

Allergenic Foods

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Susan L. Hefle, Julie A. Nordlee, and Steve L. Taylor

Food Allergy Research and Resource Program, Department of Food Science, University of Nebraska, Lincoln, Nebraska

Susan L. Hefle is formerly of the William S. Middleton V.A. Hospital and Department of Medicine and Food Research Institute, University of Wisconsin, Madison, Wisconsin.

I. INTRODUCTION

Virtually all food allergens are proteins, although only a small percentage of the many proteins in foods are allergens.¹ Any food that contains protein has the potential to cause allergic reactions in some individuals. However, a few foods or food groups are known to cause allergies on a more frequent basis than other foods. At a 1995 consultation on food allergies sponsored by the Food and Agriculture Organization (FAO), a group of international experts confirmed that peanuts, soybeans, crustacea, fish, cow's milk, eggs, tree nuts, and wheat are the most common allergenic foods.² These foods are responsible for over 90% of serious allergic reactions to foods. Allergies to certain fresh fruits and vegetables are also rather common, but the allergens tend to be labile to processing and cooking and the symptoms are mild and confined primarily to the oropharyngeal area.³ The prevalence of allergic sensitivities to specific foods varies from one country to another depending on the frequency with which the food is eaten in that country and the typical age at its introduction into the diet. For example, peanuts are a much more frequent cause of food allergies in the U.S. than in most other countries. Americans eat peanuts more often and introduce peanut butter into the diet of children at an early age. The Japanese probably experience more soybean and rice allergies than some other cultures because of the frequency of these two foods in the Japanese diet.² Scandinavians have a high incidence of codfish allergy⁴ for similar reasons.

Table 1 provides a listing of the most common allergenic foods and food groups compiled from a thorough search of the medical literature. Too many studies have been conducted to allow citation of the entire body of medical literature; citations reflect the most relevant studies documenting the allergenicity of those foods. Such hallmark studies have comparatively large groups of patients and use the most objective diagnostic criteria, such as double-blind, placebo-controlled food challenge trials (DBPCFC). For some of the individual foods within an allergenic food group, only a few published accounts of allergic reactions can be found. For example, allergic reactions to certain tree nuts, such as pistachio or macadamia, are rarely reported, probably due to less frequent consumption.

Table 2 provides a listing of the less common allergenic foods. Only some of the foods listed in this table have been documented to cause severe, life-threatening allergic reactions. Citations are provided to studies and/or case reports that document the allergenicity of those particular foods. The absence of a particular food on this list may not mean that it is nonallergenic, but may indicate that its allergenicity has not been documented. Conversely, the presence of a specific food on the list merely indicates that it has been listed in one or more reports as a cause of food allergy and does not indicate the prevalence or potential as an allergenic food.

Obviously, considerable differences exist in the quality of the information used to establish the allergenicity of each specific food appearing in

TABLE 1
Common Allergenic Foods and Food Groups

Food	Ref.
Crustacea (shrimp, lobster, crab)	26, 39, 45, 46, 51, 143, 145, 156, 199, 253
Egg	23, 26, 27, 35, 36, 67, 101, 172, 173, 199, 200, 201, 202, 203
Fish	1, 35, 36, 78, 84, 86, 101, 126, 128, 161, 198, 199, 200, 201, 202, 253
Milk	23, 26, 27, 35, 36, 79, 101, 172, 173, 175, 198, 199, 200, 201, 202, 203, 211
Peanuts	17, 25, 26, 27, 35, 101, 117, 198, 199, 200, 201, 202, 203, 254, 255
Soybeans	17, 23, 25, 27, 101, 198, 199, 200, 201, 202, 203, 255
Tree nuts	3, 5, 7, 8, 13, 14, 16, 18, 26, 27, 30, 62, 63, 65, 77, 93, 94, 102, 103, 141, 155, 165, 173, 181, 190, 204, 214, 237
Wheat	4, 11, 12, 26, 35, 36, 51, 101, 117, 120, 198, 199, 200, 201, 202, 203

Note: This table was compiled using literature searches of the Agricola (1972 to July 1994) and Medline (1966 to July 1994) databases.

Table 2. Supporting data range from highly objective DBPCFCs to anecdotal reports based primarily on clinical histories. Reports were not included in the summary if they were based on histories of controversial symptoms not widely acknowledged as being caused by allergic reactions to foods, or if the supporting clinical data were based solely on controversial diagnostic techniques. Table 2 provides information on symptoms, age of patients, and the supportive diagnostic data provided in those reports.

The variability in symptoms is quite large both between individual patients and between different studies (groups of patients). Even individual patients display variable responses depending on such factors as the exposure dose to the offending food. Certainly, some symptoms are more serious than others. Systemic anaphylaxis, asthma, and laryngeal edema are potentially life-threatening. Some foods are primarily associated with mild adverse reactions, such as the so-called oral allergy syndrome, which is associated with

itching, hives, and other mild reactions in the oropharyngeal area only after ingestion of fresh fruits, and only rarely with systemic reactions.³

DBPCFCs represent the most objective diagnostic approach to establish a cause-and-effect relationship between ingestion of a food and an allergic reaction.⁵ Other types of challenge studies, such as the single-blind and open, are also useful, but are somewhat less objective than the DBPCFC. Challenge trials establish a cause-and-effect relationship between ingestion of the food and the onset of symptoms in a sensitized individual. However, they do not establish an allergic mechanism behind the illness.

Table 2 also provides information relating to results of skin tests, immunoassays, and histamine release tests that do provide evidence of an IgE-mediated allergic mechanism for the illness. However, these tests alone are insufficient to establish a cause-and-effect relationship because false positives, and to a lesser extent, false negatives do occur.⁶

Please note that the bibliography for this section of text follows the list of references and appears on page S89.

TABLE 2
Less Common Allergenic Foods and Food Groups^a

Food	Symptoms (see end of table for list)	Age Years	Oral challenge	Skin Test	RAST	Other assays	Ref.
Abalone	A, CO, DY, FL, PR (with exercise)	19		1+	0+		51
Acacia gum	I	16-42		5+	7+	PH 1+ (after exercise)	39
Allspice	TT, U, W	39		1+			196
Amaranth	CD, DM, EX, PM	11-87		1+			252
Amaranth dye	A, AE, BR, H, U			26+			166
	AE or UC		Single; 2+	1+	1+		147
	AS		Double; 0+				148
	AE, UC		Open; 5+				245
Anise		48			1+		150
							88
					IB 1+		129
	AE, DY	26	Open; 1+	46+	23+		213
Annatto	AE, UC			1+			214
	AE, UC	8-72	Open; 15+				231
	A, AE, H, PR, U	62	Single; 10+		IB 1+		150
Apple	AE, CJ, I (hands), RN						106
				8+			169
				20+	18+		5
		4-18		157+			20
				39+			55
	AE, I (oral, palms), RN	48					83
	I (eyes, nasal), LE, W	>10			1+		88
	AE, BR, D, H, RN, U, V	6-41	Double; 2+				117
				9+			121
				51+ ("Apple")			
				32+ (Granny Smith)			
				34+ (Sturmer)			
				16+ ("Punkanoli")			
<i>Aspergillus niger</i>		10-61		36+	32+		177
	AE, I (oral)	13		1+	0+	PK 1+	187
	D, DI, H, N, V	24		1+			228
	I (hands), OI, SW (hands)	25		1+	1+		237
	A, AE, AS	28		1+			247
	AE	12		1+	1+		9
	AE, DY, PR (palms), U (with exercise)	28	Open; 1+				92
	HA, N, V	50	Open; 1+				92
	HA	27	Open; 1+				92
Avocado	AS						42
	AC, BR, U				1+		125
	BR				1+		116
Balsam of Peru	EX(hands)						132
		24-62	Open; 9+				222
	AE, AS, D, U, V						232
	EX						

TABLE 2 (continued)
Less Common Allergenic Foods and Food Groups^a

Food	Symptoms (see end of table for list)	Age Years	Oral challenge	Skin Test	RAST	Other assays	Ref.
Banana	AE, D, I (throat), U, V, W	5-75	Double; 1+	6+			6
	CU, GI, RC						26
	AC, BR, U	30		3+	1+		42
	A, AE, I (mouth), D, RN, S, U	17-32			0+	HR 2+	63
	AE	28		1+			66
	A, AE, DY, U	53, 56		2+	2+		72
	A, U	67		1+	1+		125
	A, AE, I (throat), U, V, W	15		1+	1+	PK 1+	126
	AE, LV, PP, RN, W	56	Open; 1+	1+	1+	IB 1+	155
	AE, I (oral)	10-61		2+			177
Barley	AE	44	Open; 1+	1+			158
	AE, LV	28, 30		2+	2+	HR 2+	190
	A, AE, DY, U	32		1+	1+		205
	I (pharyngeal), RN	33		3+	3+	EL 1+	239
							53
	A, EX, W	10	Double; 1+				101
	AS, GI, U	16		1+	8+		217
	AE, PR, VC (with exercise)	20-22		2+	1+	BC 1-	12
	AS	39		1+	0		73
	A, AE, W	20		1+	1+	BC 1+	78
Beans Garbanzo Green	AS, CO, DY, RN			9+			140
	AD, AS, RN	20	Double; 0+	1+	1+	HR 1+	17
	I (eyes), U	42	Double; 1+	1+			140
	AC, AD, AS, N, RN, V	0.33-24		7+			180
	I (eyes, nasal), RN, S	46		1+	1+	BC 1+; HR 1+	202
		23	Double; 0+	13+			113
	H, LE, W	37		1+		HR 1+	17
	A, AE, U	22		1+	1+	HR 1+	78
	AE, U						229
Kidney Lima Pinto Sprouts — taugh	DY, H, LE, W	3-27		2+			199
	AD, CU, GI, RC	0.5-25	Double; 9+				200
	AD, AP, AS, N, RN, V	0.33-24	Double; 2+	18+			202
	AD, CU, GI, RC	0.75-24	Double; 0+	4+			35
	CMA		Double; 3+				246
	CMA		Double; 3+				246
	I (facial), U	8-72	Single; 10+	1+			227
	AE, UC	21		1+			106
	A, I (throat), TP, U	38		1+	1+		21
	A					EL 1+, IB 1+	48
Beef							162
Cooked							
Less cooked							
Beer							
Beta-carotene							
Broccoli							
Buckwheat							

Cabbage	A, AE, DY	21			1+	1+	11
Caraway	AD, GP, RN	1-47			1+	1+	178
Cardamom	CD, DM, EX, PM	11-87			5+		167
Carrot	AE	4-18	Single; 1+				166
	I, TS, W	48			1+		55
	LE, OAS	19-20			2+		83
	I, SW	24				EL 2+	88
	AE, BR, D, H, N, RN, U, V	34			1+		90
	BR, LE	>10	Double; 3+				105
	A, RCJ, U	6-41					228
	AE, I (oral)	41			1+		115
	A	10-61			6+		117
		11-50				IB 1+	121
Cassia							129
Cassia oil	OI, PU (lips), ST	52					159
Cauliflower		39					177
		21					250
		child					250
Celery	AE	50					132
	C, H, TN, U	55	Open; 1+				54
	I, LE, TN, W	48					209
	A, GI, LE, OAS	19-53				EL 4+	21
	A, AE, U	18-55				PK 2+	178
	AE, P	22			1+		19
	BR, LE						88
	A, AE, RC, U	14-49					105
	A, AE, RCJ, U	14-49					114
	A, H	66				IB 1+	124
					17+		129
					9+		183
							184
							193
							213
	AE, DY, H, LE, U	34	Open; 1+		7+		214
	A, EX, U						230
	AE, DY, H, LE, U	23	Open; 1+				214
	A	50				IB 21+	224
	A, AE, AC, RN, U	27-53			36+		234
	AC, AE, U	28			1+		251
	AC, AE, DI, I, PR, U, W, WE	20-39			70+		103
	(with exercise)				1+		115
	AE, H, PR (with exercise)	23					210

TABLE 2 (continued)
Less Common Allergenic Foods and Food Groups^a

Food	Symptoms (see end of table for list)	Age Years	Oral challenge	Skin Test	RAST	Other assays	Ref.
Celery (celery root)							
Raw		27–53		31+			250
Cooked		27–53		66+			251
Celery salt				25+			251
Chamomile (tea)				25+			250
Cherry				1+		PK 1+; EL 1+	216
Chicken		8		13+			177
	A, CO, I (skin), V	10–61					26
	AE, I (oral)	0.25–19	Double; 2+				35
	CU, GI, RC	0.75–19	Double; 1+	4+			36
	AD, CU, GI, RC	0.6–19	Double; 1+	1+			47
	AD, AP, D, N, S, V, W	2.5	Open; 1+		1+		47
	A, EX	4	Open; 1+		3+		91
	AD, EX				1+	HR 1+	189
	A, DY, U	29	Double; 2+	1+			198
	AD, AP, CU, D, N, RN, S, V	1.3–19	Double; 6+	6+			200
	AD, CU, GI, RC, W	0.5–25	Double; 2+	1+	2+		201
	AD		Open; 1+				235
	D	0.11	Double; 2+				199
	DY, H, LE, W	3–27	Double; 3+	19+			202
	AD, AP, AS, N, RN, V	0.33–24	Double; 3+	1+	1+		238
	AE	39	Double; 5+;	3+			56
	CO, FL, HA, NS, U, V	17–58	Open; 0+	0+			60
Chocolate							
	AD	4–20	Double; 2+	18+			69
	AC, I (throat, nasal), P, S, U, V, W	>10	Double; 3+	17+			117
	AE, BR, D, H, RN, U, V	4–60	Double; 1+	3+			142
	AE, N, S, U, W	1.33–19	Double; 4+	0+			198
	AP, CU, D, N, RN, S, V, W	0.33–24	Double; 10+	4+			202
	AS, AP, AS, N, RN, V		Double; 42+		0+	HR 1+	256
	CU, GI, RN	0.75–19	Double; 0+	0+			35
	AE, AS, D, DM, RN	1–80	Open; 14+	1+			168
	AD, CU, GI, RC	1.33–19	Double; 15+	13+			198
	DY, H, LE, W	3–27	Double; 44+				199
	AD		Double; 45+	11+	12+		201
	AD, AP, AS, N, RN, V	0.33–24	Double; 106+	55+			202
	AD, AS, RN	3–18		59+			203
	AD, CU, GI, RC, W	0.5–25					200
Cinnamate — methyl				6+ (patch)			152
Cinnamate — benzyl				11+ (patch)			152
Cinnamic acetate				3+ (patch)			132

TABLE 2 (continued)
Less Common Allergenic Foods and Food Groups^a

Food	Symptoms (see end of table for list)	Age Years	Oral challenge	Skin Test	RAST	Other assays	Ref.
Grapes	A, CO, FL, NS, PR (with exercise)	15		1+	0+	PH 1+ (after exercise)	51
Red	A, U, W (with exercise)	24		0+			33
	A, EX	4	Open; 1+				47
Grapefruit seeds				2+			188
Guava	I (pharyngeal), RN	33		1+		EL 1+; IB 1+	239
Honey	D, DY, U	35		10+	0+		128
Forest		16-78		10+	7+		89
Rape		16-78		10+	6+		89
Dandelion		16-78		17+	14+		89
Sunflower	AP, D, V	24		1+	1+		29
	A	50		1+	1+		19
Royal jelly	A, BR, D	11					34
Hops	AE, DY, H, LE, U	23	Open; 1+	1+			214
Karaya gum				1+ (erythema only)			252
Kiwi	A, AE, I (eyes, throat)	26		1+			61
	OAS	32		1+			205
	I (ears), eyes, RC, U	53		1+		PK 1-	64
	AE, D, PS			10+	10+		74
	OPP			12+	0+		74
	OAS, PR, U, V	26		1+		EL 1+, HR 1-	75
	U			1+	1+		76
	A			3+	3+		104
	B, CL, PR	30	Open; 1+	1+			233
				3+	1+		236
	AD, AE	26		1+			237
	AE, GP, I (tongue), U	20	Open; 1+	1+	1+		258
Lemon	DM	52		1+ (patch)			38
Lettuce	A, AE, U	20		1+			192
	A			2+	2+		90
Eruca sativa	I (OM), WH	43		1+	1+		186
Lime	DM	52		1+ (patch)			38
Limpet	A, AE, CH, U	3-27		5+	5+		157
Lentils	DY, V	10		1+			70
	AS	20-22		2+	0+		73
	CO, DY, RN	20		1+	1+	HR 1+, BC 1+	140
	AS, RN	46		1+	1+	BC 1+	139
Lupine				1+	1+	HR 1+	182
	AE, U			5+	4+		87
	EX	5	Open; 1+	1+	1+	HR 8+	87
Mace				12+			230

Maize	CU, GI, RC AE	0.75-19	Double; 0+	2+	1+	PK 9+	95
	AD, AP, N, RN, V A	0.33-24 0.71	Open; 1+	7+	0+	PK 3+ PK 4+ HR 1+ HR 1+	96 202 47 96 96 171 171 171
Maize syrup	U	30	Open; 1+	1+			
Maize dextrin	U	30	Open; 1+	1+			
Maize invert sugar	U	30	Open; 1+	1+			
Maize GF sugar	U	30					
Maize isomerized dextrose	U	30					
Maize D-psicose	U	30					
Malt	I (facial), U						
Maple syrup	ER, PR, U						
Mango	AC, AE, SW (face), U	28			2+		103
	A, AE, W	24					43
	A, I (eyes), I (mouth), PR, RC	32					195
Melon	A, DY, ER, U	5-75		1+	0+		149
	AE, D, I (throat), N, U, V	10-61		6+			6
	AE, I (oral)	20-36		3+			177
Watermelon	AD, DY, LE, OAS, U	14-67		3+			105
	OAS	25					58
Millet seed	A, AE	31	Open; 1+	1+	1+	EL 3+ EL 6+, IB 6+ HR 1+	179
Mushrooms	AE, H, LE, U			1+			214
Ramaria flava	A(1)	41					118
Shiitake	ER, F	15-76		0			218
	DM				2+		163
Mycoprotein ("Quorn")	D, V			2+			221
Mussel		16-42		2+	1+		39
Mustard		21		1+	10+	HR 4+, EL 4+	21 80
	EX	39		1+			115
	A, AE, RC	40		1+			146
	A, AE, N, RC	17		1+	1+		154
	AD, GP, RN	14		1+	1+		154
	SW (glottis), U	1-47		29+	5+		167
	AE, H, LE	Child		1+	1+		178
	A, AE, U	43	Open; 1+	1+			214
		25			1+		248
Black		Child					178
White		Child					178
Seed	A, AE, U						
	AE, AS, DY, I (nasal), S, U	31		1+	7+	HR 2+	52
	AE, AS, I (scalp, genitals), U, V	32		1+	1+	HR 1+	135 135

TABLE 2 (continued)
Less Common Allergenic Foods and Food Groups^a

Food	Symptoms (see end of table for list)	Age Years	Oral challenge	Skin Test	RAST	Other assays	Ref.
Nutmeg	AE, U			3+	1+, 14+ flower		213
Oats	AD, AP, AS, N, RN, V AS, GI, U	0.33-24		3+	2+		53
				7+	0+		95
Orange	DM	52		1+ (patch)	9+		217
	AE, BR, D, H, RN, U, V	>10	Double; 6+	21+			38
	AE, I (oral)	10-61		11+	3+		117
	A, AE, DY, I, U	49					177
	A, AE, AS, GI, LE, N, RC, U, V	25-61	Open; 0+ (juice) Open; 3+ (seed)	0+ (juice) 3+ (seed) 2+ (seed)		PK 1+ (seed)	249
Mandarin	I (pharyngeal), RN	33					257
Orange juice	AC, AE, DY, N, U	33		0+		EL 1+, IB 1+	257
Oysters	AE, FL, PR, U (with exercise)	16-42			1+	PK 20+	188
Papain	AE, E, DY, I, W AP, CJ, D, U	31	Single; 1+ Double; 5+	2+ 1+ 5+		PK 1+	137
Chymopapain	CD, DM, EX, PM	11-87		4+			138
Paprika	AD, GP, RN			22+	5+		197
Parsley	I (nasal, eye), LE, TS, W A, AE, U	48 18-55		1+ 12+	6+		166
Pea	AD, AS, RN		Double; 2+ Double; 5+	18+			167
	DY, V	0.25-19		1+			88
	AS	10		2+			17
		20-22		1+	2+		26
		20		1+	1+	HR 1+	70
	AE, AS, D, DM, RN	1-80		42+			73
	AE, I (oral)	10-61		5+			139
	AC, AD, AS, N, RN, V	0.33-24		19+	4+		168
		39		1+			177
Chickling	AE, AS, GI, RN, U			69+		HR 58+	202
Peach	DY, N	30					98
	AC, U	28		1+			3
	AE, BR, D, H, RN, U, V	>10	Open; 6+, Double; 43+	65+	1+		42
	CU, OAS	16-27		25+ (flesh) 22+ (skin)	1+		103
		14	Double; 0+	1+			117
	AE, U			8+	0+	IB 3+	127
					8+		128
							220

Peanut oil	A, I (pharyngeal), RN	33				EL 1+	239
	A, AE, D, GI, U (with exercise)	24					33
	AD, AE (with peanuts)	0.5	Open; 1+				153
	AE, AS, D, H, LE, N, V	17-45	Double; 0+				219
Pear	(with peanuts)						
	AD, AE, ER (with peanut oil)	0.5	Open; 1+		1+		153
	AD (with peanut oil)	0.33	Open; 1+		1+		153
	EX (with peanut oil)	"infant"	Open; 1+				85
Pepper	AE, I (oral)	10-61	6+				177
	I (hands), OI, SW (hands)	24	1+ raw; 0+ cooked				228
		48	1+				88
	AD, GP, RN	1-47	20+		7+		167
Cayenne							
	Red				16+		213
	White						166
	CD, DM, EX, PM	11-87	4+			HR 2+	230
Pineapple	EX						167
	AD, GP, RN	1-47	4+		15+		213
			5+				107
	A, D, I, V	5-70					47
Plum	A, EX	4	Open; 1+		0	HR 1-	97
	AE, TS	85	Double; 1+		1+		31
	AE, RC, U, V	20			1+		110
	AE, AS	27			5+		237
Pomegranate	A, AD, AE, AS, D, P, U, V	11-33					35
	AD, CU, GI, RC	0.75-19	Double; 0+				199
	AD, DY, H, LE, W	3-27	Double; 1+				198
	AD, AP, CU, D, N, RN, S, V	1.33-19	Double; 0+				200
Poppy seed	AD, CU, GI, RC		Double; 3+				202
	AD, AP, AS, N, RN, V	0.33-24	Double; 2+				5
	AE, RN						
	A, AE, AS, H, S, U, V	11	1+		1+	HR 1+; PK 1+; IB 1+	40
Potato		4-18	139+				55
	AE, DY, W	17				HR 1+	78
	AE						83
	RN, S, TP	24				PK 1+	164
Psyllium	AE, OAS	10-61					177
	AE, AS, U	21			3+	PK 1+	185
	CU, GI, LE, NS	0.5-25					200
	AP, D, N, NS, RN, S, V, W	1.33-19	Double; 4+				198
Psalium	DY, H, LE, W	3-27	Double; 1+				199
	AD, AP, AS, N, RN, V	0.33-24	Double; 2+				202
	GI, U	1-16			12+	IB 5+; HR 8+	241
	EX	0.71	Open; 1+				47
Psalium	A, I (eyes), V	43					10
	A, AC, CO, D, H,	27-73			18+	IB 20+	102
	I (eyes), N, V, W						
	A, AE, CO, I (mouth), V	43					111
Psalium	A, AE, TC, U	60			1+	HR 1+	122
	AS, RN	28					194

TABLE 2 (continued)
Less Common Allergenic Foods and Food Groups^a

Food	Symptoms (see end of table for list)	Age Years	Oral challenge	Skin Test	RAST	Other assays	Ref.
Rape	A, D, V	40	Single; 1+	1+			146
Rice	A, AC, AE, DY, PR	0.75	Single; 1+	1+		HR 1+	28
	GI, NS	21	Open; 1+	1+ raw,	1+ raw,	HR 1+, IB 1+	78
		55		1+ cooked	0+ cooked		160
	AD, AP, AS, N, RN, V	0.33-24		8+	6+		202
	AS, EX	5-21		6+	1+	IB 1+, PK 1+	207
	D, FL, V	2				HR 17+, IB 32+	215
	AD, AS	25		1+			223
	QE	0.5	Open; 1+				226
	D, V				4+		235
	DM				10+		242
							243
Rye	CU, GI, RC	0.25-19	Double; 1+	3+	3+		26
	AD, AP, CU, D, N, RN, S, V, W	1.25-19	Double; 1+	2+			53
	AD, AP, AS, N, RN, V	0.33-24		8+			198
	AS, GI, U				10+		202
	AS, DM, RN	12-46		2+			217
	AE, PR, VC (with exercise)	16		1+	8+		237
Sesame seed	A, AE, B, FL, I (general), RD, TN, U, W	30		5+	1+		12
	A, AE, D, E, N, U, V	20-38			5+		99
	A, AE, H, PP, U	31-72		1+	3+		108
	AE	45			1+		136
	AS	6-17					237
Single cell protein	D, N, V		Open; 7+		0+		244
	D, N, V		Open; 2+		0+		206
Soybean oil	AE, AP, LE, RC, RN, U, W (with soybeans)	18-63	Double; 0+	0+			37
Spinach	CU, GI, RC	20	Double; 1+	1+	1+	HR 1-	49
Squid — Raw		0.25-19		0+	1+	BC 1+	26
Boiled	AE, AS, CJ, D, N, U, V	16-42	Double; 0+	7+	7+		39
Strawberry	AC, AD, AS, N, RN, V I (pharyngeal), RN	0.33-2 33		1+		EL 1+	202
Sugar beet	AE, BR, D, H, RN, U, V	20	Double; 25+	1+	1+	HR 1-	239
Sunflower seed	A, AE, DY, N, PR, U, V, W A, AE, GP, I (lips) AE, H, LE	>10 29-37 11-58 34 13	Open; 0+ (oil) Open; 1+ Open; 0+ (w/exercise)	52+ 2+ 3+ 1+ 1+	2+ 3+ PK 1+ (seed)		117 82 174 214 141

Sunflower oil	A, AE, DY, N, PR, U, V, W (with sunflower seeds)	29-37	Open; 0+ (oil)	2+	2+	PK 1+ (seed)	82
Swiss chard	AS, RCJ	20	Open; 1+	1+	1+	HR 1+	49
Tangerine	I (eyes, nasal), RN, S	46		1+	1+	BC 1+; HR 1+	182
Tangerine seeds	AC, AE, DY, N, U	33		1+	1+		78
Tomato	AE, AS, DM, U	12-45		2+	2+		188
	DM, I (lips)	>10	Double; 2+	7+	7+		22
	AE, BR, D, H, RN, U, V			18+	18+		83
	EX, U			1+	1+		117
	AE, I (oral)	10-61		12+	12+		144
	AD, AP, AS, N, RN, V	0.33-24		5+	5+		177
	DM, I (throat, lips)			4+	4+		202
	A (with exercise)	20-39		2+	2+		50
Tragacanth gum	AS, U	33	Open; 1+	1+	1+	PK 1+	115
	AE, AP, DY, PR	35		1+	1+		32
	I	39		1+	1+		44
	CU, GI, RC	0.25-19	Double; 1+	1+	1+		196
Turkey				1+	1+		252
Turnip				3+	3+		26
Vanillin				8+ (patch)	8+		178
Vitamin A	AD, V	0.75	Double; 1+	0+	0+		166
Vitamin E	DM	21		1+	1+		152
Wine	PU	60	Open; 1+	1+	1+		81
	A, AE, U	31		1+	1+		191
Yeast	U		Double; 5+	1+	0+	PK 1-	2
	AE, U	34	Open; 1+ (wine)	1+	1+		41
	U	33	Open; 1+ (wine)	1+	1+		100
	AS, EX, RN	6-51		39+	39+		112
	AE, NS, PR, U	15-66		7+	7+		119
	AS	15		1+	1+		131
Saccharomyces cerevisiae	AD, EX			28+	28+		225
Zucchini		12-71				EL 62+	109

^a This table was compiled using literature searches of the Agricola (1972 to July 1994) and Medline (1966 to July 1994) databases.

Abbreviations: A, anaphylaxis; AC, abdominal cramping; AD, atopic dermatitis; AE, angioedema; AP, abdominal pain; AS, asthma; B, burning mouth or lips; BC, bronchial challenge; BR, bronchospasm; BU, buccal ulceration; C, chills; CD, contact dermatitis; CH, choking; CJ, conjunctivitis; CL, Colic; CMA, cows' milk allergy; CO, cough; CU, cutaneous complaint; (see banana) CY, cyanosis; D, diarrhea; DI, dizziness; DM, dermatitis; DS, difficult swallowing; DY, dyspnea; E, edema; EL, enzyme linked immunosorbent assay; ER, erythema; EX, eczema; F, fever; FC, flatulence; FL, flushing; G, gingivostomatitis; GI, gastrointestinal symptoms; GP, gastric pain; H, hypotension; HA, headache; HR, histamine release assay; I, itching; IB, immunoblotting; LE, laryngeal edema; LV, lost voice; M, migraine; N, nausea; NS, nasal symptoms; OA, occupational asthma; OAS, oral allergy syndrome; OD, oral dermatitis; OE, oral edema; OI, oral irritation; OM, oral mucosa; OPP, oropharyngeal pruritus; P, palpebrae (eyelids); PH, plasma histamine; PK, Prausnitz-Kustner test; PM, pompholyx; PP, pharyngeal pruritus; PR, pruritus; PS, pharyngeal swelling; PU, purpura; QE, Quincke's edema; (see rice) RAST, radioallergosorbent test; RC, respiratory complaints; RCJ, rhinoconjunctivitis; RD, respiratory distress; RN, rhinitis; S, sneezing; ST, stomatitis; SW, swelling; T, elevated tryptase; TC, tachycardia; TN, tongue swelling; TP, throat pain; TS, throat swelling; TT, throat tightness; U, urticaria; UC, chronic urticaria; V, vomiting; VC, vascular collapse; W, wheezing; WE, weakness; WH, wheal.

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