

TABLE 7.1 Minimal  $a_w$  for Growth and Toxin Production by Microorganisms of Public Health Concern

Microorganism	Minimal $a_w$ for		Toxin	Reference
	Growth	Toxin production		
Bacteria <i>Clostridium botulinum</i>	0.93	0.95	type A	Baird-Parker and Freame (1967)
	0.95	0.94	type A	Ohye and Christian (1967)
			type A	Kautter et al. (1979)
	0.93	0.94	type B	Baird-Parker and Freame (1967)
	0.94	0.94	type B	Ohye and Christian (1967)
	0.95	0.97	type E	Kautter et al. (1979)
	0.97	0.97	type E	Baird-Parker and Freame (1967)
	0.95	0.97	type E	Ohye and Christian (1967)
	0.972	0.965	type E	Ohye et al. (1967)
	0.965	0.965	type G	Emodi and Lechowich (1969)
<i>Clostridium perfringens</i>	0.93-0.95			Briozzo et al. (1986)
	0.95			Kim (1965)
<i>Bacillus cereus</i>	0.95			Kang et al. (1969)
	0.93			Scott (1957)
	0.95			Jakobsen et al. (1972)
	0.86			Raevuori and Genigeorgis (1975)
<i>Staphylococcus aureus</i>	0.86			Scott (1957)
	0.86			Marshall et al. (1971)
			Enterotoxin A	Troller (1972)
			Enterotoxin A	Lotter and Leistner (1978)
Molds <i>Aspergillus flavus</i>	0.87		Enterotoxin B	Troller (1971)
				Notermans and Heuvelman (1983)
	0.78		aflatoxin	Ayerst (1969)
<i>A. parasiticus</i>	0.80	0.84	aflatoxin	Diener and Davis (1970)
	0.82	0.83-0.87	aflatoxin	Northolt et al. (1977)
	0.82	0.87	aflatoxin	Northolt et al. (1978)
	0.82	0.87	aflatoxin	Lotzsch and Trapper (1978)
<i>A. ochraceus</i>	0.83	0.85	ochratoxin	Bacon et al. (1973)
	0.77	0.83-0.87	ochratoxin	Northolt et al. (1979a)
	0.81	0.87-0.90	ochratoxin	Pitt and Christian (1968)
	0.82		ochratoxin	Northolt et al. (1979a)
	0.83			Ayerst (1969)
	0.85			Snow (1949)
	0.83	0.83-0.86	ochratoxin	Pelhate (1968)
	0.81	0.88	penicillic acid	Northolt et al. (1979a)
	0.76	0.80	penicillic acid	Northolt et al. (1979b)
	0.87	0.81	penicillic acid	Bacon et al. (1973)
	0.82	0.97	penicillic acid	Troller (1980)
	0.83	0.99	penicillic acid	Northolt et al. (1979b)
	0.79		penicillic acid	Ayerst (1969)
	0.83	0.95	patulin	Northolt et al. (1979b)
	0.83-0.85		patulin	Ayerst (1969)
0.81			Ayerst (1969)	
0.83			Northolt et al. (1978)	
0.83-0.85	0.85	patulin	Mislevic and Tuite (1970)	
0.83	0.99	patulin	Troller (1980)	
0.83			Northolt et al. (1978)	
0.85			Ayerst (1969)	
0.84	0.99	patulin	Mislevic and Tuite (1970)	
	<0.90	altenuene, alternariol, alternariol mono-methyl ether	Northolt et al. (1978)	
		stachybotrym	Orth (1976)	
		trichothecine	Magan et al. (1984)	
<i>Stachybotrys atra</i>	0.94	0.94		Jarvis (1971)
	0.90			Pelhate (1968)

Adapted from Beuchat (1983).