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## Correction: Penagos-Tabares et al. Mixtures of Mycotoxins, Phytoestrogens, and Other Secondary Metabolites in Whole-Plant Corn Silages and Total Mixed Rations of Dairy Farms in Central and Northern Mexico. *Toxins* 2023, 15, 153

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## Correction

# Correction: Penagos-Tabares et al. Mixtures of Mycotoxins, Phytoestrogens, and Other Secondary Metabolites in Whole-Plant Corn Silages and Total Mixed Rations of Dairy Farms in Central and Northern Mexico. *Toxins* 2023, 15, 153

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**Table 3.** Occurrences and concentrations of mycotoxins and other fungal metabolites detected in whole-plant corn silages and total mixed rations of Mexican dairy farms.

Group of Metabolites	Metabolite	Positive Samples <sup>1</sup> (%)	Whole-Plant Corn Silages (n = 19)			Positive Samples <sup>1</sup> (%)	Total Mixed Rations (n = 19)			Wilcoxon Matched-Pairs Test <i>p</i> -Value *		
			Concentration ( $\mu\text{g/kg DM}$ ) <sup>2</sup>				Concentration ( $\mu\text{g/kg DM}$ ) <sup>2</sup>					
			Average $\pm$ SD	Median	Range		Average $\pm$ SD	Median	Range			
Ergot alkaloids	Festuclavine +	5	—	—	2.41	0	—	—	—	>0.9999		
	Dihydroergosine +	26	1.35 $\pm$ 1.17	1.29	0.13–3.2	21	0.83 $\pm$ 0.97	0.44	0.18–2.28	0.0625		
	Chanoclavine +	5	—	—	2.04	5	—	—	12.5	>0.9999		
<i>Alternaria</i> spp.	Altenuisol +	32	2.5 $\pm$ 0	2.5	2.5–2.5	37	3.14 $\pm$ 1.7	2.5	2.5–6.99	0.7656		
	Alternariol +	5	—	—	5.5	11	9.77 $\pm$ 6.04	9.77	5.5–14	0.75		
	Alternariolmethyl ether +	47	9.89 $\pm$ 7.59	5.5	5.5–27.4	42	6.39 $\pm$ 2.51	5.5	5.5–12.6	0.25		
	Altersetin +	26	6.76 $\pm$ 4.5	5.16	1.25–12.7	42	15.7 $\pm$ 9.86	12.3	4.18–34.3	0.0488		
	Infectopyron	21	97 $\pm$ 64	94	23.9–176	16	34.2 $\pm$ 3.38	36.1	30.3–36.2	0.1875		
	Macrosporin +	16	3.75 $\pm$ 0	3.75	3.75–3.75	11	3.75 $\pm$ 0	3.75	3.75–3.75	>0.9999		
	Tentoxin +	42	7.71 $\pm$ 4.86	6.38	3.1–16	79	6.91 $\pm$ 2.87	6.41	2.48–11.3	0.0932		
	Tenuazonic acid +	32	40.2 $\pm$ 10.4	37.5	30.1–60.4	53	49.4 $\pm$ 16.8	41.8	30.3–82.8	0.064		
<i>Aspergillus</i> spp.	Averufin +	42	3.6 $\pm$ 1.9	3.0	3.0–8.4	26	2.95 $\pm$ 0	2.95	2.95–2.95	0.125		
	Deoxygerfelin	0	—	—	—	11	2.41 $\pm$ 1.33	2.41	1.47–3.35	0.5		
	Flavoglaucin +	11	2.8 $\pm$ 0.97	2.8	2.11–3.49	100	40.7 $\pm$ 29.6	41.6	3.63–111	<0.0001		
	Fumigaclavine C +	5	—	—	47.2	0	—	—	—	>0.9999		
	Fumiquinazolin D +	0	—	—	—	11	11.8 $\pm$ 5.34	11.8	8.01–15.6	0.5		
	Kojic acid +	11	877 $\pm$ 130	877	785–69	5	—	—	145	0.5		
	Kotanin A	11	2.5 $\pm$ 0	2.5	2.5–2.5	5	—	—	2.50	>0.9999		
	Methylsulochrin	5	—	—	4.5	11	4.5 $\pm$ 0	4.5	4.5–4.5	>0.9999		
	Phenopyrrozin	84	56.1 $\pm$ 28.1	53.1	16.2–132	79	12.4 $\pm$ 5.14	10.7	7.16–24.1	<0.0001		
	seco-Sterigmatocystin +	16	2.72 $\pm$ 1.8	3.58	0.65–3.91	42	0.9 $\pm$ 0.46	0.65	0.65–1.71	>0.9999		
	Sterigmatocystin +	0	—	—	—	11	2.65 $\pm$ 0	2.65	2.65–2.65	0.5		
	Versicolorin C	16	6.05 $\pm$ 3.98	3.75	3.75–10.6	0	—	—	—	0.25		

Table 3. Cont.

Group of Metabolites	Metabolite	Positive Samples <sup>1</sup> (%)	Whole-Plant Corn Silages (n = 19)			Positive Samples <sup>1</sup> (%)	Total Mixed Rations (n = 19)			Wilcoxon Matched-Pairs Test <i>p</i> -Value *		
			Concentration ( $\mu\text{g/kg DM}$ ) <sup>2</sup>				Concentration ( $\mu\text{g/kg DM}$ ) <sup>2</sup>					
			Average $\pm$ SD	Median	Range		Average $\pm$ SD	Median	Range			
<i>Fusarium</i> spp.	15-Acetyldeoxynivalenol <sup>+</sup>	11	142 $\pm$ 46.7	142	109–175	0	—	—	—	0.5		
	15-Hydroxyculmorin <sup>+</sup>	32	2090 $\pm$ 1510	1580	464–4410	26	1270 $\pm$ 195	1280	993–1510	0.1563		
	Acuminatum B <sup>+</sup>	32	151 $\pm$ 89.6	142	58.3–290	26	52.2 $\pm$ 21.8	55.8	27.6–83.2	0.1094		
	Antibiotic Y	5	—	—	9.5	5	—	—	9.5	>0.9999		
	Apicidin <sup>+</sup>	16	7.14 $\pm$ 2.32	7.23	4.78–9.41	5	—	—	9.04	0.5		
	Aurofusarin <sup>+</sup>	68	168 $\pm$ 386	48.8	3–1420	84	83.4 $\pm$ 67.3	67.1	11.4–224	0.2247		
	Beauvericin <sup>+</sup>	100	57.8 $\pm$ 74.7	32.3	5.46–330	100	33.1 $\pm$ 24.3	29.1	3.84–84.2	0.2266		
	Beauvericin A <sup>+</sup>	89	0.96 $\pm$ 1.55	0.45	0.45–6.87	84	0.55 $\pm$ 0.27	0.45	0.45–1.42	0.0204		
	Bikaverin <sup>+</sup>	95	224 $\pm$ 253	99.4	15.3–879	100	115 $\pm$ 95.6	94.7	18.1–308	0.0204		
	Chrysogin <sup>+</sup>	0	—	—	—	5	—	—	8.03	>0.9999		
	Culmorin <sup>+</sup>	58	865 $\pm$ 695	634	150–2090	58	505 $\pm$ 427	402	150–1420	0.0234		
	Deoxyfusapyron	11	22 $\pm$ 12	22	13.5–30.5	16	591 $\pm$ 603	521	26.2–1230	0.375		
	Deoxynivalenol <sup>+</sup>	53	1500 $\pm$ 1080	1370	323–3350	84	615 $\pm$ 491	376	78–1670	0.1928		
	DON-3-glucoside <sup>+</sup>	26	74 $\pm$ 95.5	19.5	19.5–240	37	60.3 $\pm$ 23.5	65	19.5–86.6	0.3984		
	Enniatin A <sup>+</sup>	11	1.02 $\pm$ 1.15	1.02	0.2–1.83	37	0.45 $\pm$ 0.37	0.2	0.2–1.19	0.3438		
	Enniatin A1 <sup>+</sup>	11	0.4 $\pm$ 0	0.4	0.4–0.4	79	1.03 $\pm$ 0.82	0.4	0.4–2.6	0.0002		
	Enniatin B <sup>+</sup>	0	—	—	—	68	4.63 $\pm$ 5.62	1.4	1.4–18.8	0.0002		
	Enniatin B1 <sup>+</sup>	11	1.45 $\pm$ 0	1.45	1.45–1.45	89	3.99 $\pm$ 3.78	1.45	1.45–12.2	<0.0001		
	Enniatin B2 <sup>+</sup>	0	—	—	—	16	0.29 $\pm$ 0.05	0.29	0.24–0.34	0.25		
	Epiequisetin <sup>+</sup>	16	3.37 $\pm$ 1.6	3.78	1.6–4.72	5	—	—	1.6	0.375		
	Equisetin <sup>+</sup>	32	6.3 $\pm$ 6.27	3.05	1.6–14.7	42	5.19 $\pm$ 2.46	4.17	2.36–9.58	0.6836		
	Fumonisin A1 precursor <sup>+</sup>	16	63.2 $\pm$ 40.5	61.2	23.7–105	58	14.3 $\pm$ 14.1	9.16	3.55–48.9	0.3096		
	Fumonisin A2 <sup>+</sup>	11	43 $\pm$ 3.91	43	40.2–45.8	5	—	—	18	0.5		
	Fumonisin B1 <sup>+</sup>	47	723 $\pm$ 1050	124	26.5–2700	84	218 $\pm$ 244	126	26.5–1010	0.2288		
	Fumonisin B2 <sup>+</sup>	42	301 $\pm$ 371	72.6	18–987	68	103 $\pm$ 100	61.5	18–395	0.7722		
	Fumonisin B3 <sup>+</sup>	16	276 $\pm$ 145	297	121–409	32	57.1 $\pm$ 41.8	40	26.5–131	>0.9999		
	Fumonisin B4 <sup>+</sup>	16	78.3 $\pm$ 70.5	61	18–156	32	26.1 $\pm$ 20	18	18–66.9	0.5625		

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			Concentration ( $\mu\text{g/kg DM}$ ) <sup>2</sup>				Concentration ( $\mu\text{g/kg DM}$ ) <sup>2</sup>					
			Average $\pm$ SD	Median	Range		Average $\pm$ SD	Median	Range			
<i>Fusarium</i> spp.	Fungenerin	0	—	—	—	5	—	—	26.5	>0.9999		
	Fusaproliferin +	37	403 $\pm$ 628	166	61.5–1820	58	280 $\pm$ 252	226	60.8–989	0.3054		
	Fusapyron +	5	—	—	1.5	5	—	—	5.46–5.46	>0.9999		
	Fusaric acid +	89	1210 $\pm$ 840	1130	260–3220	74	562 $\pm$ 235	503	298–1190	<0.0001		
	Hydrolysed Fumonisin B1 +	16	37 $\pm$ 49.1	10	7.29–93.7	5	—	—	30.4	0.75		
	Moniliformin +	89	88.9 $\pm$ 76.9	48	9–263	100	101 $\pm$ 67	78.8	27.6–247	0.1956		
	Nivalenol +	42	269 $\pm$ 184	209	103–614	68	872 $\pm$ 853	385	88.5–2600	0.0061		
	Sambutoxin +	37	0.37 $\pm$ 0.19	0.3	0.3–0.79	5	—	—	0.3	0.0625		
	Siccanol +	89	4620 $\pm$ 3530	3960	525–12,350	95	2510 $\pm$ 1650	2370	409–6130	0.0028		
	W493	79	171 $\pm$ 190	80.7	3.55–694	74	86.6 $\pm$ 65.4	101	3.55–190	0.0256		
	Zearalenone +	68	58.7 $\pm$ 79.4	21.5	4.6–278	100	38.7 $\pm$ 57.2	17.8	4.6–246	0.9297		
	Total enniatins	47	5.96 $\pm$ 7.24	1.60	0.60–19	89	11.2 $\pm$ 9.8	7.11	1.85–37	0.0144		
<i>Penicillium</i> spp.	Total fumonisins	47	1150 $\pm$ 1570	203	26.5–4410	89	325 $\pm$ 396	155	3.6–1670	0.3867		
	Total Type B trichothecenes	53	2000 $\pm$ 1230	1790	323–4230	89	1940 $\pm$ 1760	1156	78.0–5510	0.0505		
	7-Hydroxypestalotin	53	17.3 $\pm$ 9.99	14.9	7.3–41.9	47	9.74 $\pm$ 4.87	9.74	2.6–16.7	0.0186		
	Asterric acid	5	—	—	12.5	5	—	—	12.5	N/A		
	Bilaid A	100	20.3 $\pm$ 22.9	11.4	5.78–87.6	95	8.53 $\pm$ 7.04	6.77	3.49–27.3	<0.0001		
	Citreoviridin +	0	—	—	—	21	42.9 $\pm$ 12.2	41.3	31.1–58	0.125		
	Citrinin +	0	—	—	—	5	—	—	77.9	>0.9999		
	Cycloaspeptide A	0	—	—	—	5	—	—	13.4	>0.9999		
	Cyclopentin	5	—	—	2.85	0	—	—	—	>0.9999		
	Mycophenolic acid +	11	90.2 $\pm$ 118	90.2	7–173	42	32 $\pm$ 42.9	11.4	7–127	0.1094		
	Mycophenolic acid IV +	5	—	—	2.53	0	—	—	—	>0.9999		
	NP 1243	5	—	—	34.1	0	—	—	—	>0.9999		
	Oxaline	16	68.9 $\pm$ 61.2	81.2	2.55–123	16	20.1 $\pm$ 14.9	12.9	10–37.2	0.5		
	Pestalotin	53	29.2 $\pm$ 13.5	28.7	8.61–59.2	58	12.4 $\pm$ 6.93	11.2	3.3–24.5	0.0282		
	PF 1163A	5	—	—	3.32	5	—	—	0.75	>0.9999		
	Questiomycin	5	—	—	1.5	89	8.71 $\pm$ 7.72	8.6	0.6–23	<0.0001		
	Questiomycin Derivate	95	184 $\pm$ 111	164	34.9–407	95	118 $\pm$ 64.2	106	18.1–238	0.0002		
	Quinolactacin A	11	1.2 $\pm$ 0	1.2	1.2–1.2	21	1.2 $\pm$ 0	1.2	1.2–1.2	0.5		

Table 3. Cont.

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			Concentration ( $\mu\text{g/kg DM}$ ) <sup>2</sup>				Concentration ( $\mu\text{g/kg DM}$ ) <sup>2</sup>					
			Average $\pm$ SD	Median	Range		Average $\pm$ SD	Median	Range			
Other fungi	Ascochlorin	21	11.9 $\pm$ 10.2	8.43	3.75–26.9	21	6.24 $\pm$ 4.99	3.75	3.75–13.7	0.625		
	Ascofuranone	21	2.26 $\pm$ 1.82	1.35	1.35–4.98	5	—	—	1.35	0.3125		
	Bassianolide	37	3.17 $\pm$ 1.25	2.7	2.7–6	32	2.7 $\pm$ 0	2.7	2.7–2.7	0.5		
	Beauveriolide I_III	26	1.5 $\pm$ 0	1.5	1.5–1.5	16	4.22 $\pm$ 3.01	3.71	1.5–7.45	0.6563		
	Cercosporin	58	40.8 $\pm$ 25.6	36.5	13.2–87.9	79	72.2 $\pm$ 79.7	42.5	15.1–325	0.0479		
	Cytochalasin J	0	—	—	—	11	136 $\pm$ 26.5	136	117–155	0.5		
	Destruxin B <sup>+</sup>	0	—	—	—	21	1.25 $\pm$ 0.68	1.1	0.7–2.09	0.125		
	Ilicicolin A	5	—	—	6.23	37	1.83 $\pm$ 0.61	1.6	1.6–3.21	0.2813		
	Ilicicolin B	79	18.9 $\pm$ 20.7	4.45	4.45–69.4	89	14.1 $\pm$ 9.96	13	4.45–28.9	0.6848		
	Ilicicolin E	5	—	—	1.7	11	1.7 $\pm$ 0	1.7	1.7–1.7	>0.9999		
	Monocerin	89	115 $\pm$ 237	37.4	2.1–990	74	85.9 $\pm$ 133	37.2	2.1–502	0.0024		
	Mycousnine	0	—	—	—	11	0.75 $\pm$ 0	0.75	0.75–0.75	0.5		
	Myriocin <sup>+</sup>	16	67.9 $\pm$ 52.1	48.1	28.6–127	32	44.6 $\pm$ 26.2	41.1	15.7–92.6	0.5625		
	Phomalone	5	—	—	6.14	0	—	—	—	>0.9999		
Unspecific metabolites	Sporidesmolide II	84	7.9 $\pm$ 13.2	2.92	0.75–44.7	74	4.4 $\pm$ 5.07	2.54	0.75–17.2	0.0643		
	Sporidesmolide III	5	0.75	0.75	0.75	0	—	—	—	>0.9999		
	3-Nitropropionic acid	21	63 $\pm$ 60.9	43	18.5–147	21	18.5 $\pm$ 0	18.5	18.5–18.5	0.5		
	Asperglauclide	5	—	—	5.99	100	27.3 $\pm$ 33.6	10.8	2.05–142	<0.0001		
	Asperphenamate	5	—	—	4.89	79	5.98 $\pm$ 7.37	3.35	1.93–31.4	<0.0001		
	Brevianamid F	89	171 $\pm$ 77.8	166	61–408	89	116 $\pm$ 40.6	112	49.2–228	0.0021		
	Chrysophanol	47	226 $\pm$ 111	231	62.5–367	32	176 $\pm$ 65.1	205	62.5–226	0.0195		
	Citreorosein	53	24.1 $\pm$ 12.4	19.1	14.7–54.4	37	19.1 $\pm$ 6.67	15.8	12.5–30.1	0.123		
	Cyclo(L-Pro-L-Tyr)	100	4680 $\pm$ 2300	4570	926–8970	100	2180 $\pm$ 1110	1890	589–5360	0.0006		
	Cyclo(L-Pro-L-Val)	100	14,760 $\pm$ 3820	13,450	6890–2200	100	7080 $\pm$ 2300	6790	2160–11,570	<0.0001		
Unspecific metabolites	Emodin	95	9.62 $\pm$ 5.31	9.22	3.5–23.1	95	46.9 $\pm$ 102	8.49	3.5–422	0.2312		
	Fellutanine A	95	128 $\pm$ 51.8	127	48.8–260	89	94.3 $\pm$ 38.7	86.7	34.8–199	0.0053		
	Iso-Rhodoptilometrin	58	1.58 $\pm$ 0.59	1.4	1.4–3.35	53	1.4 $\pm$ 0	1.4	1.4–1.4	0.5		
	N-Benzoyl-Phenylalanine	0	—	—	—	21	12.2 $\pm$ 2.47	12.1	9.56–15	0.125		
	Neoechinulin A	0	—	—	—	100	133 $\pm$ 78.4	102	29.6–304	<0.0001		
	Norlichexanthone	5	—	—	1.9	47	1.9 $\pm$ 0	1.9	1.9	0.0078		
	Rugulusovine	100	355 $\pm$ 153	373	137–681	100	204 $\pm$ 93.8	197	53.5–407	<0.0001		
	Skyrin	68	2.06 $\pm$ 1.07	1.85	0.55–3.96	89	4.42 $\pm$ 6.13	2.48	0.55–27	0.0097		
	Ternatin	5	—	—	6.32	0	—	—	—	>0.9999		
	Tryptophol	42	258 $\pm$ 126	170	170–456	32	963 $\pm$ 817	642	170–2100	0.5508		

Table 3. Cont.

Group of Metabolites	Metabolite	Positive Samples <sup>1</sup> (%)	Whole-Plant Corn Silages (n = 19)			Positive Samples <sup>1</sup> (%)	Total Mixed Rations (n = 19)			Wilcoxon Matched-Pairs Test p-Value *		
			Concentration ( $\mu\text{g/kg DM}$ ) <sup>2</sup>				Concentration ( $\mu\text{g/kg DM}$ ) <sup>2</sup>					
			Average $\pm$ SD	Median	Range		Average $\pm$ SD	Median	Range			
Phytoestrogens	Biochanin	5	—	—	147	79	36.3 $\pm$ 13	34.5	20.2–61.6	0.0081		
	Coumestrol	26	56 $\pm$ 104	8	8–241	89	157 $\pm$ 126	109	45.5–479	0.0011		
	Daidzein	37	263 $\pm$ 351	89	89–1020	100	12,700 $\pm$ 6710	10,710	3820–27,620	<0.0001		
	Daidzin	68	428 $\pm$ 719	191	91–2730	100	63,690 $\pm$ 40,170	65,640	9350–125,770	<0.0001		
	Genistein	58	153 $\pm$ 272	47	47–947	100	11,760 $\pm$ 6170	11,190	3990–26,530	<0.0001		
	Genistin	63	1000 $\pm$ 1850	362	110–6700	100	118,150 $\pm$ 75,850	113,270	157,180–249,320	<0.0001		
	Glycitein	5	—	—	324	89	4790 $\pm$ 1840	4450	2220–8220	<0.0001		
	Glycitin	11	364 $\pm$ 292	364	158–570	100	13,340 $\pm$ 7920	12,070	1080–27,390	<0.0001		
	Ononin	5	—	—	46	100	176 $\pm$ 28	153.3	46–512	<0.0001		
Other plant metabolites	Abscisic acid	42	1610 $\pm$ 2860	574	273–8670	100	1660 $\pm$ 636	1620	411–3270	0.0012		
	Anisodamine	16	514 $\pm$ 373	470	164–907	16	137.2 $\pm$ 101	141	34.5–236	0.375		
	Atropine	16	318 $\pm$ 85	360	219–374	11	69.1 $\pm$ 22.4	69.1	53.3–84.9	0.25		
	Hyoscine	16	427 $\pm$ 391	473	15–794	11	215.7 $\pm$ 93.1	216	150–282	0.375		
Bacterial	Nonactin	16	1 $\pm$ 0	1	1–1	26	1.3 $\pm$ 1.2	0.8	0.6–3.3	0.3906		

<sup>1</sup> Samples with values > limit of detection (LOD). <sup>2</sup> Excluding data < LOD. In case values > LOD and < limit of quantification (LOQ), LOQ/2 was used for calculation. \* Significant differences between each set of matched pairs presented p-value < 0.05. SD = Standard deviation; DM = Dry matter; + = metabolites classified as mycotoxins.

The authors state that the scientific conclusions are unaffected. The original publication has also been updated.

## Reference

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