

Supplementary Materials: Spread of *Jacobaea vulgaris* and Occurrence of Pyrrolizidine Alkaloids in Regionally Produced Honeys from Northern Germany: Inter- and Intra-Site Variations and Risk Assessment for Special Consumer Groups

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Table S1. Studies on the occurrence of pyrrolizidine alkaloids (PA) and PA N-oxides (PANO) in honey (raw bulk honey, regionally produced honey and blended retail products) in chronologic order.

Study (year)	Sample type	N	% positive	Origin	Mean PA/PANO level (µg/kg)	Range PA/PANO sum level (µg/kg)	Method	Number of analytes
Deinzer et al. (1977)	bulk honey (<i>Jacobaea vulgaris</i> -sourced)	4	100	North America	not reported	300–3900	LC–MS	6
Culvenor et al. (1981)	bulk honey (<i>Echium plantagineum</i> -sourced)	5	100	Australia	not reported	270–950	GC–MS	7
Crews et al. (1997)	bulk honey (<i>Jacobaea vulgaris</i> -sourced)	15	53	United Kingdom	not reported	<LOD–1480	LC–MS	5
Beales et al. (2004)	bulk honey (<i>Heliotropium</i> spp./ <i>Echium</i> spp.-sourced)	28	100	Australia	not reported	25–2634	LC–MS/MS	17
	bulk honey	35	46			<LOD–814		
	retail honey	5	80			<LOD–1263		
Betteridge et al. (2005)	retail honey	9	78	New Zealand	790	<LOD–2850	LC–MS/MS	15
Kempf et al. (2008)	retail honey	216	8,8	EU/non-EU	56	<LOD–120	GC–MS	retronecine equivalents
Dübecke et al. (2011)	retail honey	696	94	EU/non-EU	26	<LOD–267		
	bulk honey	2839	68	Central/South America	67	<LOD–1087	LC–MS/MS	10

	bulk honey	381	65	EU	26	<LOD–225		
BfR (2011)	retail honey	1324	91	EU/non-EU	21.4	<LOD–267	LC–MS/MS	14/18
	bulk honey	13,280	74	EU/non-EU	55	<LOD–3298		
Kempf et al. (2011)	retail honey	8	75	EU/non-EU	not reported	<LOD–625		
	retail honey	8	100	New Zealand	not reported	334–520	GC–MS	retronecine equivalents
	bulk honey (<i>Jacobaea vulgaris</i> -sourced)	31	87	The Netherlands	1261	<LOD–13,019		
Orantes-Bermejo et al. (2013)	regionally produced honey	103	94	Spain	48	<LOD–237	LC–MS/MS	17
Griffin et al. (2013)	retail honey	50	16	EU/non-EU	1260	<LOD–5614	LC–MS/MS	11
Kast et al. (2014)	retail honey	71	54	Switzerland	3.6	<LOD–55	LC–MS/MS	18
Martinello et al. (2014)	retail honey	17	53	Italia	1.4	<LOD–7.0		
		22	50	EU	3.1	<LOD–23	LC–MS	9
		31	77	EU/non EU	17	<LOD–172		
Bodi et al. (2014)	regionally produced honey	15	47	Germany/Austria	6.1	<LOD–28	LC–MS/MS	17
	retail honey	72	93	EU/non-EU	13	<LOD–235		
Griffin et al. (2015 a)	retail honey	59	69	Australia/New Zealand	153	<LOD–932	LC–MS/MS	14
Griffin et al. (2015 b)	retail honey	150	23	EU/non-EU	not reported	< LOD–545	LC–MS/MS	14
Lorena et al. (2016)	bulk honey	60	28	Italy	not reported	<LO–18	LC–MS/MS	6
Valese et al. (2016)	retail honey	92	99	Brazil	not reported	<LOD–423	LC–MS/MS	8
Neumann and Huckauf (2016)	bulk honey	86	54	Schleswig-Holstein	34	<LOD–604	LC–MS/MS	28
Letsyo et al. (2017)	regionally produced honey	48	85	Ghana	283	<LOD–2639	GC–MS	retronecine equivalents
Kowalczyk et al. (2018)	regionally produced honey	40	68	Poland	4.5	<LOD–20	GC–MS	retronecine equivalents
	retail honey	14	93	Asia	23	<LOD–64		
Hungerford et al. (2019)	retail honey	465	84	Australia	280	<LOD–3300	HR–UPLC–MS/MS	30

Carpinelli de Jesus (2019)	regionally produced honey	3	100	Australia	not reported	1400–2000	HR-UPLC–MS/MS	30
Celano et al. (2019)	retail honey	25	100	Italia/EU/non-EU	not reported	0.2–17.5	UPLC–MS/MS	9