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Can a Little Vinegar with Your Meals Help Control Blood Sugar, Appetite, and Weight?

If you have a hankering for the taste of vinegar, be it dill pickles or balsamic vinaigrette salad dressing, your body may be seeking a subtle way to better control blood its sugar levels.

Thirty years ago, a diet plan revolving around apple-cider vinegar was all the rage. Like so many other diet fads, the rationale was elusive at best.

But several recent studies have investigated the use of vinegar for reducing blood sugar (glucose) and insulin levels and blunting appetite—all changes that would contribute to weight loss. And the evidence now suggests two plausible mechanisms: that the acetic acid in vinegar inhibits the activity of starch-digesting enzymes called amylases, and that it also slows the movement of food from the stomach to the intestine.

Last year, Carol S. Johnston, PhD, of Arizona State University, Mesa, reported that diabetic subjects who consumed 1 ounce of vinegar had significantly improved insulin function after eating a high-carbohydrate meal. (See the March 2004 *The Nutrition Reporter*.)

Just recently, Swedish researchers reported that consuming two tablespoons (almost 1 ounce) of vinegar can significantly decrease the rise in glucose and insulin responses after eating carbohydrates.

In one experiment, Elin Ostman, PhD, of Lund University, and her colleagues tested the effect of household white vinegar (containing 6 percent acetic acid) on 12 healthy women and men. Ostman measured the subjects' glucose and insulin levels before and after they ate 50 grams of bread. On another day, the subjects consumed roughly 1 tablespoon, 1.5 tablespoons, and 2 tablespoons of vinegar.

Consuming 2 tablespoons of vinegar significantly reduced the expected increase in insulin levels 15 and 30 minutes after eating, and it had a similar effect on glucose after 30 and 45 minutes. Furthermore, when the subjects consumed the vinegar, they were less hungry 30 minutes, 90 minutes, and two hours after eating.

In a second study, Ostman tested the effects of a vinaigrette dressing (containing 2 tablespoons of vinegar and about 1/2 tablespoon of olive oil) on the post-meal glucose and insulin responses of 13 healthy subjects. The subjects were fed 50 grams of either boiled potatoes or boiled-and-refrigerated potatoes, first without the dressing and then with the dressing.

Interestingly, Ostman found that the boiled-and-refrigerated potatoes had less of an effect on glucose and insulin compared with just-boiled potatoes. In addition, the vinaigrette reduced the post-meal glucose response by 43 percent and the insulin response by 31 percent.

In a recent paper, Johnston referred to unpublished data from her laboratory in which 12 subjects lost weight after consuming 2 tablespoons of red raspberry vinegar twice daily, compared with control subjects who took the same amount of cranberry juice.

References: Ostman E, Granfeldt Y, Persson L, et al. Vinegar supplementation lowers glucose and insulin responses and increases satiety after a bread meal in healthy subjects. *European Journal of Clinical Nutrition*, 2005;59:983-988. Leeman M, Ostman E, Bjorck I. Vinegar dressing and cold storage of potatoes lowers postprandial glycaemic and insulinaemic responses in healthy subjects. *European Journal of Clinical Nutrition*, 2005: epublication ahead of print. Johnston CS. Strategies for healthy weight loss: from vitamin C to the glycemic response. *Journal of the American College of Nutrition*, 2005;24:158-165. □

Researchers Identify Anti-Inflammatory Constituent in Extra-Virgin Olive Oil

A newly discovered compound in olive oil works a lot like the analgesic drug Advil (ibuprofen) in reducing inflammation.

The compound, named oleocanthal, is found in extra-virgin olive oil, which is produced from the first pressing of olives. Oleocanthal has a different

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chemical structure from ibuprofen, but both substances inhibit the activity of Cox-1 and Cox-2 enzymes, which are involved in inflammation.

Gary K. Beauchamp, PhD, of the University of Pennsylvania, Philadelphia, and his colleagues identified oleocanthal in olive oil and made a synthetic version of it to confirm its anti-inflammatory properties.

Fifty grams of olive oil (equivalent to almost 4 tablespoons of the oil) contain relatively small amounts of oleocanthal—therapeutically equivalent to about 10 percent of the ibuprofen usually recommended for pain relief in adults. That's not enough to be a feasible treatment for headaches.

However, the research explains part of the anti-inflammatory benefits of olive oil and suggest that it might be helpful in reducing chronic inflammation.

Beauchamp pointed out that some of the health benefits of olive oil, a component of the Mediterranean diet, may be related to its oleocanthal content. The Mediterranean diet is known to thin blood, reduce the risk of heart disease, and lower the chances of developing some cancers.

Reference: Beauchamp GK, Keast RS, Morel D, et al. Ibuprofen-like activity in extra-virgin olive oil. *Nature*, 2005; 437(7055):45-46. □

Higher Intake of Omega-3 Fish Oils May Reduce Risk of Dry Eye Syndrome

An estimated 10 million Americans suffer from dry-eye syndrome (DES), which can affect eyesight, reading, and driving at night. The most common therapy has been "artificial tears," which provides only brief and partial relief of symptoms. Recently, the drug Restasis has been promoted as a treatment, though its active ingredient (cyclosporine) is a powerful immune suppressant.

It turns out that DES may be related to a nutritional imbalance, which medications are incapable of treating. In this case, the imbalance may relate to consuming too many processed cooking oils and not enough fish oils.

Debra A. Schaumberg, ScD, of the Harvard School of Public Health, and her colleagues investigated the incidence of DES and the eating habits of more than 32,000 subjects in the Women's Health Study. Although no previous studies had investigated the role of diet in DES, "anecdotal evidence has suggested a possible protective role of omega-3 fatty acid supplementation in the treatment of DES," Schaumberg wrote.

High intake of omega-3 fish oils, docosahexaenoic acid (a specific type of omega-3 fish oil), and tuna (an omega-3-rich fish) were each associated with modest decreases in the risk of DES.

The most striking finding, however, was this: women who consumed large amounts of omega-6 oils and relatively small amounts of omega-3 oils were two and one-half times more likely to suffer from DES.

Schaumberg noted that large amounts of omega-3 fats historically had been found in the American diet. Today's diet provides large amounts of omega-6 fats in cooking oils and processed foods and very little omega-3 fats, significantly "distorting" the ratio.

Other researchers have found increased levels of inflammation-promoting compounds in the eyes of patients with DES. Relatively large amounts of omega-6 fats can promote inflammation, whereas omega-3 fats have an anti-inflammatory effect.

Reference: Miljanovic B, Trivedi KA, Dana RM, et al. Relation between dietary n-3 and n-6 fatty acids and clinically diagnosed dry eye syndrome in women. *American Journal of Clinical Nutrition*, 2005;82;887-892. □

For Cancer Treatment, Intravenous Vitamin C May Be Better than Oral

Researchers and clinicians have found mixed results in evaluating vitamin C in the treatment of cancer. Last year, a study found that intravenous (IV) vitamin C could produce blood concentrations up to 70 times higher than those achievable with oral vitamin C, suggesting that IV vitamin C might be more likely to have an anti-cancer effect.

Now, in a follow-up study, Mark Levine, MD, PhD, of the National Institutes of Health, Bethesda, Maryland, reported that very high concentrations of vitamin C are capable of killing cancer cells.

Levine and his colleagues exposed 10 types of cancer cells (from human and mouse strains of cancer) and four types of normal cells to large concentrations of vitamin C. Laboratory conditions were designed to mimic the intravenous administration of vitamin C, so that the conditions were "clinically relevant," and some of the concentrations were 200 times greater than the levels of vitamin C normally found in the body.

Levine found that growth of most of the cancer cells was significantly reduced by the high concentrations of vitamin C. However, normal cells were not affected.

Vitamin C generated large amounts of hydrogen peroxide, a potent generator of free radicals, which led to the destruction of cancer cells. The action of hydrogen peroxide on cancer cells was similar to that of conventional chemotherapy, but vitamin C did not increase hydrogen peroxide levels in whole blood.

"Ascorbate [vitamin C] administered intra-

venously is likely to be safe in most patients, with virtually no toxicity compared to most currently available cancer chemotherapeutic agents," Levine wrote.

The cancer-cell-killing effects of vitamin C are not as likely to occur through oral intake of 10 grams of vitamin C.

"Our data show that ascorbic acid selectively killed cancer but not normal cells, using concentrations that could only be achieved by intravenous administration and conditions that reflect potential clinical use....It is unknown why ascorbate, via hydrogen peroxide, killed some cancer cells but not normal cells," Levine wrote.

Reference: Chen Q, Espey MG, Krishna MC, et al. Pharmacologic ascorbic acid concentrations selectively kill cancer cells: action as a pro-drug to deliver hydrogen peroxide to tissues. *Proceedings of the National Academy of Sciences*, 2005;102:13604-13609. □

Another Study Confirms Benefits of Natural Treatment for Osteoarthritis

A large study funded by the U.S. National Institutes of Health has confirmed that supplements of glucosamine hydrochloride and chondroitin sulfate significantly reduce pain in people with osteoarthritis of the knee. The findings were presented ahead of publication at the annual scientific meeting of the American College of Rheumatology, Nov. 14, 2005, in San Diego, California.

Lead researcher Daniel O. Clegg, MD, of the University of Utah, Salt Lake City, reported the initial findings of the Glucosamine/chondroitin Arthritis Intervention Trial (GAIT), which involved 1,583 patients. The subjects included men and women with an average age of 58 years, who had symptoms of osteoarthritis of the knee for 10 years.

The subjects took the following supplements or medication daily: 1,500 mg glucosamine; 1,200 mg chondroitin; both supplements; the drug Celebrex; or placebos. The study was "double blinded" in that neither the patients nor their doctors were aware of what they were taking.

Results of the GAIT study covered the first 24 weeks of supplementation, and changes were noted with WOMAC scoring, a standardized method of evaluating the severity of osteoarthritis.

In patients with moderate to severe knee pain (those most likely to require intervention in the real world), 78 percent of the study subjects responded significantly to the combination of glucosamine and chondroitin. The combination of these two supplements helped much more than either supplement by itself or Celebrex (noteworthy because Celebrex is a

prescription drug for osteoarthritis).

The researchers are expected to report in 2006 whether the supplements helped regenerate cartilage. At least two studies on glucosamine and one on chondroitin have found that these supplements can regenerate cartilage in the knees.

Reference: Clegg DO, Reda DJ, Harris CL, et al. The efficacy of glucosamine and chondroitin sulfate in patients with painful knee osteoarthritis (OA): the glucosamine/chondroitin arthritis intervention trial (GAIT). American College of Rheumatology annual scientific meeting, Nov. 12-17, San Diego, California. □

Eating Fish Each Week Helps Seniors Keep Their Wits as They Get Older

Seniors who regularly eat fish experience less age-related mental decline compared with people who consume little or no fish.

Martha Clare Morris, MD, and her colleagues at the Rush University Medical Center, Chicago, tracked the diets and mental functioning of 3,718 people for six years. All of the subjects were at least 65 years old.

People who ate fish once a week had a 10 percent slower rate of cognitive decline, compared with people who rarely ate fish. Eating two fish meals per week led to a 13 percent slower mental decline.

In practical terms, fish eaters maintained mental functioning equivalent to people who were three to four years younger, according to Morris.

The omega-3 fat intake was not consistently associated with maintaining mental sharpness, but the benefits "were in the direction of slower decline," wrote Morris.

Reference: Morris MC, Evans DA, Tangney CC, et al. Fish consumption and cognitive decline with age in a large community study. *Archives of Neurology*, 2005;62:publication ahead of print. □

Chromium Supplements Beneficial in Depressive Patients Who Overeat

In 1999, researchers first published case histories showing that supplements of chromium picolinate could help reverse depression. Now, in a well-controlled study, researchers have confirmed that some depressive patients can benefit significantly from chromium picolinate supplements.

Chromium is essential for normal glucose management, and depression is strongly associated with diabetes and heart disease.

In the study, John P. Docherty, MD, of the Weill Medical College of Cornell University, New York City, and his colleagues asked 113 patients to take either placebos or 600 mcg of elemental chromium as

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Quick Reviews of Recent Research

• Ginseng extract reduces respiratory infections

Canadian researchers investigated whether an extract of North American ginseng (*Panax quinquefolium*) could reduce the incidence of colds and cold symptoms. They gave 400 mg daily of the extract, standardized to contain 80 percent polyfuranosyl-pyranosyl-saccharides, to 323 men and women ages 18 to 65 years of age. Over a four-month period of supplementation, subjects taking the ginseng extract had both fewer colds and cold symptoms. Only 10 percent of the subjects taking ginseng had two or more colds, compared with 22.8 percent of the subjects taking placebos.

Preddy GN, et al. *Canadian Medical Association Journal*, 2005;173:1043-1048.

• Antioxidants boost post-heart attack recovery

Polish researchers treated 800 heart-attack patients with conventional medications followed by either placebos or an antioxidant regimen. The antioxidants consisted of intravenous vitamin C for 12 hours, followed by 1,200 mg of oral vitamin C daily and 600 mg of vitamin E daily. Patients receiving the antioxidants were 18 percent less likely to experience a composite of symptoms including in-

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chromium picolinate daily for eight weeks.

Although there were no overall benefits from chromium supplements, a subgroup of depressive patients did have a significant reversal of symptoms related to depression. These patients were characterized by increased appetite, overeating, carbohydrate craving, and low sexual libido.

Among these patients, two-thirds of those taking chromium supplements had a significant improvement in symptoms. Only one-third of those taking placebos got better.

In a separate study, researchers measured toenail concentrations of chromium, an accepted way of measuring body levels of the mineral. The researchers found that men with the highest concentrations of chromium were 41 percent less likely to have a heart attack.

References: Docherty JP, Sack DA, Roffman M, et al. A double-blind, placebo-controlled, exploratory trial of chromium picolinate in atypical depression: effect on carbohydrate craving. *Journal of Psychiatric Practice*, 2005;11:302-314. Gualiar E, Jimenez FJ, van 't Veer P, et al. Low toenail chromium concentration and increased risk of nonfatal myocardial infarction. *American Journal of Epidemiology*, 2005;162:157-164. □

hospital death from the heart attack, a second nonfatal heart attack, arrhythmias, or pulmonary edema.

Jaxa-Chamiec T, et al. *Kardiologia Polska*, 2005;62:344-350.

• Vitamin K deficiency may mimic child abuse

A Canadian physician reported the case of an infant born at home with subsequent intracranial bleeding and other signs consistent with child abuse. The cause was identified as a vitamin K deficiency, which is needed for normal blood clotting.

Brousseau TJ, et al. *Journal of Emergency Medicine*, 2005;29:283-288.

• Vitamin C protects against circulation problem

In a Japanese study of 11 healthy men, researchers found that blood-vessel flexibility decreased when homocysteine levels were experimentally increased. The decrease was largely normalized when the subjects received 2 grams of vitamin C.

Yamashita K, et al. *International Journal of Cardiology*, 2005;104:163-169.

• Prilosec reduces body's vitamin C levels

The drug Prilosec (omeprazole) is frequently used to treat gastric reflux and heartburn. However, as gastric acid is reduced, vitamin C becomes unstable. Scottish researchers investigated vitamin C levels in 29 patients who had been prescribed 40 mg of Prilosec for four weeks. During this time, blood levels of vitamin C decreased by an average of 12.3 percent.

Henry EB, et al. *Alimentary Pharmacology & Therapeutics*, 2005;22:539-545.

• High selenium intake reduces risk of prostate cancer

In an analysis of 16 studies, Canadian researchers found that high intake of selenium reduced the risk of prostate cancer by a little more than 25 percent. Selenium is a component of glutathione peroxidase, a potent antioxidant made by the body.

Etmninan M, et al. *Cancer Causes & Control*, 2005;16:1125-1131.

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Post Office Box 30246 • Tucson AZ 85715-0246 USA

Editor and Publisher: **Jack Challeng**

Copy Editor: **Mary E. Larsen**

Medical and Scientific Advisors:

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