


INE | INSTITUTE OF
NUTRITIONAL
ENDOCRINOLOGY


Food Principles: Oxalates

Dr. Ritamarie Loscalzo




www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)


Medical Disclaimer: The information in this presentation is not intended to replace a one-on-one relationship with a qualified health care professional and is not intended as medical advice. It is intended as a sharing of knowledge and information from the research and experience of Dr. Ritamarie Loscalzo, drritamarie.com, and the experts who have contributed. We encourage you to make your own health care decisions based upon your research and in partnership with a qualified health care professional. This presentation is provided for informational purposes only and no guarantees, promises, representations or warranties of any kind regarding specific or general benefits, have been or will be made by Dr. Ritamarie Loscalzo, her affiliates or their officers, principals, representatives, agents or employees. Dr. Ritamarie Loscalzo is not responsible for, and shall have no liability for any success or failure, acts and/or omissions, the appropriateness of the participant's decisions, or the use of or reliance on this information.



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

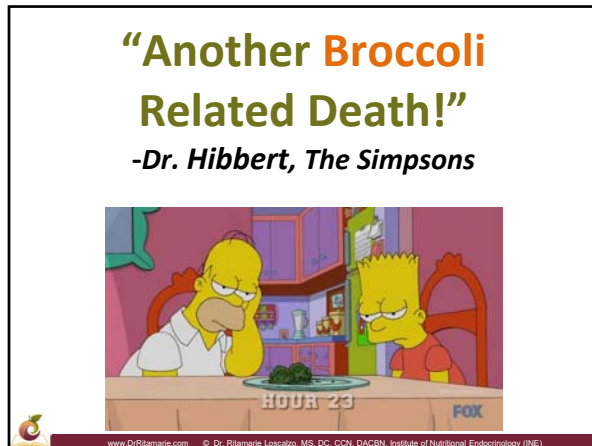


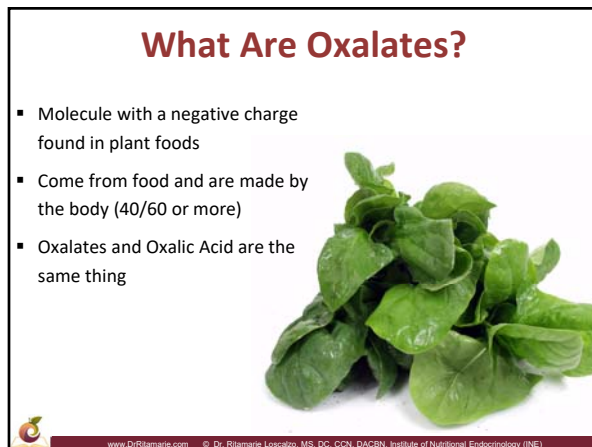
**"If diet is *Wrong*,
medicine is of no use.
If diet is *Correct*,
medicine is of no need."**

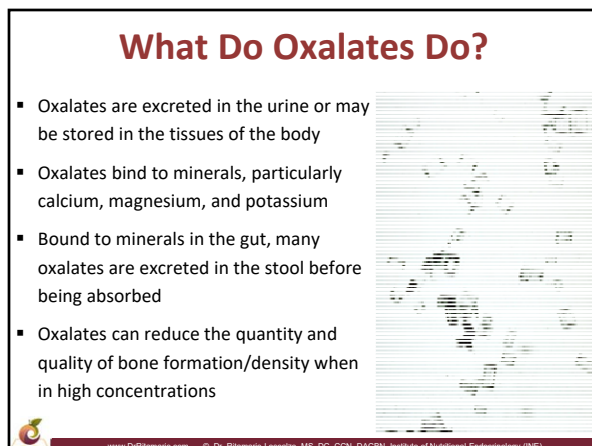


~ Ancient Ayurveda Proverb

www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

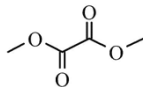






Oxalic Acid is an Anti-Nutrient that Inhibits Mineral Absorption

- Spinach: Calcium availability is poor due to oxalates
- Oxalate levels are so high they bind to calcium in the food making it unavailable
- Oxalates in spinach can bind to the calcium and minerals from other sources in the diet (1, 2)
- Raw spinach oxalate level - 1000 mg/3 oz



1. Speirs, Mary, "The utilization of the calcium in various greens." *The Journal of Nutrition* 27.6 (1939): 357-361.
2. Peterson, Catherine A., J. A. Eurell, and J. W. Erdman Jr. "Bone composition and histology of young growing rats fed diets of varied calcium bioavailability: spinach, nonfat dry milk, or calcium carbonate added to casein." *The Journal of Nutrition* 122.1 (1992): 137



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Oxalic Acid

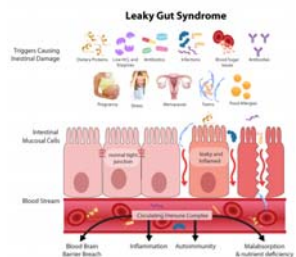
- Can bind to calcium, forming crystals with sharp edges which can cause inflammation and pain
- Can disrupt other minerals, impair mitochondrial function, and create oxidative stress
- Can deplete glutathione



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

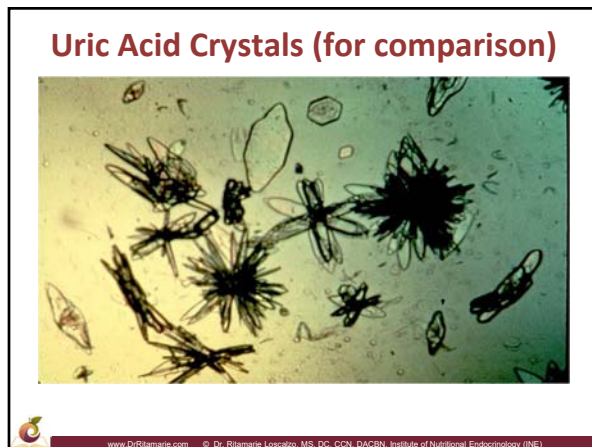
Who is Affected?

- 3-fold greater plasma oxalate levels in people with conditions on the autistic spectrum and 2.5 fold in urine oxalate levels
- Those with compromised digestive barriers



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)







Hyperoxaluria Type 1 and 2

- Body is lacking in enzymes to break down oxalates to some degree
- Type 1 usually has stronger symptoms and is often noticeable earlier in life
- Clinical diagnosis of these disorders is rare



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Organic Acid Test

- Great Plains Lab
- Spot oxalate tests are less accurate
- Genova test doesn't have oxalates



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Interpreting the OAT

20	Glyceric	0.71 - 9.5	H	17		<17
21	Glycolic	20 - 202	H	207		<207
22	Oxalic	15 - 174	H	223		<223



Organic Acids Test - Nutritional and Metabolic Profile

Metabolic Markers in Urine Reference Range (mmol/mol creatinine) Patient Reference Population - Females Under Age 13

- Glyceric = type 2
- Glycolic = type 1
- Oxalic = measurement of oxalic acid



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Oxalate Degrading Enzymes

20	Glyceric	0.71	-	9.5	H	17		
21	Glycolic	20	-	202	H	207		
22	Oxalic	15	-	174	H	223		

Organic Acids Test - Nutritional and Metabolic Profile


Metabolic Markers in Urine	Reference Range (mmol/mol creatinine)	Patient	Reference Population - Females Under Age 13
Serine-Pyruvate Aminotransferase			
Alanine-Glyoxylate Aminotransferase			
Glyoxylate Reductase (Hydroxypyruvate Reductase)			
D-Glycerate Dehydrogenase			

- Serine-Pyruvate Aminotransferase
- Alanine-Glyoxylate Aminotransferase
- Glyoxylate Reductase (Hydroxypyruvate Reductase)
- D-Glycerate Dehydrogenase

www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Most At Risk

- Children grabbing their heads, joints, or genitals and/or poking at their eyes
- Those with **leaky gut**
- Those with a history of **upper GI surgery**
- Popeye (ha ha!)
- Those with **low gallbladder function** or gallbladders removed
- Those with **mineral imbalances**, known methylation or sulfation issues, and fat deficiencies
- Those with conditions on the autistic spectrum
- Those with impaired Krebs cycle
- Those with a **history of IBD, IBS, interstitial cystitis, headaches, high histamine, or thyroid insufficiency**



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Oxalates and Sulphates

- High oxalates can lead to poor sulphation/low sulphate
- Low sulphates slow detoxification
- Low sulphates can overwhelm methylation cycles
- Low sulphates can let oxalates into cells, affecting the mitochondria




Durian is a dietary source of sulphur

www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Oxalates and Phenols


- Low sulphates can cause phenol reactions
- Salicylates (Aspirin) = similar reactions to phenols
- Phenols = petroleum
- High phenol foods =
Natural/artificial color/flavor, tomatoes, apples, peanuts, bananas, honey, oranges, cocoa, coffee, grapes/wine, colorful berries
- Also high phenol =
Castoreum, sodium benzoate, petroleum based preservatives, BHT, fragrance, phenoxyethanol, mineral oil, PEG (6, 7, 40 etc.)



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Oxalate Producing Organisms


- Aspergillus
- Candida
- Carbohydrate malabsorption feeds fungi
- LPS (lipopolysaccharides) are produced by gram-negative dysbiotic flora
- Toll Like Receptors in the kidneys can become desensitized to oxalates by LPS



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Oxalates and the Kidneys


- Kidneys protect themselves with a mucosal lining
- Toll Like Receptors in kidneys signal when to produce a more protective barrier
- Toll Like Receptors can become desensitized to oxalates by LPS (lipopolysaccharides)
- LPS are produced by gram-negative dysbiotic flora
- LPS can get into the body through a weak digestive barrier (leaky gut)



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

High Oxalate Foods

<input type="checkbox"/> Nuts, especially almonds and peanuts	<input type="checkbox"/> Sweet potatoes
<input type="checkbox"/> Beans, most	<input type="checkbox"/> Chocolate
<input type="checkbox"/> Beets	<input type="checkbox"/> Citrus peel
<input type="checkbox"/> Figs	<input type="checkbox"/> Kiwi and starfruit
<input type="checkbox"/> Rhubarb	<input type="checkbox"/> Tea
<input type="checkbox"/> Swiss chard, field greens, spinach	<input type="checkbox"/> Blackberries
<input type="checkbox"/> Buckwheat	<input type="checkbox"/> Raspberries
<input type="checkbox"/> Amaranth	<input type="checkbox"/> Gooseberries
<input type="checkbox"/> Soy	



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Sneaky Oxalate Foods

<input type="checkbox"/> Turmeric (curcumin okay)	<input type="checkbox"/> Curry leaf
<input type="checkbox"/> Black pepper	<input type="checkbox"/> Moringa
<input type="checkbox"/> Horsetail	<input type="checkbox"/> Aronia (chokeberry)
<input type="checkbox"/> Stinging nettle	<input type="checkbox"/> Purslane
<input type="checkbox"/> Herbal tinctures (of high oxalate herbs)	
<input type="checkbox"/> Dandelion greens	
<input type="checkbox"/> Chicory	
<input type="checkbox"/> Figs	
<input type="checkbox"/> Tamarillo	



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Safe Food Alternatives

<input type="checkbox"/> Flour: coconut, water chestnut, garbanzo bean
<input type="checkbox"/> Seeds: pumpkin and sunflower
<input type="checkbox"/> Blueberries
<input type="checkbox"/> Dinosaur/lacinato kale
<input type="checkbox"/> Oils
<input type="checkbox"/> Squash
<input type="checkbox"/> Basil
<input type="checkbox"/> Cilantro
<input type="checkbox"/> Cranberries
<input type="checkbox"/> White pepper
<input type="checkbox"/> Cherries, peaches, plums



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Medications, Supplements, Chemicals

- Miralax (Constipation)
- Antifreeze (Cars)
- Lexapro (SSRI)
- Naftidrofuryl (Reynauds and peripheral neuropathy, dementia)



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Band-aids and Relief

- Calcium or Magnesium Citrate with meals
 - (powder, liquid, or chewable = best)
- B6 (pyridoxine)
- Magnesium
- B1 (thiamin)
- B7 (biotin)
- Gravel root, Chanca Piedra, Hydrangea root (decoctions)
- High antioxidant diet
- Acetyl-L-Glutathione, liposomal or transdermal glutathione



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Long-Term Solutions

- Better fat absorption
- Digestive bacteria balancing including Oxalobacter formigenes, Bifidobacterium (all), Lactobacillus plantarum
- Healing tight junctions in the gut
- Liver / gallbladder (bile) support
- Adequate mineral, amino acid, and vitamin intake
- Reducing oxalate intake for a time to give the liver a chance to detoxify stored oxalates



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Myths and Mix-ups: 1

- Oxalates can inhibit LDH (lactate dehydrogenase), which may or may not have an effect on the growth of cancer cells
- Oxalates from anti-cancer medications have been found to be neurotoxic
- Oxalates are poisonous; one would have to eat at least 11 pounds of the highest oxalate foods (like turmeric or rhubarb) to get to this level
- The body can make oxalates from ascorbic acid (vitamin C), although studies have not shown this to extend to levels excreted in urine
- High oxalates can lead to high histamine by triggering its release, just like anything irritating can cause histamine release
- No, cooking foods does not reduce oxalates
- Boiling vegetables and dumping the water will reduce oxalates and nutrients



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Myths and Mix-ups: 2

- Essential oils are ok even if the plants may not be (e.g. black pepper, turmeric, herbs)
- Curcumin is okay, turmeric is high oxalate
- Green juices can be high oxalate
- Think in *oxalates per meal*



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Helping Your Clients

- Eliminating one food at a time
- Supporting children and families
- Facebook recipe groups
- Lists/charts/handouts
- Eating out



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

How to Remove Oxalates from the Diet

- Cut out one oxalate food at a time (several days between)
- If your client feels worse they may be dumping oxalates (detoxifying rapidly)
- This is art/science; everyone is different



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

The Real Problem

- Oxalate LOAD
- Too many coming in, not enough going out
- Oxalates are absorbed in higher amounts when there is fat malabsorption, leaky gut, and dysbiosis
- The body can detoxify oxalates via citric acid (endogenous)
- The body can detoxify oxalates through these enzymes:
 - Serine-Pyruvate Aminotransferase
 - Alanine-Glyoxylate Aminotransferase
 - Glyoxylate Reductase (Hydroxypyruvate Reductase)
 - D-Glycerate Dehydrogenase



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Vitamin/Mineral Interactions

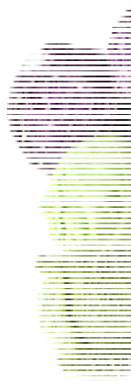
- B6 is depleted by high oxalates
- B6 is required for oxalate metabolism
- Calcium is depleted by high oxalates
- Calcium can bind to oxalates in the gut
- Cholesterol and taurine (cysteine, B6, C) help us produce bile and absorb less oxalic acid
- Magnesium, manganese, potassium, iron, zinc



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Low Oxalate Diet


- **Pros:**
 - Can support those with mitochondrial dysfunction
 - Has positive implications for many disorders
 - Gets people out of physical pain
 - Can have dramatic effects with children
 - Can address yeast overgrowth for some people that diet can't
- **Cons:**
 - Must remove oxalates SLOWLY over time
 - Reactions can seem confusing - often worse before better
 - Best to include supplements for support along with diet changes
 - Adds another level of restriction
 - May not be a long-term solution for most



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Address the Following


- Cellular metabolism (Krebs/citric acid cycle)
- Bile production and liver health
- Leaky gut
- Dysbiosis and fungal overgrowths
- Nutrient deficiencies and imbalances
- Oxalate load
- Endogenous antioxidant production



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

Low Oxalate Diet Resources



- **Food chart:** <http://www.drRitamarie.com/go/LowOxalateRecipes>
- **Facebook:** Trying Low Oxalates
- **WHfoods:** <http://www.drRitamarie.com/go/WHFoodsOxalates>
- **Rotating greens:** <http://www.drRitamarie.com/go/LowOxalateGreens>
- **Julie Matthews:** *Nourishing Hope for Autism* (book)
- **Phenols:** <http://www.drRitamarie.com/go/Phenols>



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)

References

- Kumar R, Lieske JC, Collazo-Clavell ML, et al. Fat malabsorption and increased intestinal oxalate absorption are common after Roux-en-Y gastric bypass surgery. *Surgery*. 2011 May;149(5):654-61
- Dobbins JW, Binder HJ. Importance of the colon in enteric hyperoxaluria. *N Engl J Med*. 1977 Feb 10;296(6):298-301
- Hess B, Jost C, Zipperle L, et al. High-calcium intake abolishes hyperoxaluria and reduces urinary crystallization during a 20-fold normal oxalate load in humans. *Nephrol Dial Transplant*. 1998 Sep;13(9):2241-7
- Marengo SR, Romani AM. Oxalate in renal stone disease: the terminal metabolite that just won't go away. *Nat Clin Pract Nephrol*. 2008 Jul;4(7):368-77
- Le, Anne; Charles Cooper; Arvin Gouw; Ramani Dinavahi; Anirban Maitra; Lorraine Deck; Robert Royer; David Vander Jagt; Gregg Semenza; Chi Dang (14 December 2009). "Inhibition of lactate dehydrogenase A induces oxidative stress and inhibits tumor progression". *Proceedings of the National Academy of Sciences*. 107: 2037–2042.
- Siener R, Seidler A, Voss S, et al. The oxalate content of fruit and vegetable juices, nectars and drinks. *Journal of Food Composition and Analysis*, Volume 45, February 2016, Pages 108-112
- Miller AW and Dearing D. The metabolic and ecological interactions of oxalate-degrading bacteria in the Mammalian gut. *Pathogens*. 2013 Dec 6;2(4):638-52
- Knight J, Deora R, Assimos DG, et al. The genetic composition of *Oxalobacter formigenes* and its relationship to colonization and calcium oxalate stone disease. *Urolithiasis*. 2013 Jun;41(3):187-96
- Amalraj A and Plus A. Bioavailability of calcium and its absorption inhibitors in raw and cooked green leafy vegetables commonly consumed in India — An in vitro study. *Food Chemistry*, Volume 170, 1 March 2015, Pages 430-436
- Jonassen JA, Kohijimoto Y, Scheid CR and Schmidt M. Oxalate toxicity in renal cells. *Urolithiasis*. 2005 Nov;33(5):329-39



www.DrRitamarie.com © Dr. Ritamarie Loscalzo, MS, DC, CCN, DACBN, Institute of Nutritional Endocrinology (INE)
