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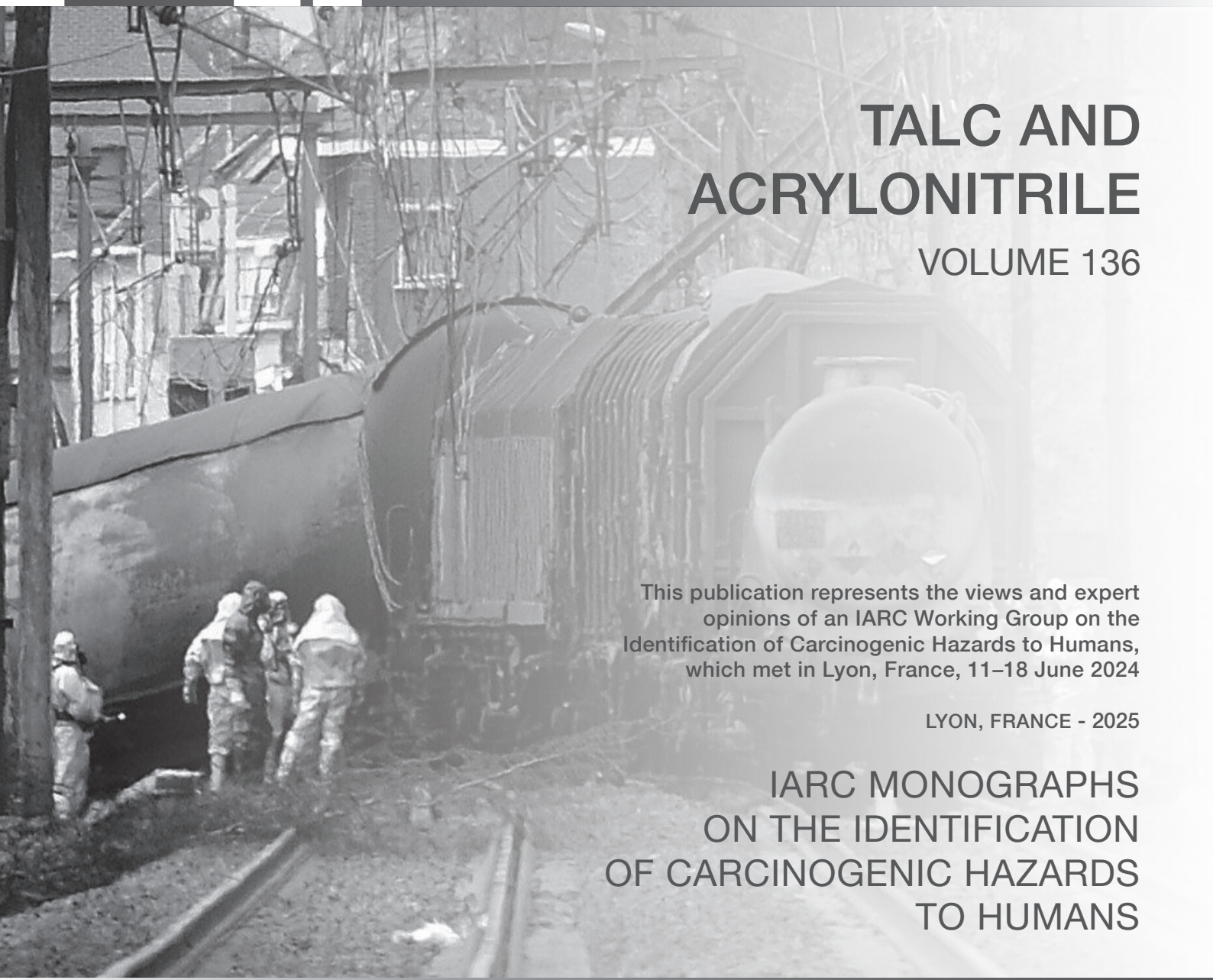

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International Agency for Research on Cancer

World Health Organization

Table S1.7 Occupational personal air monitoring data for acrylonitrile, by production industry[a]

Industry	Country, period	Job and tasks	Type of sampling	No. of workers	Concentration (personal sampling, mg/m³)		Comment	Reference
					Arithmetic average ± SD	Range		
Monomer								
AN	France, NR	Unloading/loading	ST	1	[6.1]	NR	Factory A	Cicolella et al. (1981)
		Unloading/loading	ST	1	[4.1]	NR	Factory A	
Fibre								
Acrylic	Japan, 1975–1976	NR	$TWA_{8\,h}$	11	[0.2]	NR	Group A	Sakurai et al. (1978)
		NR	$TWA_{8\,h}$	37	[1.1]	NR	Group B	
		NR	$TWA_{8\,h}$	14	[9.1]	NR	Group C	
Acrylic	France, NR	Manual reactor cleaning	ST	1	[41.2]	NR	Factory B	Cicolella et al. (1981)
		Unloading/loading (shift worker)	ST	1	[71.6]	NR	Factory B	
Acrylic	Canada, 1980–1981	Unloading	$TWA_{8\,h}$	NR	ND	NR	Same as 1978–1979	Guirguis et al. (1984)
		Reactor work	$TWA_{8\,h}$	NR	ND		Same as 1978–1979	
		Wet spinning	$TWA_{8\,h}$	NR	ND	NR	Same as 1978–1979	
		Maintenance/cleaning	$TWA_{8\,h}$	NR	ND	NR	Same as 1978–1979	
		Processing	$TWA_{8\,h}$	NR	ND	NR	Same as 1978–1979	
Acrylic	Japan, 1976	Production	FS	64	[1.6 ± 2.3]	[0.02–12.4]	Group A	Muto et al. (1992)
		Production	FS	52	[0.7 ± 0.9]	[0.02–4.3]	Group B	
		Production	FS	26	[1.1 ± 0.9]	[0.2–3.0]	Group C	
	Japan, 1987	Production	FS	142	[1.4 ± 2.0]	[0.02–12.4]	Group A & B	
		Production	FS	62	[0.4 ± 0.4]	[0.02–1.7]	Group A	
		Production	FS	80	[2.5 ± 2.5]	[0.2–12.4]	Group B	
Resin								
ABS/SAN	Canada, 1980–1981	Unloading reactor	$TWA_{8\,h}$	NR	[3.5]	NR	Lower than 1978–1979	Guirguis et al. (1984)
		Coagulation/drying	$TWA_{8\,h}$	NR	[2.4]	NR	Lower than 1978–1979	
		Compounding	$TWA_{8\,h}$	NR	[2.2]	NR	Lower than 1978–1979	
		Sample taking	$TWA_{8\,h}$	NR	[1.1]	NR	Lower than 1978–1979	
		Maintenance/cleaning	$TWA_{8\,h}$	NR	[1.5]	NR	Lower than 1978–1979	

Table S1.7 (continued)

Industry	Country, period	Job and tasks	Type of sampling	No. of workers	Concentration (personal sampling, mg/m³)		Comment	Reference
					Arithmetic average ± SD	Range		
		Laboratory	$TWA_{8\,h}$	NR	[1.3]	NR	Lower than 1978–1979	Guirguis et al. (1984) (cont.)
		Control room	$TWA_{8\,h}$	NR	[2.2]	NR	Lower than 1978–1979	
Acrylic	Canada, 1980–1981	Unloading	$TWA_{8\,h}$	NR	< 2.2	NR	Lower than 1978–1979	
		Reactors	$TWA_{8\,h}$	NR	< 2.2	NR	Lower than 1978–1979	
		Packaging	$TWA_{8\,h}$	NR	< 2.2	NR	Lower than 1978–1979	
		Using product	$TWA_{8\,h}$	NR	< 2.2	NR	Lower than 1978–1979	
Acrylic	NR, NR	Production	FS	34	[0.2 ± 0.4]	[0.02–2.1]		Perbellini et al. (1998)
		Production	FS	18	[0.2 ± 0.3]	[0.02–1.3]		
		Production	FS	18	[0.2 ± 0.3]	[0.01–1.1]		
Polymer								
Nitrile rubber	France, NR	Shift worker	ST	NR	[ND]	NR	Factory E	Cicolella et al. (1981)
		Manual stripper cleaning	ST	NR	[5.6]	NR	Factory E	
		Shift worker	ST	NR	[4.6]	NR	Factory F	
		Automated stripper cleaner	ST	NR	[0.4]	NR	Factory F	
		Automated stripper cleaner	ST	NR	[0.4]	NR	Factory F	
		Automated stripper cleaner	ST	NR	[0.2]	NR	Factory F	
		Manual stripper cleaner	FS	NR	[65.1]	NR	Factory G	
		Manual stripper cleaner	FS	NR	[49.9]	NR	Factory G	
		Manual stripper cleaner	ST	NR	[19.1]	NR	Factory G	
Plastics	Kingdom of the Netherlands, NR	All	$TWA_{8\,h}$	15	[0.3]	NR	All workers	Houthuijs et al. (1982)
		Reaction operator	$TWA_{8\,h}$	NR	[0.7]	NR	Maintenance – day 2	
		Reaction operator	$TWA_{8\,h}$	NR	[3.9]	NR	Maintenance – day 3	
		Panel operator	$TWA_{8\,h}$	NR	[0.04]		Weekly average	

Table S1.7 (continued)

Industry	Country, period	Job and tasks	Type of sampling	No. of workers	Concentration (personal sampling, mg/m³)		Comment	Reference
					Arithmetic average ± SD	Range		
		Panel operator	$TWA_{8\,h}$	NR	[0.1]		Day 5	Houthuijs et al. (1982) (cont.)
		NR	$TWA_{8\,h}$	5	[0.2 ± 0.1]	[0.04–0.3]	Without respiratory protection	
		NR	$TWA_{8\,h}$	5	[1.8 ± 1.5]	[0.07–3.9]	With respiratory protection	
Nitrile rubber	Canada, 1980–1981	Unloading reactor	$TWA_{8\,h}$	NR	[4.3]	NR	Lower than 1978–1979	Guirguis et al. (1984)
		Sample taking	$TWA_{8\,h}$	NR	[2.2]	NR	Lower than 1978–1979	
		Coagulation/drying	$TWA_{8\,h}$	NR	[3.5]	NR	Lower than 1978–1979	
		Maintenance	$TWA_{8\,h}$	NR	[4.3]	NR	Lower than 1978–1979	
ABS	Islamic Republic of Iran, 2019	All	FS	15	[0.7 ± 0.1]	NR		Sajedian et al. (2023)
		Safety/fire	FS	NR	[0.2 ± 0.2]	[0.01–0.4]		
		Laboratory	FS	NR	[0.02]	[0.003–0.06]		
		SAN	FS	NR	[0.2]	[0.01–0.4]		
		Coagulation	FS	NR	[0.03]	[0.004–0.06]		
		Compound 1	FS	NR	[0.03]	[0.005–0.05]		
		Compound 2	FS	NR	[0.02]	[0.003–0.03]		
		Supervisor	FS	NR	[0.02]	[0.01–0.03]		
		Packaging	FS	NR	[0.004]	[0.004–0.005]		
		ABS	FS	NR	[0.003]	[0.003–0.003]		
		Dryer	FS	NR	[0.004]	[0.003–0.004]		
		Instruments	FS	NR	[0.1]	[0.01–0.35]		
		Facilities	FS	NR	[0.07]	[0.003–0.2]		
		Mechanics	FS	NR	0.04	[0.003–0.05]		
Chemical								
AA, AAE, AD	Czechia, 1988–1999	Chemical production	NR	NR	Up to 0.2	NR	15 factories	Tucek et al. (2002)

Table S1.7 (continued)

Industry	Country, period	Job and tasks	Type of sampling	No. of workers	Concentration (personal sampling, mg/m³)		Comment	Reference
					Arithmetic average ± SD	Range		
NR	Taiwan, China, NR	NR	FS	79	0.009[b]	< 0.004–11.5	All workers	Wu et al. (2023)
		NR	FS	53	< 0.004	NA	Low-exposure group	
		NR	FS	26	0.2[b]	0.05–11.5	High-exposure group	
Miscellaneous								
Tyre manufacture	USA, 1975	Cutter	FS	1	[ND]	NR	At Banbury mill	NIOSH (1976)
ABS moulding	USA, 1978	Press operator	FS	2	[ND]	NR	Injection and extrusion	NIOSH (1978)
Aircraft manufacture	USA, 1978	Oven operator	FS	2	[ND]	NR	ABS moulding oven	NIOSH (1979)
Helmet manufacture	USA, 1979	Operator	FS	NR	[ND]	NR	Helmet factory	NIOSH (1980)
Plastic products	USA, 1980	Operator	FS	9	[ND]	NR	Injection moulding	NIOSH (1981)
NR	NR, NR	NR	FS	9	[1.0 ± 1.3]	[0.02–4.3]	Paired active	Benson et al. (1981)
		NR	FS	9	[1.0 ± 1.3]	[0.1–4.1]	Paired passive	
Plastic products	Italy, NR	Machine operator	FS	NR	< 0.01	NR	ABS moulding	Cirla et al. (2007)

AA, acrylic acid; AAE, acrylic acid esters; ABS, acrylonitrile–butadiene–styrene; AD, acrylate dispersions; AN, acrylonitrile; FS, full-shift (6–8 hours) sample; NA, not applicable; ND, not detected (value not reported); NR, not reported; SAN, styrene–acrylonitrile; SD, standard deviation; ST, short-term (e.g. 0.5–3.5 hours) sample; $TWA_{8\,h}$, 8-hour time-weighted average; USA, United States of America.

[a] <, below limit of detection (value given); [ ], approximately (values read from figure or calculated by the Working Group).

[b] Geometric mean.

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