

Milling & Baking News

NEW ZEALAND

PLEASE CIRCULATE TO: General Manager Bakery Manager Sales Staffroom

formed by a Maillard browning reaction between the amino acid asparagine and reducing sugars at high temperatures. There is a need for research to discover the processing variables that affect acrylamide levels, such as temperature, moisture content and pH.

The BIRT committee is in contact with international experts and is monitoring the situation. It will inform the industry when more definite information is available. It is interesting to note that some of the relevant research, for example, measuring levels of asparagine in foods, would have appeared to be pure research of little practical interest nine months ago, but a few months later suddenly assumed huge importance.

Fruit as bakery ingredients

When you're thinking about enhancing bakery products by adding different colours, textures and tastes, remember fruit. Some types of blueberries contain higher levels of antioxidants than most other fruit and vegetables. The antioxidants in blueberries and blackcurrants are the blue-purple anthocyanins. These fascinate kids because when mixed with ice-cream they change colour as the pH increases. For the same reason they also change colour when baked in muffins, due to the baking powder. Many other types of fruit, including grapes, raisins, cherries, strawberries, apples and bananas contain a variety of nutritional factors and phytonutrients. But perhaps the best reason to add them to bakery products is because they add colour and texture. Fruit are available in several forms - fresh, freeze-dried, sugar-infused, or drum-dried.



Date slice

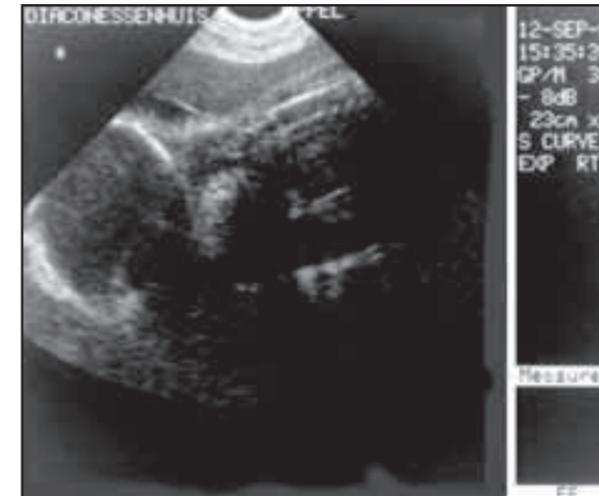
Obituaries

Russell Sara of the Crop & Food Research Food & Biomaterials Innovation team died of a sudden seizure on 18 July 2002. Russell had many contacts in the milling and baking industries because, since joining the old Wheat Research Institute of DSIR in May 1984, he ran the test bakery and helped out with other laboratory work. Russell was an extremely talented guitar player and was very knowledgeable about rock music. He loved life on the West Coast and when he returned for a weekend, Russell often played with some mates in a pub band. Workmates will greatly miss his cheerful attitude and enjoyment of life, which he maintained in spite of a series of health problems in the last five years. We will greatly miss him and our deepest condolences go to his family.

Courtney Archer died on 31 March 2002. Courtney Archer was Managing Director of Archers Flour Mill in Rangiora from 1953 until he semi-retired in the 1980s. He remained a director until 1991, when the mill was sold to North's Bakery. Although small, Archers was regarded as one of the best-managed mills in New Zealand. For years Courtney represented the flour millers on the New Zealand Flour Millers Association Committee and the Wheat Research Committee, which used to oversee the administration of wheat research levies and the Wheat Research Institute. Occasionally, Courtney told stories of his years as administrator at Rewi Alley's School in China. Courtney assisted in many diverse roles, as acting headmaster, in the medical clinic, and on one occasion dismembered their school's only truck and buried the parts to prevent its confiscation.



Russell Sara



Baby foetal scan

WHOLE GRAIN RYE BREAD HELPS PREVENT HEART ATTACKS

These are the kind of headlines used to promote the advantages of eating whole grain rye bread in Scandinavia. "All types of fibre are good for the heart, but rye is the 'wonder grain', and high consumption of all fibre-containing foods - cereals, vegetables, and fruit - is recommended to prevent coronary heart disease," the head researcher said. Rye and other whole grain breads help prevent heart attacks by increasing dietary fibre consumption.

Elderly Finnish men who smoked and ate an additional 10 grams of fibre a day, equivalent to about three slices of rye bread, reduced their risk of dying of coronary heart disease by 17%. The average Finnish resident eats about 25 grams of fibre a day, mostly from brown rye bread, which contains more fibre than the soft white bread favored by most Westerners. The study found that all fibre, including insoluble fibre, provides protection, and that the effect was not due to lowered cholesterol. The strong effect of rye and cereal grains may be partially due to the Finns' unusual diet, which contains a lot of dark rye bread and few vegetables. The study reinforces recommendations to increase fibre intake to at least 20-30 grams per day. Sources of insoluble fibre include wheat bran, rye, brown rice, and most other grains, beans, prunes, and apples. Good sources of soluble fibre include oat bran, beans, Brussels sprouts, oranges, and prunes. The study was led by the acting head of the Department of Nutrition at Finland's National Public Health Institute in collaboration with US scientists, and was reported in the journal "Circulation".

FOLATE FORTIFICATION

A recent report from the Ministry of Health found that only 33% of women had folate levels sufficient to protect their babies against neural tube defects. Furthermore, although nearly 40% of them understood the importance of folic acid, only 11% took folic acid supplements prior to becoming pregnant. As a significant number of pregnancies are unplanned, it is desirable to improve the folic acid intake of all potential mothers. Supplementation of flour was recommended as the most effective method of doing so.

The pilot health claim project was intended to encourage food manufacturers to fortify foods. Few did so. The Ministry of Health is working to encourage more food manufacturers to add folate to foods. If that is not effective, they may recommend compulsory fortification. (Ministry of Health Public Health Perspectives September 2002).

Folic acid and other B vitamins also seem to prevent a range of circulation related diseases, including heart disease, deep vein thrombosis, and stroke. Folate reduced the risks of stroke and cardiovascular disease in a US trial of almost 10 000 people. After 19 years, those in the group who ate the most folate (four times more) had a lower risk of stroke than those with the lowest intakes. Recent research found that folic acid and three other B vitamins limit blood levels of homocysteine, which is alleged to cause up to 10% of coronary artery disease. One hundred micrograms of folate per day is estimated to reduce the risk of coronary heart disease by 5.8%, and another study claimed that supplementation to 280-330 microgram/day could prevent 49 000 deaths from cardiovascular disease in the US.

New FSANZ food standards code came into force in December 2002

Crop & Food Research has made available food composition database information on seven key nutrients for over 2400 foods at www.crop.cri.nz/psp/fcdnpl/index.htm

Information to help food manufacturers calculate food composition data for labels is available at www.foodstandards.gov.au

The Flour Milling and Baking Industry Research Trusts publish this newsletter with Crop & Food Research to present the results of levy-funded research and other information relevant to New Zealand industry.



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The New Zealand Association of Bakers Inc.



New Zealand Flour Millers Association Inc.

Whole grains provide useful levels of antioxidants

Antioxidants are believed to help prevent some cancers and heart disease. The foods usually targeted as being sources of antioxidants are vegetables, fruits, tea and red wine. Whole grains also contain useful levels of antioxidants, but as they are concentrated in the germ and bran most of them are lost when grains are milled into refined flour. Consumers who eat the recommended levels of whole grain foods should benefit from both antioxidants and dietary fibre. These dietary components may have synergistic effects when consumed together.

It seems ironic that valuable nutrients from grain end up in stock food while many people buy expensive health food supplements. Antioxidants are best consumed in a mixture of foods rather than as dietary supplements. This advice is strengthened by results from Crop & Food Research scientist, Dr Caroline Lister, who found wide variations in the levels of antioxidants in health supplements.

Antioxidants reduce the oxidative stress that contributes to diseases such as coronary artery disease, some cancers, chronic inflammatory disease, rheumatoid arthritis and Alzheimer's disease, as well as poor wound healing and aging. Antioxidants are believed to be an important part of



the body's protection against oxidative damage, which includes DNA damage and lipid oxidation. Antioxidants can reduce these in several ways - by reducing free radical formation or by scavenging free radicals. These are the roles played by vitamins C and E, and beta-carotene. Other antioxidant substances were previously not considered important and some, such as phytate, were thought harmful.

ANTIOXIDANTS IN GRAIN

Whole grains are excellent sources of some antioxidants and contain higher levels than many common vegetables and fruits although less than some berries and dried fruits, which contain very high levels. Whole grain foods contain a wide variety of antioxidant compounds including vitamins, minerals, non-nutrients and antinutrients. Most of these are similar to the antioxidants found in fruits and vegetables but some are unique.

There is evidence that the antioxidant activity of whole grain cereals increases at the pH of the gastrointestinal tract.

Wheat germ oil is one of the richest sources of vitamin E, and whole grains contain useful levels of the tocopherols and related compounds. Vitamin E is believed to prevent the formation of carcinogens by preventing the oxidation of polyunsaturated fatty acids in cell membranes. It also keeps selenium in a reduced state. Tocopherols are the most important antioxidants in oats.

The most active antioxidants in grain are flavonoids and phenolics. Flavonoids seem to protect us against coronary heart disease. They occur in grains, although in lesser amounts than in fruit and vegetables. Phenolic substances in whole grains and bran are strong antioxidants that aid the body's detoxifying systems by preventing the dangerous, free radical oxidation of lipids. They can both prevent the formation of carcinogens and prevent them from reacting with body tissues. There is evidence that they protect against chemically induced colon cancer in rats.

"A study found that after adjusting for age and calorie intake, women in Iowa who consumed more whole grains had about a 40% lower mortality rate." (Presumably over the time of the trial!)

Selenium is important in New Zealand because although foreign grains contain useful levels of it, New Zealand soils and grains are deficient. Selenium helps to prevent cancer by protecting cells from oxidative damage via its action as a cofactor for the enzyme glutathione peroxidase.

Phytate is interesting because it occurs in bran and was regarded as a villain. Now its binding of metals, particularly iron, is believed to give it antioxidant activity and it seems to reduce cancers in experiments on animals.

Other antioxidants include flavonoids, anthocyanins, lignans and polysaccharides. Flavonoids and anthocyanins occur in grains, but at lower concentrations than in fruits and vegetables. The lignans are concentrated in the outer bran layers. The human digestive system converts lignans into forms believed to modify the hormone system so that it protects us against breast and prostate cancers. Also, some polysaccharides have unexplained antioxidant activity.

(Source: Cereal Foods World 47(8):370-373. E. Decker, G. Beecher, J. Slavin, H. Miller, L. Marquart.)

USDA dietary survey

The results of a US Department of Agriculture survey of food intake for over 10 000 people show the value of high carbohydrate diets. For each food type, people were assigned to one of four groups, according to the amount they consumed. People who ate the most carbohydrates were less likely to be obese than people who ate more fat and protein. High carbohydrate consumers averaged 200-300 fewer calories per day, consumed more nutrients, and were more likely to meet recommended intakes of total and saturated fat.

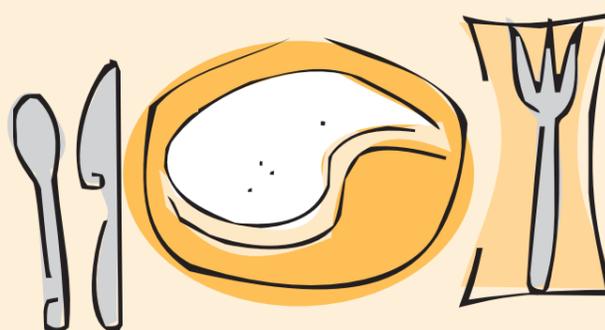
Those whose diets were high in whole grains had about half the risk of developing cancers of the upper gastrointestinal tract than those who ate the least in a 14 year study of more than 34 000 post-menopausal women. Those who ate the most yellow or orange vegetables also lowered their risk of these cancers compared to those who ate the least.

In a trial of people with high blood pressure, nearly 75% of those on a whole-grain diet could halve their medication without ill effects, significantly more than those on a diet of refined grains. Diets high in whole grains, fruits and vegetables and low-fat dairy products reduced blood pressure in people with slightly elevated blood pressure (mildly hypertensive).

Whole grain diets also helped diabetic people by moderating blood glucose levels. Diets with low glycaemic index (GI) have been found to improve cardiovascular health of slightly overweight men. However, Crop & Food Research's John Monro expressed reservations about the validity of comparing diets on the basis of GI in Milling & Baking News issue 15.

USDA data comparing home and bought meals showed that meals and snacks eaten out contained more calories per meal and, per calorie, were higher in total fat, saturated fat, cholesterol and sodium. Bought meals also contained less dietary fibre, calcium and iron per calorie than home-prepared meals. Staff who plan restaurant meals and takeaways need to be taught that nutritious foods such as breads and vegetables are not a waste of plate space.

(Source: Cereal Foods World 47(8):398-401. J Miller-Jones.)



Acrylamide found in foods

It's probably no exaggeration to say that the international food community was shocked in April 2002 when the Swedish National Food Authority reported "high" levels of acrylamide in some starchy foods. Researchers in the United Kingdom, Norway and the US have since confirmed that foods high in starch and fat, and cooked at high temperature, may contain levels of acrylamide much higher than expected. In June WHO and FAO convened a group of international food scientists, who recommended the creation of an international network to share research data.

In December the American Food and Drug Administration (FDA) released preliminary data but emphasised that no clear conclusions can be drawn. Some patterns seem to be emerging but these may be misleading. This story demonstrates the sensitivity of modern chemical methods, which can measure acrylamide at levels as low as 10 parts per billion (ppb). This is equivalent to 10 micrograms per kilogram, or in more familiar terms, to one 5 ml measuring teaspoon of flour (2.9 g) per 290 tonnes.

Of particular concern is the levels of acrylamide found in many samples of French fries and potato chips, but lower levels were also found in crackers, cookies, breakfast cereals and breads. The levels in the foods after high temperature cooking by frying, baking or toasting are several times higher than before cooking. But although some foods cooked at high temperatures had high levels, others did not. There were large differences in the results. Some samples of food contained several times more acrylamide than similar foods, even similar food produced by the same company.

The FDA pointed out that the number of samples was insufficient to allow firm conclusions to be drawn and that the implications for human health are yet to be assessed. Until they have more definite results, FDA advice remains unchanged - in brief, eat a balanced diet of grains, vegetables, fruit, etc.

This topic has been the focus of intense interest over the last six months and looks likely to be an important topic of research for some time. Research is needed on several related issues. The most important is to learn whether the levels found pose risks for human health at all. At the moment this is unknown, but as high levels of acrylamide cause cancer in animals a precautionary approach seems wise. However, people have been eating some of these foods for thousands of years and many common foods contain low levels of natural toxins that can cause diseases in animals at high dose rates.

International research will aim to discover the sources, the mechanisms by which acrylamide can be formed, and strategies for limiting levels. It seems likely that acrylamide is

continued over...

"Dietary intake of antioxidants and vitamin E in food (not supplements) was associated with the reduced development of Alzheimer's disease in a US trial of 5000 people over the age of 54."