

RMA FST Enhanced **Accession: 716954**

Healthcare Professional

Patient

Age:

Date of Birth:

Gender:



RESULT STATUS	NOTE: Results are reported in U/mL. The limits assigned to individual antigens are based on a statistical analysis of a Canadian population
NORMAL	The upper limit for assigning Normal status varies by antigen. Results below 15 U/mL are reported as <15.
BORDERLINE	The upper and lower limits for assigning Borderline status vary by antigen.
ELEVATED	The lower limit for assigning Elevated status varies by antigen. Results above 160 U/mL are reported as >160.

Dairy / Egg

144 Alpha-Lactalbumin (whey)	121 Beta-Lactoglobulin (whey)	131 Casein
96 Egg White	134 Egg Yolk	88 Milk (Buffalo)
147 Milk (Cow)	>160 Milk (Goat)	139 Milk (Sheep)

Grains

135 Barley	155 Couscous	160 Durum Wheat
116 Gliadin	144 Malt	107 Oat
127 Rye	146 Spelt	119 Wheat
140 Wheat Bran		

Grains (Gluten-Free)

53 Amaranth	49 Buckwheat	41 Corn
63 Millet	53 Polenta	35 Quinoa
134 Rice	<15 Tapioca	

Fruit

41 Apple	83 Apricot	24 Avocado
63 Banana	<15 Black Currant	<15 Blackberry
50 Blueberry	67 Cherry	35 Cranberry
58 Date	43 Fig	71 Grape (Black/Red/White)
40 Grapefruit	60 Guava	21 Kiwi
26 Lemon	49 Lime	28 Lychee
53 Mango	41 Melon (Galia/Honeydew)	66 Mulberry
86 Nectarine	46 Olive	65 Orange
26 Papaya	93 Peach	40 Pear
76 Pineapple	33 Plum	84 Pomegranate

Testing performed at Burnaby Reference Laboratory, 3680 Gilmore Way, Burnaby, BC V5G 4V8

Fruit

36	Raisin	31	Raspberry	32	Red Currant
37	Rhubarb	37	Strawberry	42	Tangerine
59	Watermelon				

Vegetables

33	Artichoke	26	Arugula	49	Asparagus
29	Beet	18	Bell Peppers	46	Broccoli
60	Brussels Sprout	51	Cabbage (Red)	69	Cabbage (Savoy/White)
28	Carrot	15	Cauliflower	50	Celery
<15	Chard	36	Chicory	41	Cucumber
16	Eggplant	85	Fennel (Leaf)	30	Leek
64	Lettuce	67	Onion	29	Potato
56	Radish	29	Shallot	19	Spinach
18	Squash (Butternut/Carnival)	21	Squash, Summer	34	Sweet Potato
80	Tomato	70	Turnip	32	Watercress
50	Yuca				

Fish / Seafood

47	Alga Espaguette	<15	Alga Wakame	<15	Anchovy
57	Barnacle	80	Bass	36	Carp
26	Caviar	71	Clam	23	Cockle
15	Cod	39	Crab	32	Cuttlefish
44	Eel	<15	Haddock	38	Hake
22	Herring	24	Lobster	20	Mackerel
21	Monkfish	16	Mussel	41	Octopus
25	Oyster	<15	Perch	108	Pike
15	Plaice	61	Razor Clam	32	Salmon
48	Sardine	24	Scallop	26	Sea Bream (Gilthead)
23	Sea Bream (Red)	45	Shrimp/Prawn	<15	Snail (Sea Snail/Winkle)
<15	Sole	55	Spirulina	<15	Squid
26	Swordfish	<15	Trout	42	Tuna
15	Turbot				

Meat

52	Beef	47	Chicken	40	Duck
41	Goat	21	Horse	46	Lamb
21	Ostrich	26	Ox	33	Partridge
<15	Pork	27	Quail	15	Rabbit
65	Turkey	50	Veal	66	Venison
19	Wild Boar				

Herbs / Spices

58	Aniseed	23	Basil	<15	Bayleaf
63	Camomile	62	Cayenne	15	Cinnamon
28	Clove	29	Coriander (Leaf)	56	Cumin
30	Curry (Mixed Spices)	44	Dill	81	Garlic
42	Ginger	66	Ginkgo	28	Ginseng
19	Hops	30	Licorice	44	Marjoram

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Herbs / Spices

17	Mint	87	Mustard Seed	38	Nettle
33	Nutmeg	58	Parsley	22	Peppercorn (Black/White)
20	Peppermint	50	Red Chili Pepper	16	Rosemary
<15	Saffron	51	Sage	47	Tarragon
26	Thyme	97	Vanilla		

Nuts / Seeds / Legumes

113	Almond	60	Bean (Broad)	<15	Bean (Green)
51	Bean (Red Kidney)	50	Bean (White Haricot)	129	Brazil Nut
<15	Canola	>160	Cashew Nut	59	Chestnut
29	Chickpea	51	Coconut	39	Flax Seed
79	Hazelnut	56	Lentil	54	Macadamia Nut
25	Pea	146	Peanut	17	Pine Nut
>160	Pistachio	24	Sesame Seed	102	Soy Bean
48	Sunflower Seed	38	Tiger Nut	62	Walnut

Miscellaneous

19	Agar Agar	65	Aloe Vera	<15	Cane Sugar
64	Caper	28	Carob	16	Cocoa Bean
36	Coffee	28	Cola Nut	38	Honey
70	Mushroom	19	Tea (Black)	<15	Tea (Green)
22	Transglutaminase	38	Yeast (Baker's)	118	Yeast (Brewer's)

Note: Quantification of Food Specific IgG has been utilized in research settings to assess and investigate Type III hypersensitivity. Measurement of food specific IgG is not a diagnostic indicator of IgE (classical or type I) allergy and should not be used for this purpose. Measurement of Candida albicans IgG levels is not a diagnostic indicator of Candidiasis. Research studies have shown levels of Candida albicans IgG in the circulation to have some Correlation with the degree of its colonization in the gut. Use of repeat serum IgG measurements to monitor declining Candida albicans burden is not recommended. The Burnaby Reference Laboratory is ISO 15189 accredited by The Institute of Quality Management in Healthcare for this class of test. The tests are currently not accredited by the Diagnostic Accreditation Program. An accreditation application has been submitted.

IgG FOOD REACTIONS VS IgE FOOD ALLERGIES: IgG food reactions differ significantly from classic IgE food allergies. IgE food allergies are immediate reactions that occur within minutes or hours of consuming a food and may include serious reactions like hives, difficulty breathing and anaphylaxis. In contrast, an IgG food sensitivity is a delayed reaction that occurs hours to days after the food is consumed, with symptoms that may not appear for days or months. Lack of an IgG antibody response to a specific food does not rule out the possibility that the food may elicit an IgE reaction (food allergy). Patients should continue to avoid foods to which they have a known IgE food allergy. Conversely, elevated IgG to a specific food is not diagnostic of IgE food allergy. If symptoms (e.g. hives, difficult breathing) are suggestive of food allergy, the patient should be referred to an Allergist Specialist for specific IgE testing via ImmunoCAP.

IgG REACTIONS: IgG reactions are food sensitivities, not food allergies. When a reactive food is consumed, the IgG antibody forms a complex with the food antigen. Normally, the body is able to eliminate these antibody-antigen complexes, but with excess antigen, small complexes tend to deposit in blood vessel walls where they can cause tissue injury via the release of inflammatory mediators [Brantzaeg 1997]. Over time, this tissue injury may contribute to the development of a variety of health conditions. Research has shown that elimination of IgG reactive foods from the diet improves a variety of health conditions including irritable bowel syndrome and migraine headaches [Atkinson, Alpay]. Eliminating IgG reactive foods has also been reported to help with eczema, mood disturbances, weight gain and other digestive disturbances [Mullin, Lewis, Bentz].

NORMAL REACTIONS: A normal reaction to a food antigen may indicate lack of recent exposure to that food. Therefore, under circumstances of complete avoidance, it is impossible to determine whether the food(s) avoided would elicit a reaction if consumed recently. It is important to note that a normal reaction to a specific food does not mean it can be safely consumed by someone who has previously had a serious reaction to that specific food. Serious reactions to foods (e.g. anaphylaxis or hives) are caused by IgE antibodies, not IgG. Therefore, a normal IgG reaction to a known food allergen is not an indication the tested food is safe to consume.

PATIENT HAS A REACTION TO ONE OR MORE FOOD ANTIGENS NOT CONSUMED REGULARLY: It is possible to have elevated IgG to foods not recently consumed, or to foods that have been specifically avoided (i.e. due to serious previous IgE reaction). Elevated IgG in this circumstance may be due to panallergen reactions [refer to the RMA FST Food Sensitivities and Cross-Reactions document], or to an abundance of the IgG4 subtype antibody, which acts on mast cells and may have a protective effect for IgE reactions and antibodies may remain in circulation for 18 months even with no exposure [Mullin].

GOAT'S MILK AND/OR SHEEP'S MILK ARE BORDERLINE OR ELEVATED but patient may have never consumed: In vitro studies have shown extensive cross reactivity between milks from ruminant species. Significant amino acid sequence homology between milk from cows, goats and sheep mean cross-reactivity is highly probable [URL: www.uptodate.com/contents/milk-allergy-management. Accessed June 11, 2016]. Clinical research has found that a significant percentage of cow's milk allergic patients also react to goat and sheep milks [Pediatr Allergy Immunol. 2012 Mar;23(2):128-32].

CURRY IS BORDERLINE OR ELEVATED: Note that curry is a combination of several spices including: cardamom, chili, cloves, cinnamon, coriander, cumin, garlic, ginger, mustard, nutmeg, onion, paprika, pepper, and turmeric. The RMA FST does not test turmeric, paprika or cardamom separately. Therefore, if all the component curry spices tested are in the normal range, but curry is Borderline or Elevated, the clinician may decide avoidance of cardomom, paprika and turmeric is warranted in addition to curry powder.

BREWER'S YEAST IS BORDERLINE OR ELEVATED: Note that Brewer's Yeast and Baker's Yeast are different strains of one organism, *Saccharomyces cerevisiae*. The Brewer's Yeast strain is slower acting and has less after-taste than Baker's Yeast. Food sources of Brewer's Yeast include: beer, cider, dried fruits, marmite, miso, tamari, vegemite, yeast extract, wine. Brewer's Yeast may also be added to cookies, oatmeal and yogurt to improve nutrition. Brewer's Yeast is high in chromium and B vitamins and may be used in supplements.

BAKER'S YEAST IS ELEVATED: Note that Baker's yeast and Brewer's yeast are different strains of one organism, *Saccharomyces cerevisiae*. Baker's yeast must multiply quickly and under high heat, and so the appropriate strain of *Saccharomyces cerevisiae* is selected for rapid growth and ability to tolerate high heat. Food sources of baker's yeast include: bagels, bread, buttermilk, cheese, MSG, Oxo cubes, pizza dough, pretzels, root beer, soy sauce, soup, sourdough.

SEVERAL BIRCH POLLEN PROFILIN CONTAINING FOODS ARE ELEVATED: Profilins are small proteins in the plant cell cytoplasm that play a significant role in sensitizing individuals to pollens. Profilins are responsible for Oral Allergy Syndrome, a condition that results in burning or tingling in the mouth when cross-reactive foods are consumed. Different pollens are associated with specific foods. Foods that contain BIRCH POLLEN PROFILIN include: almond, apple, carrot, celery, cherry, hazelnut, kiwi, peach, peanut, pear, plum, potato, and soy. A reaction to several of these foods may indicate general reactivity to BIRCH POLLEN PROFILIN rather than reactivity to specific food antigens or families. Refer to the RMA Food Sensitivities and Cross-Reactions document for more information on cross-reactions.

SEVERAL LIPID TRANSFER PROTEIN CONTAINING FOODS ARE ELEVATED: Lipid transfer proteins (LTPs) are heat and acid stable, and therefore retain potential allergenicity after cooking or upon ingestion. Foods that have documented cross-reactivity via LTPs include: apple, celery, corn/maize, grape, hazelnut, kiwi, legumes, lettuce, peach, peanut, rice, soy, sunflower, and walnut. Refer to the RMA FST Food Sensitivities and Cross-Reactions document for more information on cross-reactions.

SEVERAL MUGWORT PROFILIN CONTAINING FOODS ARE ELEVATED: Profilins are small proteins in the plant cell cytoplasm that play a significant role in sensitizing individuals to pollens. Profilins are responsible for Oral Allergy Syndrome, a condition that results in burning or tingling in the mouth when cross-reactive foods are consumed. Different pollens are associated with specific foods. Foods that contain MUGWORT PROFILIN include: anise, broccoli, cabbage, caraway, carrots, cauliflower, celery, coriander, fennel, mango, parsley, and members of the Liliaceae, Rosaceae and Solanaceae families. A reaction to several of these foods may indicate general reactivity to MUGWORT PROFILIN rather than reactivity to specific food antigens or families. Refer to the RMA FST Food Sensitivities and Cross-Reactions document for more information on cross-reactions.

SEVERAL RAGWEED/TIMOTHY CONTAINING FOODS ARE ELEVATED: Profilins are small proteins in the plant cell cytoplasm that play a significant role in sensitizing individuals to pollens. Profilins are responsible for Oral Allergy Syndrome, a condition that results in burning or tingling in the mouth when cross-reactive foods are consumed. Different pollens are associated with specific foods. Foods that contain TIMOTHY OR RAGWEED PROFILIN include: banana, cucumber, melon, orange, tomato, watermelon and zucchini squash. A reaction to several of these foods may indicate general reactivity to TIMOTHY OR RAGWEED PROFILIN rather than reactivity to specific food antigens or families. Refer to the RMA FST Food Sensitivities and Cross-Reactions document for more information on cross-reactions.

SEVERAL SEED STORAGE PROTEIN-CONTAINING FOODS ARE ELEVATED: Seed storage proteins are heat and acid stable, and therefore retain their potential allergenicity after cooking or upon ingestion. The three categories of seed storage proteins are based on sedimentation rates: 2S, 7/8S and 11S. The 2S category includes: Brazil nut, buckwheat, canola, chickpea, mustard, peanut, pistachio, poppy seed, sesame seed, sunflower, and walnut. The 7/8S category includes: lentil, pea, peanut, soy and walnut, and the 11S category contains: cashew, chickpea, hazelnut, peanut, pistachio, and soy. Refer to the RMA FST Food Sensitivities and Cross-Reactions document for more information on cross-reactions.

REACTIVITY TO CRUSTACEA AND/OR MOLLUSCA: Reaction to Crustacea and/or Mollusca (even in the absence of exposure to, or with strict avoidance of), may indicate cross-sensitivity to TROPOMYOSIN, an allergenic protein found in insects and arachnids. Dust mites and cockroaches are common tropomyosin-containing allergens. If the clinician determines that exposure to tropomyosin could be contributing to clinical symptoms, measures to reduce exposure to insect and arachnid antigens may be recommended. Refer to the RMA FST Food Sensitivities and Cross-Reactions document for more information on cross-reactions.

ELEVATED REACTIONS TO FOODS: Interpretation comments are provided for certain foods. Comments appear when related foods give seemingly inconsistent results (e.g. casein normal and cow's milk high) and for reactive foods that are not commonly found in the North American diet. Refer to the FST Patient Guide Book for commentary on sources of individual foods or food categories.



ORDER BY REACTIVITY Report

ELEVATED FOODS

>160	Cashew Nut	160	Durum Wheat	>160	Milk (Goat)
>160	Pistachio	155	Couscous	147	Milk (Cow)
146	Peanut	146	Spelt	144	Alpha-Lactalbumin (whey)
144	Malt	140	Wheat Bran	139	Milk (Sheep)
135	Barley	134	Egg Yolk	134	Rice
131	Casein	129	Brazil Nut	127	Rye
121	Beta-Lactoglobulin (whey)	119	Wheat	118	Yeast (Brewer's)
116	Gliadin	113	Almond	108	Pike
107	Oat	102	Soy Bean	97	Vanilla
93	Peach	88	Milk (Buffalo)	87	Mustard Seed
86	Nectarine	85	Fennel (Leaf)	84	Pomegranate
83	Apricot	81	Garlic	80	Bass
80	Tomato	79	Hazelnut	76	Pineapple
71	Clam	71	Grape (Black/Red/White)	70	Mushroom
70	Turnip	69	Cabbage (Savoy/White)	67	Cherry
67	Onion	66	Ginkgo	66	Mulberry
66	Venison	65	Aloe Vera	65	Orange
65	Turkey	64	Caper	64	Lettuce
63	Banana	63	Camomile	63	Millet
62	Cayenne	62	Walnut	61	Razor Clam
60	Bean (Broad)	60	Brussels Sprout	60	Guava
59	Chestnut	59	Watermelon	58	Aniseed
58	Date	58	Parsley	57	Barnacle
56	Cumin	56	Lentil	56	Radish
55	Spirulina	54	Macadamia Nut	53	Amaranth
53	Mango	53	Polenta	52	Beef
51	Bean (Red Kidney)	51	Cabbage (Red)	51	Coconut
51	Sage	50	Bean (White Haricot)	50	Blueberry
50	Celery	50	Red Chili Pepper	50	Veal
50	Yuca	49	Asparagus	49	Buckwheat
49	Lime	48	Sardine	48	Sunflower Seed
47	Alga Espaguette	47	Chicken	47	Tarragon
46	Broccoli	46	Lamb	46	Olive
45	Shrimp/Prawn	44	Dill	44	Eel
44	Marjoram	43	Fig	42	Ginger
42	Tangerine	42	Tuna	41	Apple
41	Cucumber	41	Goat	41	Melon (Galia/Honeydew)
41	Octopus	40	Duck	40	Grapefruit

ELEVATED FOODS

40	Pear	39	Crab	39	Flax Seed
38	Hake	38	Honey	38	Nettle
38	Tiger Nut	38	Yeast (Baker's)	37	Rhubarb
37	Strawberry	36	Carp	36	Chicory
36	Coffee	36	Raisin	35	Cranberry
35	Quinoa	34	Sweet Potato	33	Artichoke
33	Nutmeg	33	Partridge	33	Plum
32	Cuttlefish	32	Red Currant	32	Salmon
32	Watercress	31	Raspberry	30	Curry (Mixed Spices)
30	Leek	30	Licorice		

BORDERLINE FOODS

96	Egg White	41	Corn	29	Beet
29	Chickpea	29	Coriander (Leaf)	29	Potato
29	Shallot	28	Carob	28	Carrot
28	Clove	28	Ginseng	28	Lychee
27	Quail	26	Arugula	26	Caviar
26	Lemon	26	Ox	26	Papaya
26	Sea Bream (Gilthead)	26	Swordfish	26	Thyme
25	Oyster	24	Avocado	24	Lobster
24	Scallop	24	Sesame Seed		

NORMAL FOODS

28	Cola Nut	25	Pea	23	Basil
23	Cockle	23	Sea Bream (Red)	22	Herring
22	Peppercorn (Black/White)	22	Transglutaminase	21	Horse
21	Kiwi	21	Monkfish	21	Ostrich
21	Squash, Summer	20	Mackerel	20	Peppermint
19	Agar Agar	19	Hops	19	Spinach
19	Tea (Black)	19	Wild Boar	18	Bell Peppers
18	Squash (Butternut/Carnival)	17	Mint	17	Pine Nut
16	Cocoa Bean	16	Eggplant	16	Mussel
16	Rosemary	<15	Alga Wakame	<15	Anchovy
<15	Bayleaf	<15	Bean (Green)	<15	Black Currant
<15	Blackberry	<15	Cane Sugar	<15	Canola
15	Cauliflower	<15	Chard	15	Cinnamon
15	Cod	<15	Haddock	<15	Perch
15	Plaice	<15	Pork	15	Rabbit
<15	Saffron	<15	Snail (Sea Snail/Winkle)	<15	Sole
<15	Squid	<15	Tapioca	<15	Tea (Green)
<15	Trout	15	Turbot		

Understanding the Reference Ranges

What Do the Numbers Mean?

The Majority of the foods tested in the RMA FST™ test fall within the following ranges:

- Green: 0 to 23 U/mL
- Yellow: 24 to 29 U/mL
- Red: 30+ U/mL

However, there are 19 foods tested that have different reporting thresholds.

Why Are the Reporting Thresholds for Some Foods Different?

When we graph the ranked reactivities of most foods for a large population, we observe a fairly consistent curve (Figure 1). The inflection point of the curve, where reactivity increases markedly, tends to occur about the 75th percentile, which coincides with a result of 30. In other words, approximately 25 out of 100 people tested will have a result of 30 or higher.

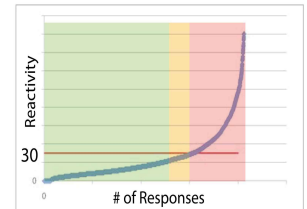


Figure 1 Population Research Curve for Most Foods

Based on statistical analysis of a large body of patients tested at RMA, the reporting thresholds of some foods do not fit the pattern shown in Figure 1; instead, a result of 30 appears very "early" in the distribution. Therefore, the reporting thresholds for those foods are different in order to reserve a red result for those patients whose result for that food lies in the top quartile of the population (shown in Figure 2). These thresholds also allow the practitioner more leeway to interpret the findings in the context of his or her clinical experience. See the list of foods and their associated reference ranges below.

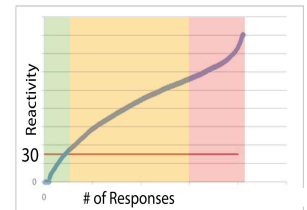


Figure 2 Population Research Curve for Different Foods

Foods with Different Reporting Thresholds

Updated Foods	Green Range	Yellow Range	Red Range
Agar Agar	0 to 30	31 to 54	55+
Almond	0 to 30	31 to 49	50+
Barley	0 to 30	31 to 49	50+
Bean,Red Kidney	0 to 30	31 to 47	48+
Bean,White Harricot	0 to 30	31 to 44	45+
Casein	0 to 30	31 to 97	98+

Updated Foods	Green Range	Yellow Range	Red Range
Cola Nut	0 to 30	31 to 58	59+
Corn (Maize)	0 to 30	31 to 46	47+
Egg White	0 to 30	31 to 99	100+
Gliadin	0 to 30	31 to 50	51+
Hazelnut	0 to 30	31 to 37	38+
Milk (Cow)	0 to 30	31 to 114	115+

Updated Foods	Green Range	Yellow Range	Red Range
Milk (Goat)	0 to 30	31 to 64	65+
Milk (Sheep)	0 to 30	31 to 66	67+
Pea	0 to 30	31 to 66	67+
Peanut	0 to 30	31 to 43	44+
Pistachio	0 to 30	31 to 50	51+
Wheat	0 to 30	31 to 66	67+
Yeast (Brewer's)	0 to 30	31 to 58	59+

We'd like to know more about the patient experience with our tests and services. Please enter the link below into your browser to complete our short online survey. You could win a \$50 gift card!

www.rmalab.com/FSTsurvey