

Systemic Dermatitis and Nickel Rich Foods

Nickel is a trace element found everywhere on earth, it is in the soil, water, air, and food that we eat. Exposure to nickel through one's diet can result in acute flares of allergic-dermatitis also known as systemic contact dermatitis. Increasing amounts of nickel consumed increases the chance that a nickel sensitive patient could develop a skin rash. The most common reactions being a generalized eczema-like rash, but sometimes it can be localized (involve only) to the hands.

Different types of foods inherently contain different amounts of nickel. This is a brief summary and guide to aid the consumer in navigating through which foods contain nickel and how to avoid high levels of nickel in our diets.

General instructions:

- Give the diet time to work; it may take a couple of months before a difference is noticed.
- Adults should consume **less than 150 µg of nickel per day**.
- **Children <12 years** and younger should consume **less than 100 µg/day** of nickel per day.
- In general avoid chocolate, oatmeal, granola, and legumes (such as peas, beans, lentils, soybeans, and peanuts to name a few).
Avoid cooking acidic foods with stainless steel cookware, as this causes the release of the otherwise tightly bound nickel.

Grains

Food Source	Nickel content (µg)	Serving Size
Bagel, plain	4.2	1 Bagel
Biscuits, baked	2.9	1 Biscuit
Bread, cracked wheat	5.7	1 slice
Bread, rye	3.7	1 slice
Bread, white, enriched	2.4	1 slice
Bread, whole wheat	6.0	1 slice
Corn flakes cereal	2.3	1 cup
Corn/hominy grits	1.4	1/4 cup
Corn/tortilla chips	12.3	1 cup

Cornbread	5.0	1 piece
Crackers, butter-type	2.8	6 crackers
Crackers, graham	2.7	2 large rectangular pieces
Crackers, saltine	1.2	5 crackers
Cream of wheat	2.3	1 cup
Crisped rice cereal	5.0	1 cup
English muffin, plain	4.6	1 muffin
Fruit-flavored cereal, presweetened	11.1	1 cup
Granola with raisins	40.7	1 bar
Muffin	1.2	1 muffin
Oat ring cereal	59.5	1 cup
Oatmeal	82.8	1 cup
Popcorn, microwave, butter-flavored	2.4	1 cup
Pretzels, hard, salted	3.9	10 twists
Raisin bran cereal	5.6	1 cup
Rice, white	7.8	1 cup
Shredded wheat cereal	3.3	1 cup
Spaghetti	6.7	1 cup
Tortilla, flour	4.6	1 tortilla
Wheat germ	82	1 cup

Dairy

Food Source	Nickel content (ug)	Serving Size
Butter, regular (salted)	0.2	1 tbsp
Cheese, American	1.2	1 slice
Cheese, Swiss	0.1	1 slice
Cottage cheese, creamed, low-fat (2% milk fat)	0.9	1 cup
Eggs	0.4	2 large eggs
Half & half cream	0.5	1/2 cup
Macaroni and cheese, prepared from box mix	4.1	1 serving
Sour cream	0.1	2 tbsp
Yogurt, low-fat, fruit-flavored	2.3	1/2 cup

Vegetables

Food Source	Nickel content (ug)	Serving Size
Asparagus	9.5	1 cup
Beets, canned	5.0	1 cup
Black olives	1.2	1 tbsp
Broccoli	8.3	1 cup
Brussels sprouts	5.0	1 cup
Cabbage	1.3	1 cup
Carrot	6.6	1 cup
Cauliflower	5.6	1 cup
Celery	2.6	1 cup

Coleslaw	2.8	1 cup
Collards	1.4	1 cup
Corn	4.3	1 large ear
Cucumber	2.4	1 cup slices
Dill pickles	1.3	1 medium pickle
Eggplant	0.7	1 cup
Green beans	28.3	1 cup
Lettuce, iceberg raw	9.1	1 cup
Lettuce, leaf, raw	4.5	1 cup
Lima beans	98.4	1/2 cup
Mixed vegetables, frozen	23.6	1 cup
Mushrooms	1.2	1 cup
Okra	4.7	1 cup
Onion	4.5	1 cup chopped
Peas	19.9	1/2 cup
Pepper, sweet, green	3.6	1 pepper
Pinto beans	98.8	1 cup
Potato	20.3	1 large potato
Potato chips	11.5	1 cup
Potato, french-fried, fast-food	22.9	1 medium serving
Soup, tomato, canned	21.5	1 cup
Spinach	2.5	1 cup
Spirulina	302.4	1 cup
Squash, winter (Hubbard/acorn)	9.8	1 cup

Summer squash	5.1	1 cup
Sweet potatoes	17.8	1 large potato
Tomato	3.4	1 tomato
Tomato juice	19.5	1 cup
Tomato ketchup	2.2	2 tbsp
Tomato salsa	12.5	1 cup
Tomato sauce	23.5	1 cup
Turnip	2.4	1 medium turnip
White beans	82.3	1 cup

Fruits

Food Source	Nickel content (ug)	Serving Size
Apple	1.1	1 Medium apple
Apricots, canned	11.0	1 cup
Avocado	9.5	1 avocado
Banana	5.3	1 Large banana
Cantaloupe	12.6	1 cup
Fruit cocktail, canned	16.9	1 drink
Grapefruit	6.7	1 cup
Grapes	0.6	1 cup
Orange	4.1	1 medium orange
Peach	12.0	1 medium peach
Peach, canned	14.9	1 cup
Pear	5.2	1 medium pear

Pear, canned	8.0	1 cup
Pineapple, canned	20.5	1 cup
Raisins	11.2	1 cup
Strawberries	5.8	1 cup
Watermelon	9.0	1 cup

Meat

Food Source	Nickel content (ug)	Serving Size
Beef steak, loin/sirloin	1.4	1 Steak
Beef, ground	7.5	3 oz
Bologna (beef/pork)	0.9	1 slice
Burrito with beef, beans and cheese	48.9	1 Burrito
Catfish	15.0	1 fillet
Chicken breast	3.7	1 breast
Chicken filet sandwich, fast-food	6.6	1 sandwich
Chicken nuggets, fast-food	9.8	5 pieces
Chicken thigh	0.7	1 thigh
Chili con carne with beans, canned	62.5	1 cup
Clam chowder	20.6	1 cup
Egg, cheese, and ham on English muffin, fast-food	8.1	1 sandwich
Fish sticks	8.1	4 sticks
Frankfurter (beef/pork)	2.1	1 link
Ham, cured	1.8	3 oz

Lamb chop	1.4	3 oz
Lasagna with meat	38.3	1 serving
Liver (beef/calf)	5.9	3 oz
Luncheon meat	0.5	2 slices
Meatloaf, beef	0.7	1 slice
Mussels	155.0	1 cup
Pizza, cheese and pepperoni, regular crust	10.1	1 slice
Pork and beans, canned	105.8	1 cup
Pork bacon	0.6	2 slices
Pork chop	1.2	3 oz
Pork roast, loin	1.1	1 chop
Pork sausage	25.2	1 sausage
Quarter-pound cheeseburger on bun, fast-food	10.4	1 cheeseburger
Quarter-pound hamburger on bun, fast-food	9.5	1 burger
Salami, luncheon-meat	1.2	3 slices
Salmon	9.2	1 fillet
Shrimp	0.9	1 cup
Soup, bean with bacon/pork, canned	42.8	1 cup
Soup, chicken noodle, canned	11.3	1 cup
Soup, vegetable beef, canned	11.5	1 cup
Spaghetti with meat sauce	25.5	1 cup
Taco/tostada with beef and cheese	12.9	1 taco
Tuna, canned	0.4	1 can

Turkey breast	2.2	1 breast
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Desserts

Food Source	Nickel content (ug)	Serving Size
Breakfast tart/toaster pastry	2.6	1 slice
Brownie	14.9	1 brownie
Cake, chocolate with icing	37.0	1 piece (1/8 of 18 oz cake)
Candy bar, milk chocolate	40.5	1 bar
Candy, hard, any flavor	0.4	5 pieces
Chocolate chip cookies	9.6	1 cookie
Cocoa powder	14.7	3 tbsp
Doughnut, cake-type, any flavor	14.6	1 doughnut
Honey	0.5	2 tbsp
Ice cream vanilla	0.2	1/2 cup
Milk shake, chocolate, fast-food	31.8	1 cup
Pudding, flavor other than chocolate	8.4	1 package
Pumpkin pie	13.6	1 piece
Sandwich cookies with crème filling	5.5	1 sandwich cookie
Sherbet, fruit-flavored	0.8	1/2 cup
Sugar cookies	0.9	1 cookie
Sweet roll/Danish pastry	3.0	1 pastry
Syrup	0.6	2 tbsp

Drinks

Drink	Nickel content (ug)	Serving Size
Coffee	1.4	1 cup
Cranberry juice cocktail	3.8	1 cup
Cream substitute, non-diary	3.0	1 cup
Decaffeinated coffee	1.7	1 cup
Decaffeinated tea	7.3	1 cup
Infant formula, soy-based	5.9	1 cup
Lemonade, frozen concentrate	1.0	1 cup
Milk, chocolate	19.8	1 cup
Pineapple juice, frozen concentrate	32.0	1 cup
Prune juice	34.8	1 cup
Tea	5.5	1 cup
Wine, red/ white	4.6	1 drink

Fats and Oils

Food Source	Nickel content (ug)	Serving Size
Margarine, regular (salted)	0.9	1 tbsp
Olive oil	0.0	2 tbsp
Peanut butter	15.4	2 tbsp
Peanuts	34.6	1/2 cup

Vegetable oil	0.1	2 tbsp
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Baby Food

Cereal, oatmeal	6.1	1 jar
Applesauce	1.0	1 jar
Bananas	3.3	1 jar
Beef and broth/gravy	1.7	1 jar
Carrots	5.3	1 jar
Cereal, rice	0.6	1 jar
Cereal, rice with apples	1.4	1 jar
Chicken and broth/gravy	25.8	1 jar
Chicken noodle dinner	36.8	1 jar
Fruit dessert/pudding	6.9	1 jar
Green beans	18.0	1 jar
Mixed vegetables	15.0	1 jar
Peaches	29.6	1 jar
Pears	20.4	1 jar
Peas	25.5	1 jar
Squash	15.2	1 jar
Sweet potatoes	17.7	1 jar
Teething biscuits	22.6	1 jar

Turkey and broth/gravy	4.1	1 jar
Vanilla custard/pudding	4.3	1 jar
Vegetables and beef	23.8	1 jar
Vegetables and chicken	21.9	1 jar
Vegetables and ham	11.6	1 jar

Avoid

Food Source	Nickel content (ug)	Serving Size
Brownie	14.9	1 brownie
Cake, chocolate with icing	37.0	1 piece (1/8 of 18 oz cake)
Candy bar, milk chocolate	40.5	1 bar
Chocolate chip cookies	9.6	1 cookie
Granola with raisins	40.7	1 bar
Green beans	28.3	1 cup
Lima beans	98.4	1/2 cup
Milk shake, chocolate, fast-food	31.8	1 cup
Mussels	155.0	1 cup
Oat ring cereal	59.5	1 cup
Oatmeal	82.8	1 cup
Peanuts	34.6	1/2 cup
Pinto beans	98.8	1 cup
Pork and beans, canned	105.8	1 cup
Refried beans, canned	125.0	1 cup

Spirulina	302.4	1 cup
Sunflower seeds	103.1	1 cup
Syrup, chocolate	36.2	2 tbsp
Wheat germ	82	1 cup
White beans	82.3	1 cup

- Nickel from drinking water and other beverages ranges from 1-10 µg per liter, and is generally considered negligible.

References:

- 1.) Jensen CS, Menne T, Johansen JD. Systemic contact dermatitis after oral exposure to nickel: a review with a modified meta-analysis. *Contact Dermatitis*. 2006; 54: 79-86.
- 2.) Mislankar M, Zirwas MJ. Low nickel diet scoring system for systemic nickel allergy. *Dermatitis* 2013; 24: 190-5
- 3.) Sharma AD. Relationship between nickel allergy and diet. *Indian J Dermatol Venereol Leprol* 2007; 73: 307-12
- 4.) Total Diet Study Statistics on Element Results based on 2006-2011 US Food and Drug Administration Market Baskets. Available at:
<http://www.fda.gov/Food/FoodScienceResearch/TotalDietStudy/ucm184293.htm>
Accessed Feb 15, 2016

Sample Weekly Meal Plan: Nickel Content

	Breakfast	Lunch	Dinner	Total:
Sunday	2 egg omelet with mushrooms and asparagus 1 slice of wheat toast with butter	Turkey Sandwich on wheat bread with lettuce, tomatoes and mustard	Turkey Breast, oven-roasted 1 cup broccoli	
Nickel (µg)	8.2	17.9	10.5	36.6
Monday	Plain bagel with cottage cheese 1 cup cantaloupe	Bacon (3 slices), lettuce(1/2 cup), avocado (1/2 fruit), tomato sandwich	Salmon Fillet 1 cup of white rice	
Nickel (µg)	17.6	9.6	17	44.2
Tuesday	Cornflakes with milk 1 medium orange	Meat lasagna	2 cups of chicken noodle soup 1 piece of cornbread	
Nickel (µg)	7.4	38.3	16.6	62.3
Wednesday	Cream of wheat 1 medium pear	Macaroni and Cheese	Grilled Chicken breast 1 cup of sautéed winter squash (in olive oil) 1 large sweet potato	
Nickel (µg)	2.3	4.1	31.3	37.7
Thursday	1/2 cup of low fat yogurt 1 English muffin with butter	2 cups of tomato soup 1 wheat roll with butter	2 Tacos with beef and cheese 1 cup white rice	
Nickel (µg)	6.1	29	33.6	68.7
Friday	3, 4 inch pancakes with syrup 1 cup of strawberries	Chicken salad (made with spinach): 1 chopped medium apple 1 cup sliced cucumber 1 diced tomato Dressing: Olive oil	Shrimp (1 cup) Stir-fry 1/4 cup chopped onion 1/2 cup carrots 1/2 green pepper 1/2 cup broccoli	
Nickel (ug)	18.1	15.6	11.3	45
Saturday	1 large potato, diced and sautéed in olive oil 3 oz of cured ham	2 cups of beef and vegetable soup	3oz Pork Chop 1 cup cauliflower 1 large baked potato	
Nickel (ug)	22.1	23	27.1	72.2