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In the News

Rice Bran Fights Cholesterol

Rice bran might be as effective as oat bran at lowering blood cholesterol levels, according to scientists with USDA's Agricultural Research Service (ARS). High cholesterol levels have been associated with heart disease.

Bran, the external layer of the rice removed when milling white rice, is available in brown rice, certain rice cakes, snack foods, and cereals.

In the ARS experiments, hamsters were fed either a standard control diet plus a high dose of pure cholesterol or diets with rice bran plus cholesterol or oat bran plus cholesterol. Both rice bran and oat bran groups were found to have significantly lower plasma cholesterol when compared to the standard control group. Further ARS studies are planned.

For more information, contact Talwinder S. Kahlon, Western Regional Research Center, Albany, California, (415) 559-5650.

Bitter Taste In Fruit May Be Good for You

Compounds that make some winter citrus such as oranges and grapefruit taste bitter may help fight cancer. ARS researchers have discovered that nomilin, one of the bitterness agents, helped prevent cancerous tumors from forming in the stomachs of 28 percent of the laboratory mice fed with a potent carcinogen.

Limonin, another bitter compound, also has some anticarcinogenic effect in mice but less than nomilin. However, researchers have found that limonin exhibited a 60-percent reduction in the formation of cancerous oral tumors in hamsters fed with a carcinogen.

The challenge for scientists is to find a way to modify citrus' production of

these compounds to take advantage of their benefits, without increasing juice bitterness. ARS scientists have discovered that both nomilin and limonin can occur as practically nonbitter derivatives, called limonoid glucosides. (A 6-ounce glass of orange juice contains a high amount of glucosides.) Further research will tell if these derivatives can also fight cancer and if they will benefit humans.

For more information, contact Shin Hasegawa, Fruit and Vegetable Chemistry Laboratory, Pasadena, California, (818) 796-0239 or Luke K.T. Lam, Gray Freshwater Biological Institute, Navarre, Minnesota, (612) 471-0013.

When Is a Pig Fat?

ARS researchers are developing a blood test that will tell breeders and farm-

ers which pigs in a litter will be fat adults and which will be lean.

Scientists take about 10 milliliters of blood serum from the subject pig and place it in a growth medium of pre-fat cell cultures (rat cells before they develop globules of oily fat in their cytoplasm). The cultures are tested for the enzyme glycerol phosphate dehydrogenase after 7 to 8 days. Cultures from pigs genetically destined to be fat had four times as much enzyme compared to serum from lean pigs.

When perfected, this test might eventually find uses in human medicine. Currently, the test is not yet practical for commercial use.

For more information, contact Gary J. Hausman, Animal Physiology Research Unit, Athens, Georgia, (404) 546-3224.



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Boron and Health

Fruits and vegetables contain lots of boron, which ARS researchers have found may help the body metabolize copper, an essential element for a healthy heart, and may even influence brain function. Boron also helps the body handle calcium, which helps build strong bones.

Subjects fed a low-boron diet (0.23 milligrams per day) for 9 weeks had lower levels of copper and two copper-containing enzymes than when these same subjects took a daily supplement of 3 mg of boron for 6 weeks. (Researchers estimate that people who eat a well-balanced diet would consume about 3 mg of boron per day.)

It is unknown how boron affects copper metabolism, but any decline is probably undesirable, says scientist Forrest H. Nielsen. An adequate intake of boron results in more available calcium and an active form of vitamin D—both important for maintaining healthy bones and thus may be useful in preventing osteoporosis.

The researchers also found that boron depletion may alter brain function. Subjects on low-boron intake showed significantly different brain wave patterns than when they received the boron supplement.

For more information, contact Forrest H. Nielsen or James G. Penland, Grand Forks Human Nutrition Research Center, Grand Forks, North Dakota, (701) 795-8456.

Consumers Can Now Analyze What They Eat

Health-conscious consumers with access to an IBM-compatible microcom-

puter can now analyze their daily food consumption to get the total calorie content and a breakdown for 27 nutrients and food components.

The "USDA Dietary Analysis Program" is a user-friendly, inexpensive software program developed by the Human Nutrition Information Service in cooperation with the Extension Service.

After entering their daily food intake, consumers will get a list of foods and quantities eaten; the percentages of calories coming from protein, carbohydrates, fats, and alcohol; breakdowns for fats, fatty acids, sodium, cholesterol, fiber, potassium, and copper; and nutrient amounts. Bar graphs will show the percentage of the user's Recommended Dietary Allowances for 15 nutrients.

The program includes 850 foods and uses common household measures for quantity estimates. Educators and nutritionists can use it to identify the major food sources of nutrients in specific diets and to look at how alternative food selections would affect nutrient intakes.

To order, contact the National Technical Information Center, Springfield, Virginia, (703) 487-4650.

A Super Carrot for Health

Vitamin A deficiency is a common dietary problem around the world. In the United States, more than 40 percent of Hispanics, 20 percent of blacks, and 10 percent of whites may consume less vitamin A than they need.

Because one source of vitamin A is carrots—they account for about 14 percent of the vitamin A in U.S. diets—a carrot developed by ARS researchers that is richer in vitamin A precursors,

such as beta carotene, may improve diets. The super carrot, Beta III, has three to five times more beta carotene than most other carrots.

Just 1 square foot of land can produce slightly more than a dozen of the new carrots, enough to meet an adult's vitamin A needs for about a month. The carrot has already received high marks for flavor and growth in diverse geographical settings. Carrots may supply an even greater percentage of vitamin A as scientists learn more about carotene absorption and content.

For more information, contact Philipp W. Simon, Vegetable Crops Research, Madison, Wisconsin, (608) 262-1248.

Judging the Sweetness of a Melon

Melons are often picked before they are ripe and consequently are not sweet when consumers purchase them. ARS scientists have found a way to measure how sweet melons really are so that they can be picked when they are ready. They have developed a device that measures the amount of infrared light a melon absorbs. The more infrared light absorbed, the sweeter the fruit.

The meter, as big as a breadbox, can also help wholesalers and retailers identify fruit that is ripe. The meter works for onions and papayas as well.

For more information, contact Gerald Dull, Horticultural Crops Research, Athens, Georgia, (404) 546-3320.

Minced Fish Instead of Ground Beef?

Some meat processors are promoting the idea of adding processed minced fish to certain cured meat products to boost

nutrition and improve binding and gel characteristics. USDA's Food Safety and Inspection Service already has approved a nugget product that uses both meat and processed minced fish. Currently, this form of fish is used to make imitation shellfish products, which have become very popular with U.S. consumers.

But researchers are trying to iron out some problems with use of minced fish. Nitrite used in cured meats to prevent botulism and for reasons of color and flavor can combine with chemical compounds called amines that are found in fish. When nitrite and amines combine during processing or home cooking, nitrosamines form, some of which are carcinogens.

To determine what factors affect the level of nitrosamines in the product, researchers are studying the species and age of fish used, and the amount of time spent in frozen storage.

For more information, contact Walter J. Fiddler, Eastern Regional Research Center, Philadelphia, Pennsylvania, (215) 233-6502.

Better Flavor for Reheated Meat

Cooked meat that has been reheated often has a warmed-over flavor, which is

better described as meat flavor deterioration. ARS scientists have recently discovered that a chitin derivative, N-carboxymethylchitosan (NMC), when added to cooked meat, will inhibit this off-flavor development. Chitin comes from the shells of lobsters, crabs, shrimp, and crayfish. The NMC has been shown to be nontoxic and nonallergenic.

"Warmed-over flavor occurs when oxygen in the air breaks down fats in the meat," says USDA chemist A.J. St. Angelo. "But when NMC is added, it binds to iron in the meat so that it cannot oxidize the lipids, whose secondary oxidation products contribute to the warmed-over flavor process."

Although still experimental, the NMC can be mixed into meat, rolled over the surface, or sprayed on. It also will work with frozen foods, baked foods, or foods stored at room temperatures.

For more information, contact John Vercellotti or A.J. St. Angelo, Southern Regional Research Center, New Orleans, Louisiana, (504) 286-4421.

Sugars Slash Chance of Poultry Contamination

Lactose, or milk sugar, can reduce the number of *Salmonella* bacteria in infected chicken by 99.9 percent for pennies per bird.

Biochemist John R. DeLoach of ARS says both lactose and D-mannose, a natural sugar produced by a Mediterranean plant, were tested by adding the sugars at 2.5 percent to the drinking water of broiler chicks dosed with 100 million *Salmonella typhimurium* bacteria. When the birds were compared at 10 days of age with chicks that received bacteria but no sugars, only 53 percent of the birds on lactose and only 26 percent on D-mannose had any *Salmonella* bacteria.

"It's not only important how many birds had *Salmonella*, but how many *Salmonella* bacteria those birds had," DeLoach says. "The birds treated with mannose and lactose had 99.9 percent fewer *Salmonella* than the control birds in these experiments."

"Lactose worked just as well as mannose, and the cost of lactose in drinking water might be no more than 2 cents per bird," he says. "Right now, if the poultry producer put his birds on D-mannose for 10 days, it would cost him 50 cents a bird."

For more information, contact John DeLoach, Veterinary Toxicology Research Unit, College Station, Texas, (409) 260-9484. □