	159.21	62	257 (99)	0.005	0.405	39.41	65
OHP	0.06	264 (99)	0.018	0.844	946.36	64	238 (92)	0.024	0.848	20.97	66
OHT	0.03	265 (99.6)	0.007	0.306	677.83	62	186 (72)	0.009	0.387	299.96	70
3PBA	0.03	266 (100)	0.046	1.578	32.61	65	259 (100)	0.105	2.431	41.37	65
DCCA	0.04	266 (100)	0.076	2.169	45.77	65	259 (100)	0.128	3.190	30.32	65
Pyrethroid	0.03	266 (100)	0.165	3.794	78.38	67	259 (100)	0.233	5.462	52.24	64
Polycyclic aromatic hydrocarbons											
1-HP	0.05	-	-	-	-	-	253 (97.7)	0.020	0.670	18.22	71
2-OH-PH	0.05	-	-	-	-	-	243 (93.92)	0.030	0.550	39.96	62

Abbreviations: ETU=ethylenethiourea, TCP=3,5,6-trichloro-2-pyridinol, OHP= hydroxypyrimethanil, OHT=5-hydroxythiabenzazole, 3PBA=3-phenoxybenzoic acid, DCCA=3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylic acid, 1-HP=1-hydroxypyrene, 2-OH-PH= hydroxyphenanthrene

Table S2. Spearman correlation coefficients between urinary metabolites for pesticides and polycyclic aromatic hydrocarbons (PAHs) in women living in Matina County, Costa Rica, 2016-2017 (n=259)

		Pesticides								PAHs	
		ETU	TCP	2,4-D	OHP	OHT	3PBA	DCCA	Pyrethroid ¹	1-HP	2-OH-HP
Pesticides	ETU	1	0.294	0.000	0.274	0.280	0.217	0.288	0.265	0.274	0.270
	TCP		1	0.020	0.162	0.169	0.315	0.329	0.330	0.054	0.075
	2,4-D			1	-0.008	-0.047	-0.083	-0.007	-0.040	0.102	0.143
	OHP				1	0.205	0.161	0.155	0.161	0.071	0.138
	OHT					1	0.123	0.104	0.124	0.174	0.187
	3PBA						1	0.798	0.921	0.222	0.251
	DCCA							1	0.962	0.287	0.293
	Pyrethroid ¹								1	0.269	0.281
PAHs	1-HP									1	0.736
	2-OH-HP										1

Abbreviations: PAHs=Polycyclic aromatic hydrocarbons, ETU=ethylenethiourea, TCP=3,5,6-trichloro-2-pyridinol, OHP= hydroxypyrimethanil, OHT=5-hydroxythiabenzazole, 3PBA=3-phenoxybenzoic acid, DCCA=3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylic acid, 1-HP=1-hydroxypyrene, 2-OH-PH= hydroxyphenanthrene

¹Sum of 3PBA and DCCA

Table S3. Unadjusted odds ratios (ORs) and adjusted odds ratios (aORs) for respiratory and allergic outcomes with historic pesticides in non-smoking women living in Matina County, Costa Rica, 2010-2015 (n=266)

Exposure	N Exposed	Wheeze (n=43)				Doctor-diagnosed asthma (n=56)				High asthma score (n=98)			
		OR	95% Confidence Interval	aOR ¹	95% Confidence Interval	OR	95% Confidence Interval	aOR	95% Confidence Interval	OR	95% Confidence Interval	aOR	95% Confidence Interval
Historic Pesticides ² (n=266)													
ETU	68	0.74	(0.32, 1.57)	0.74	(0.31, 1.58)	0.66	(0.30, 1.32)	0.65	(0.30, 1.32)	0.64	(0.35, 1.15)	0.64	(0.34, 1.15)
TCP	66	0.44	(0.16, 1.03)	0.43	(0.16, 1.01)	0.79	(0.37, 1.56)	0.77	(0.36, 1.55)	0.56	(0.30, 1.02)	0.55	(0.29, 1.01)
2,4-D	62	0.85	(0.36, 1.82)	0.96	(0.41, 2.10)	0.99	(0.48, 1.96)	1.14	(0.54, 2.30)	0.84	(0.46, 1.52)	0.93	(0.50, 1.71)
OHP	64	1.27	(0.59, 2.60)	1.23	(0.56, 2.54)	1.07	(0.52, 2.07)	1.02	(0.50, 2.01)	1.13	(0.63, 2.01)	1.10	(0.60, 1.97)
OHT	62	1.16	(0.53, 2.40)	1.20	(0.54, 2.53)	1.13	(0.55, 2.19)	1.17	(0.57, 2.31)	1.58	(0.88, 2.81)	1.65	(0.91, 2.97)
3PBA	65	0.45	(0.16, 1.05)	0.44	(0.16, 1.04)	0.71	(0.33, 1.42)	0.70	(0.32, 1.42)	0.77	(0.42, 1.38)	0.76	(0.41, 1.38)
DCCA	65	0.36	(0.12, 0.88)	0.31	(0.10, 0.77)	0.71	(0.33, 1.42)	0.62	(0.28, 1.27)	1.1	(0.61, 1.94)	1.00	(0.55, 1.80)
Pyrethroid ³	67	0.43	(0.16, 1.00)	0.38	(0.14, 0.91)	0.87	(0.42, 1.71)	0.79	(0.38, 1.57)	1.12	(0.63, 1.97)	1.04	(0.58, 1.85)
Exposure		Rhinitis (n=25)				Eczema (n=83)				Itchy Rash (n=25)			
ETU	68	0.73	(0.24, 1.91)	0.72	(0.23, 1.88)	0.67	(0.35, 1.22)	0.67	(0.35, 1.23)	1.15	(0.43, 2.77)	1.16	(0.43, 2.81)
TCP	66	0.72	(0.23, 1.86)	0.72	(0.23, 1.87)	0.64	(0.33, 1.18)	0.63	(0.33, 1.17)	0.74	(0.24, 1.91)	0.73	(0.23, 1.90)
2,4-D	62	1.91	(0.77, 4.50)	1.84	(0.73, 4.37)	0.97	(0.51, 1.77)	1.01	(0.53, 1.85)	1.04	(0.37, 2.60)	1.16	(0.40, 2.93)
OHP	64	0.75	(0.24, 1.95)	0.77	(0.25, 2.01)	1.45	(0.80, 2.61)	1.44	(0.79, 2.59)	1.00	(0.35, 2.48)	0.96	(0.34, 2.42)
OHT	62	0.44	(0.10, 1.33)	0.43	(0.10, 1.31)	1.17	(0.63, 2.13)	1.19	(0.64, 2.16)	2.00	(0.80, 4.69)	2.07	(0.83, 4.90)
3PBA	65	0.53	(0.15, 1.47)	0.53	(0.15, 1.48)	1.29	(0.71, 2.31)	1.29	(0.71, 2.32)	1.86	(0.75, 4.36)	1.87	(0.75, 4.42)
DCCA	65	0.56	(0.16, 1.54)	0.58	(0.16, 1.63)	1.41	(0.78, 2.53)	1.37	(0.75, 2.46)	1.52	(0.59, 3.61)	1.41	(0.55, 3.38)
Pyrethroid ³	67	0.68	(0.22, 1.78)	0.71	(0.23, 1.85)	1.58	(0.88, 2.81)	1.54	(0.86, 2.76)	1.77	(0.72, 4.16)	1.67	(0.67, 3.95)

Abbreviations: ETU=ethylenethiourea, TCP=3,5,6-trichloro-2-pyridinol, OHP= hydroxypyrimethanil, OHT=5-hydroxythiabendazole, 3PBA=3-phenoxybenzoic acid, DCCA=3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylic acid

¹ Odds ratios adjusted for obesity (BMI≥30)

² Dichotomized at the 75th percentile

³ Sum of 3PBA and DCCA

Table S4. Sensitivity analysis including smokers for unadjusted odds ratios (ORs) and adjusted odds ratios (aORs) for respiratory outcomes and environmental exposures in women living in Matina County, Costa Rica, 2016-2017 (n=290)

Exposure	N	OR	95% Confidence Interval	Wheeze (n=46)				Doctor-diagnosed asthma (n=60)				High asthma score (n=111)	
				aOR ¹	95% Confidence Interval	OR	95% Confidence Interval	aOR	95% Confidence Interval	OR	95% Confidence Interval	aOR	95% Confidence Interval
Occupational/Residential Exposures (n=290)													
Mother currently works in banana or other agriculture business	49	1.60	(0.70, 3.43)	1.66	(0.71, 3.63)	1.50	(0.72, 3.01)	1.56	(0.73, 3.20)	1.27	(0.68, 2.37)	1.37	(0.72, 2.59)
Father currently works on banana plantation	135	0.88	(0.45, 1.69)	0.79	(0.40, 1.54)	1.01	(0.57, 1.81)	0.90	(0.50, 1.64)	1.24	(0.77, 2.02)	1.20	(0.73, 1.98)
Father worked in other agriculture business in last 3 years	22	1.29	(0.36, 3.69)	1.20	(0.33, 3.51)	2.39	(0.91, 5.90)	2.29	(0.85, 5.80)	1.39	(0.57, 3.35)	1.37	(0.55, 3.36)
Pesticide used inside the home	148	1.22	(0.63, 2.38)	1.09	(0.56, 2.17)	2.33	(1.27, 4.39)	2.14	(1.15, 4.08)	1.26	(0.78, 2.05)	1.22	(0.74, 2.02)
Government spraying	162	1.07	(0.55, 2.12)	1.16	(0.59, 2.33)	1.44	(0.79, 2.67)	1.59	(0.86, 3.00)	0.91	(0.56, 1.48)	0.94	(0.57, 1.55)
Smoke from waste burning reached house													
Never	48	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref	ref
Some Months/Monthly	60	1.08	(0.35, 3.50)	1.04	(0.33, 3.41)	1.08	(0.42, 2.91)	1.04	(0.39, 2.83)	1.35	(0.59, 3.15)	1.29	(0.56, 3.06)
Weekly/Daily	182	1.49	(0.62, 4.17)	1.56	(0.64, 4.40)	1.18	(0.55, 2.79)	1.23	(0.56, 2.95)	2.02	(1.02, 4.20)	2.17	(1.08, 4.58)
Current Metabolites ² (n=282)													
Pesticides													

ETU	71	1.11	(0.52, 2.22)	1.06	(0.49, 2.16)	1.04	(0.52, 1.96)	0.98	(0.49, 1.90)	0.84	(0.48, 1.46)	0.87	(0.49, 1.54)
TCP	71	0.6	(0.25, 1.30)	0.60	(0.25, 1.31)	1.59	(0.84, 2.94)	1.62	(0.84, 3.06)	0.91	(0.52, 1.58)	0.87	(0.49, 1.52)
2,4-D	71	0.71	(0.31, 1.50)	0.73	(0.31, 1.56)	0.64	(0.30, 1.26)	0.65	(0.30, 1.31)	0.77	(0.44, 1.35)	0.78	(0.44, 1.37)
OHP	71	0.6	(0.25, 1.30)	0.63	(0.26, 1.37)	0.64	(0.30, 1.26)	0.66	(0.31, 1.33)	1.35	(0.78, 2.32)	1.49	(0.85, 2.60)
OHT	71	1.44	(0.70, 2.83)	1.43	(0.69, 2.88)	1.29	(0.67, 2.41)	1.29	(0.65, 2.46)	1.69	(0.98, 2.92)	1.89	(1.08, 3.32)
3PBA	71	0.71	(0.31, 1.50)	0.63	(0.27, 1.35)	1.59	(0.84, 2.94)	1.43	(0.74, 2.68)	1.07	(0.61, 1.84)	0.97	(0.55, 1.69)
DCCA	71	0.6	(0.25, 1.30)	0.57	(0.23, 1.24)	0.82	(0.40, 1.59)	0.77	(0.37, 1.51)	0.71	(0.40, 1.24)	0.67	(0.37, 1.18)
Pyrethroid ³	71	0.6	(0.25, 1.30)	0.56	(0.23, 1.22)	1.04	(0.52, 1.96)	0.97	(0.48, 1.86)	0.91	(0.52, 1.58)	0.84	(0.47, 1.47)
Polycyclic Aromatic Hydrocarbons													
1-HP	79	0.62	(0.27, 1.30)	0.55	(0.24, 1.19)	0.85	(0.43, 1.60)	0.77	(0.38, 1.47)	0.72	(0.41, 1.24)	0.68	(0.38, 1.17)
2-OH-PH	71	0.85	(0.38, 1.77)	0.49	(0.21, 1.07)	0.91	(0.45, 1.74)	0.85	(0.41, 1.68)	0.98	(0.56, 1.71)	0.97	(0.54, 1.7)

Abbreviations: ETU=ethylenethiourea, TCP=3,5,6-trichloro-2-pyridinol, OHP= hydroxypyrimethanil, OHT=5-hydroxythiabendazole, 3PBA=3-phenoxybenzoic acid, DCCA=3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylic acid, 1-HP=1-hydroxypyrene, 2-OH-PH=hydroxyphenanthrene

¹ Odds ratios adjusted for obesity (BMI≥30)

² Dichotomized at the 75th percentile

³ Sum of 3PBA and DCCA

Table S5. Sensitivity analysis including smokers for unadjusted odds ratios (ORs) and adjusted odds ratios (aORs) for allergic outcomes and environmental exposures in women living in Matina County, Costa Rica, 2010-2015 (n=290)

Exposure	N	OR	95% Confidence Interval	Rhinitis (n=25)				Eczema (n=92)				Itchy Rash (n=27)	
				aOR ¹	95% Confidence Interval	OR	95% Confidence Interval	aOR	95% Confidence Interval	OR	95% Confidence Interval	aOR	95% Confidence Interval
<i>Occupational/Residential Exposures (n=290)</i>													
Mother currently works in banana or other agriculture business	49	0.20	(0.01, 1.02)	0.19	(0.01, 0.93)	2.18	(1.16, 4.09)	2.26	(1.19, 4.27)	2.85	(1.14, 6.71)	2.92	(1.16, 6.97)
Father currently works on banana plantation	135	0.21	(0.06, 0.57)	0.20	(0.06, 0.56)	1.28	(0.77, 2.12)	1.27	(0.76, 2.11)	0.92	(0.40, 2.07)	0.87	(0.38, 1.98)
Father worked in other agriculture business in last 3 years	22	1.06	(0.16, 3.98)	1.04	(0.16, 3.94)	1.23	(0.48, 3.00)	1.22	(0.47, 2.97)	3.33	(1.02, 9.43)	3.23	(0.98, 9.22)
Pesticide used inside the home	148	1.42	(0.60, 3.52)	1.36	(0.57, 3.40)	0.99	(0.60, 1.64)	0.95	(0.57, 1.60)	1.14	(0.50, 2.66)	1.06	(0.46, 2.51)
Government spraying	162	2.37	(0.96, 6.72)	2.43	(0.97, 6.93)	0.96	(0.57, 1.60)	0.98	(0.58, 1.64)	0.76	(0.33, 1.76)	0.79	(0.34, 1.83)
Smoke from waste Burning													
Never	48	ref		ref		ref		ref		ref		ref	
Some Months/Monthly	60	2.32	(0.50, 16.41)	2.55	(0.55, 18.15)	1.10	(0.49, 2.51)	1.08	(0.48, 2.46)	1.17	(0.41, 3.48)	1.15	(0.40, 3.42)
Weekly/Daily	182	2.31	(0.63, 14.93)	2.38	(0.64, 15.43)	1.00	(0.51, 2.04)	1.02	(0.52, 2.09)	0.34	(0.12, 0.99)	0.35	(0.12, 1.01)
<i>Current Metabolites² (n=282)</i>													
Pesticides													
ETU	71	0.91	(0.32, 2.27)	0.83	(0.29, 2.08)	0.96	(0.53, 1.69)	0.97	(0.53, 1.73)	1.34	(0.53, 3.10)	1.31	(0.51, 3.09)

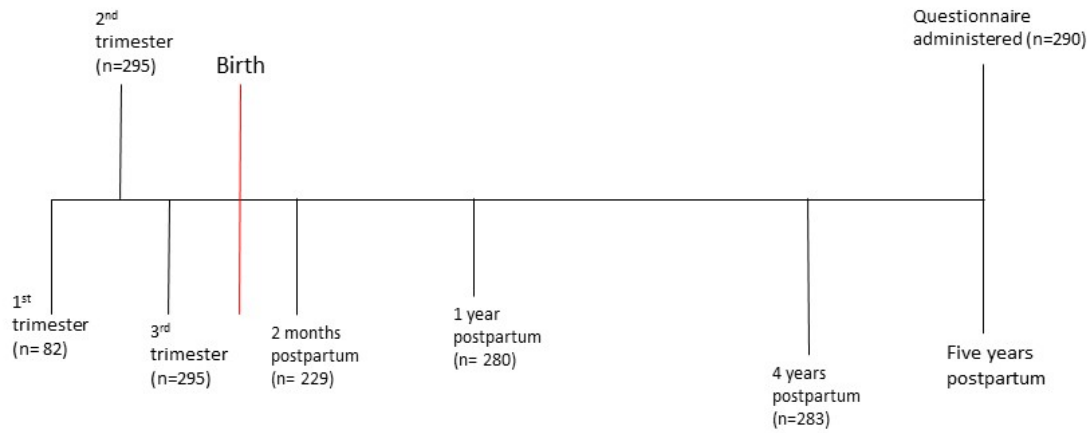
TCP	71	1.81	(0.73, 4.25)	1.93	(0.77, 4.55)	1.13	(0.64, 1.99)	1.11	(0.62, 1.96)	0.87	(0.31, 2.13)	0.87	(0.31, 2.13)
2,4-D	71	0.38	(0.09, 1.14)	0.38	(0.09, 1.14)	0.96	(0.53, 1.69)	0.96	(0.53, 1.70)	0.87	(0.31, 2.13)	0.89	(0.31, 2.18)
OHP	71	1.20	(0.45, 2.90)	1.18	(0.44, 2.87)	1.04	(0.58, 1.83)	1.09	(0.61, 1.93)	0.51	(0.15, 1.38)	0.53	(0.15, 1.44)
OHT	71	0.43	(0.10, 1.30)	0.38	(0.09, 1.16)	1.58	(0.90, 2.75)	1.65	(0.93, 2.90)	1.95	(0.82, 4.41)	1.98	(0.82, 4.57)
3PBA	71	1.81	(0.73, 4.25)	1.96	(0.78, 4.66)	0.96	(0.53, 1.69)	0.91	(0.50, 1.61)	1.09	(0.41, 2.58)	1.01	(0.38, 2.42)
DCCA	71	1.73	(0.70, 4.06)	1.81	(0.73, 4.28)	0.88	(0.48, 1.55)	0.85	(0.47, 1.52)	1.34	(0.53, 3.10)	1.30	(0.51, 3.02)
Pyrethroid ³	71	1.48	(0.58, 3.52)	1.60	(0.62, 3.83)	1.23	(0.69, 2.16)	1.19	(0.67, 2.09)	1.34	(0.53, 3.10)	1.28	(0.51, 3.00)
Polycyclic Aromatic Hydrocarbons													
1-HP	79	0.82	(0.29, 2.05)	0.83	(0.29, 2.08)	1.09	(0.62, 1.89)	1.06	(0.60, 1.84)	1.09	(0.43, 2.53)	1.04	(0.41, 2.42)
2-OH-HP	71	0.56	(0.16, 1.55)	0.52	(0.14, 1.47)	0.96	(0.53, 1.71)	0.93	(0.51, 1.66)	1.56	(0.64, 3.56)	1.26	(0.5, 2.96)

Abbreviations: ETU=ethylenethiourea, TCP=3,5,6-trichloro-2-pyridinol, OHP= hydroxypyrimethanil, OHT=5-hydroxythiabenzodazole, 3PBA=3-phenoxybenzoic acid, DCCA=3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylic acid, 1-HP=1-hydroxypyrene, 2-OH-PH=hydroxyphenanthrene

¹ Odds ratios adjusted for obesity (BMI \geq 30)

² Dichotomized at the 75th percentile

³ Sum of 3PBA and DCCA

Figure S1. Study Timeline for 290 women enrolled in ISA Study, Matina County, Costa Rica, 2010-2017**Figure S2. Exposure distributions for current pesticides**