

ALDEHYDE POISONING

by Dr. Lawrence Wilson

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Fermenting foods changes the chemistry. Examples are yogurt, kefir, kimchi, sauerkraut, miso, all cheese, tempeh, natto, tofu, wine, beer, apple cider vinegar, Rejuvelac, and some others **to provide better flora for the intestines** and produce certain vitamins and other chemical substances beneficial for the body. Some yeasts, produce some B-complex vitamins in the intestines.

Fermenting a food is a way of preserving it, in some cases, and cultures have used this method for millennia.

Fermenting allows one to eat food essentially raw, and have some benefits of cooking because the ferment or yeast may help break down tough fibers in the vegetable, for example, as occurs in sauerkraut.

PROBLEMS WITH FERMENTED FOODS

Eating some, but not all fermented foods causes aldehyde toxicity, produced mainly by action of yeasts, molds and fungi, not lethal, but definitely affects the body and damages health.

Crit Rev Toxicol. 2005 Aug;35(7):609-62. **Aldehyde sources, metabolism, molecular toxicity mechanisms, and possible effects on human health** by O'BrienPJ, Siraki AG, Shangari N., Department of Pharmaceutical Sciences, Leslie Dan

Faculty of Pharmacy, University of Toronto, Toronto, Ontario, Canada. peter.obrien@utoronto.ca, concludes toxic effects of aldehydes are many, including:

1. **Acting as haptens** in allergenic hypersensitivity diseases, respiratory allergies, and idiosyncratic drug toxicity
2. **Potential carcinogenic risks** of the carbonyl body burden
3. In liver disease, embryo toxicity/teratogenicity, **diabetes, hypertension**, sclerosing peritonitis, cerebral ischemia/neurodegenerative diseases, and other **aging-associated diseases**.

ACETALDEHYDE, A VERY COMMON AND POTENT NEUROTOXIN

It has been known since 1941 that it easily combines with red blood cell membrane proteins to convert the red blood cells into a "time-release capsule", releasing it in the body far from the site where it attached (3).

The membrane covering the red blood cell **becomes stiffer**. To travel through capillaries, it must be able to fold or deform. Average diameter is 7 microns; a typical capillary is only 2 microns in diameter. Stiffened cells **have difficulty deforming** sufficiently to pass through capillaries, consequently, red blood cell-carried **oxygen to many cells is reduced**. (4) (Our brains require 20% of all the oxygen we breathe!)

K.K. Tsuboi et al show it forms stable combinations with hemoglobin in red blood cells, reducing their ability

to accept, hold and transport oxygen through the bloodstream, their primary function. (5)

Acetaldehyde decreases the ability of the protein tubulin to assemble into microtubules. (6) Microtubules are long, thin, tube-like structures in the brain cell, helping provide structural support to the nerve cell, somewhat like girders in a bridge or a building, keeping the nerve cell and the dendrites semi-rigid.

Dendrites connect nerve cells to each other, with some neurons connecting through dendrites to as many as 100,000 other neurons. Microtubules transport nutrients and biochemical raw materials manufactured in the cell body to the dendrites. When transport is compromised, dendrites gradually atrophy and die off.

Classic examples of brain pathology involving degeneration of dendrites in humans are chronic alcoholic brain damage and Alzheimer's.

Thiamin/Vitamin B1, is so critical to brain and nerve function it is often called the "nerve vitamin." Acetaldehyde induces deficiency of vitamin B1, having a very strong tendency to combine with B1, as the work of Herbert Sprince, M.D. (discussed below) has shown. (7)

In detoxifying, B1 is destroyed. Moderately severe B1 deficiency in humans leads to a group of symptoms called Wernicke-Korsakoff syndrome, characterized by mental confusion, poor memory, poor neuromuscular coordination, and visual disturbances. Its primary accepted cause is chronic alcoholism. B1 is also

necessary for the production of ATP bioenergy in all body cells including the brain, and the brain must produce and use 20% of the body's energy total, even while asleep.

Vitamin B1 is essential for production of acetylcholine, a major neurotransmitter, facilitating optimal memory, mental focus and concentration, and learning. Alzheimer's disease represents an extreme case of memory loss and impaired concentration due to destruction of acetylcholine-using brain cells.

In 1942, R.R. Williams et al found mild B1 deficiency in humans continued over a long period (six months) produces symptoms of ***apathy, confusion, emotional instability, irritability, depression, feelings of impending doom, fatigue, insomnia, and headaches***, less-than-optimal brain function.

Foods high in aldehydes include Rejuvelac, apple cider vinegar, and kombucha tea.

SAFE FERMENTED FOODS

For the above reason, and other problems with fermented foods, rules about eating fermented foods are:

1. Only small amounts.
2. The only acceptable fermented foods are those that are very low in aldehydes: **cheese, yogurt, kefir, miso, sauerkraut and occasional use of tofu or tempeh**, appearing safe, eaten in small amounts.
3. Adults may have a total of 4 ounces daily of cheese, yogurt and kefir. If eating four ounces of cheese in a day, don't have more dairy products.

References

1. Cleary, J.P. The NAD Deficiency Diseases. *J Orthomolecular Med*, 1986, 1:164-74.
2. Galland, L.D. Nutrition and Candida Albicans, 1986 A Year in Nutritional Medicine, ed J. Bland. New Canaan :Keats Pub., 1986, 203-238.
3. Truss, C.O. Metabolic Abnormalities in Patients with Chronic Candidiasis: The Acetaldehyde Hypothesis. *J Orthomolecular Psychiatry*, 1984, 13:66-93.
4. Levine, S. and Kidd, P. Antioxidant Adaptation, pp. 70-71. San Francisco : Biocurrents Pub., 1986.
5. Tsuboi, K.K. et al. Acetaldehyde-Dependent Changes in Hemoglobin and Oxygen Affinity of Human Erythrocytes. *Hemoglobin*, 1981, 5:241-50.
6. Tuma, D.J. et al. The Interaction of Acetaldehyde with Tubulin, in: *Ann NY Acad Sci*, ed. E. Rubin , Vol. 492, 1987.
7. Sprince, H., et al. Protective Action of Ascorbic Acid and Sulfur Compounds against Acetaldehyde Toxicity: Implications in Alcoholism and Smoking. *Agents and Actions*, 1975, 5:164-73.
8. Williams, R.R., et al. Induced Thiamin (Vitamin B1) Deficiency in Man. *Arch Int Med*, 1942, 69:721-38.