



'Yeast can do it'



Acrylamide is a colourless and odourless chemical compound that was propelled into the spotlight in 2002 when the Swedish National Food Administration and the University of Stockholm reported considerably high levels of this WHO Group 2A carcinogen in commonly consumed foods such as bread, coffee, potato chips, French fries, baby food and many others. Prior to this discovery, acrylamide was known mainly as an industrial chemical used as an intermediate for polyacrylamide production. Based on various laboratory studies, clear evidence on carcinogenic and genotoxic effects of acrylamide and its metabolite glycidamide have been established, although epidemiological studies of exposure through various foods have not been as clear. Review of all the data has convinced numerous scientific committees and regulatory agencies worldwide that exposure to acrylamide by humans should be limited to the lowest possible level.

Most recently, the European Chemical agency added acrylamide to its list of substances of very high concern. Acrylamide was added to the State of California's Proposition 65 list of carcinogens in 1990.

The main source of acrylamide formation in food occurs when the amino acid asparagines and reducing sugars – such as glucose or fructose are heated together above 120C and are transformed into acrylamide. Since asparagines is the limiting precursor for acrylamide and is widely present in many different carbohydrate rich foodstuffs – grains, potatoes reducing its content in food product prior to heating would significantly reduce acrylamide levels.

Numerous approaches have been attempted to reduce acrylamide formation in food. However, no method has yet been accepted as the ideal solution, mainly because major drawbacks exist. The conditions that plague the technologies currently available range

from cost, impact on the organoleptic properties (taste, colour, odour and feel) of the food, and / or ineffective acrylamide reduction under typical food production / processing conditions. Yeast presents a low-cost solution to the acrylamide problem.

Using the natural ability of baker's yeast to metabolise asparagines, Functional Technologies Phytterra Yeast subsidiary has developed bread yeast strains with enhanced asparagines in media and food matrices, thereby dramatically reducing acrylamide formation offer heating.

Potato Perfection

Diseases and sprout growth which affect tuber quality are always a problem for processors who get their potatoes from storage facilities.

Similarly, storage professionals, equipment and chemical manufacturers are doing their best to ensure the quality is good and disease damage is minimal.

Storage conditions can be ripe for diseases to develop and devastate potato crops, leading many universities to seek ways to control or prevent diseases before they become a problem.

At the University of Maine (UM) a fungicide testing programme looks at new chemicals and their potential for preventing potato diseases, as well as new uses for current chemicals.

"There are not postharvest diseases, so the problem begins in the field or delivery into storage." said Steve Johnson, a potato specialist with the university Co-operative Extension, Presque Isle.

"As you store potatoes longer, it certainly does get to be a problem. Whether it's fresh cut or processed, any amount of disease you can lower is a good thing,".

Multiple diseases such as late blight, pink rot, leak, black dot and silver scurf impact Maine's potato fields.

POSITIVE REDUCTIONS

Agraquest's Serenade and Syngenta's Mertect are two fungicides labeled for potatoes, each showing positive reduction in silver scurf, but so far, it has yet to see similar effect on black dot.

Even with the success of many fungicides, alternatives that can provide adequate disease reduction while limiting environmental impacts.

Phosphorous acid is one such alternative that is already seeing use in Maine.

Through phosphorous acid field trials, it has seen reduction in late blight, pink rot and leak.

Compounds with similar structures to bleach have shown mixed results.

And, internationally, the Potato Genome Sequencing Consortium (PGSC) is actively working to identify ways to combat the worldwide economic loss on the potato crop of about €3 billion per year due to diseases such as late blight.

These diseases are still largely controlled by frequent application of fungicides. It is expected that one of the first benefits of a potato sequence will be a major breakthrough in the ability to characterize and select genes involved in disease resistance.



POTATO'S VALUE

Potatoes are a great source of energy, fibre, vitamins C, B1 and B6 including folic acid and potassium, magnesium, iron and zinc.

However, a recent survey by the British Potato Council revealed that one in 10 adults didn't think that potatoes contained any vitamins or nutrients, and less than one in five people realized that potatoes contain vitamin C.

In fact, the average British person gets 15 percent of their annual intake of vitamin C from Potatoes.

Nearly 3000 potato farmers grow over six million tones of potatoes in Britain each year, the majority of which are eaten here in Britain. When asked, more than 80 percent of consumers want to support home-grown food, but there is some confusion about what British farmers produce.

Half of consumers think rice is being grown in Britain, and three quarters of consumers think that British farmers grow wheat for pasta – in fact, neither is true.

ABOUT BUTANOL

Butanol is an alcohol that can be used as a transport fuel. It is a higher member of the series of straight chain alcohols with each molecule of butanol ($C_4H_{10}O$) containing four carbon atoms rather than two as in ethanol.

Butanol can be produced by traditional ABE fermentation – the anaerobic conversion of carbohydrates by strains of *Clostridium* into acetone, butanol and ethanol. However, cost issues, the relatively low yield and sluggish fermentations, as well as problems caused by end product inhibition and phage infections, meant that ABE butanol could not compete on a commercial scale with butanol produced synthetically and almost all production ceased as the petrochemical industry evolved.

However, there is now increasing interest in use of biobutanol as a transport fuel. 85 percent Butanol / gasoline blends can be used in unmodified petrol engines. It can be transported in existing gasoline pipelines and produces more power than ethanol. Biobutanol can be produced from cereal crops, sugar cane and sugar beet etc., but can also be produced from cellulosic raw materials.

FUNCTIONS AND BENEFITS OF DIETARY FIBRE

It stimulates chewing and therefore increases saliva flow and gastric juice secretion	Increases the efficiency of overall digestive system.
Adds bulk to diet, fills the stomach and provide a sense of satiety.	Reduces the appetite
Increases the faecal bulk which in turn decreases colon intraluminal pressure	Alleviates constipation
Speeds the passage of foods through the digestive system (normalizes the intestinal transit time)	Maintains regularity
Water holding capacity (attracts water and traps it to form gel during digestion, trapping carbohydrates and slowing the absorption of glucose)	Avoiding sharp variances in blood glucose levels.
Lowers total and LDL cholesterol	Decreases the risk of heart diseases

Gut Health

Gut health problems can lead to cases of extremely serious diseases, such as bowel cancer. There is a strong link between fibre intake and a reduction of gut health problems. Prebiotic fibres in a consumer diet provide the energy source for probiotic bacteria to work effectively. This probiotic bacteria lives within the gut and ensure a number of gut-health benefits, including the overwhelming of pathogenic bacteria which encourage the onset of illness. As little as 5g of prebiotic fibre inulin a day can favour the growth of good bacteria within the human body.

Satiety (feeling of fullness for a longer period of time)

Researchers have discovered that it is not only the quantity of food that promotes satiety, but its macronutrient (i.e. protein, carbohydrate, fat) and ingredient composition, such as fibre and whole grains. The nutritionist Dr. Beth Reames from Louisiana State University Agricultural Center claims that a high fibre diet is linked with helping consumers control their weight. Foods high in fibre are denser with nutrients. This 'fills' the consumer and results in a smaller appetite for snacking between meals. Test subjects who ate from a healthy selection of low fat products, fruit, vegetables and high fibre foods had a lower body mass index (BMI) than those who ate more refined products like white bread, meat and potatoes.

The health benefits of high fibre products are well accepted among the nutritional research community.

High awareness of the positive health associations with fibre.

We all know that having the correct amount of dietary fibre in our diets is extremely important. We all hear about the 5 pieces of fruit and vegetables we have to take every day.

A survey shown the results that European consumers place high importance on fibre intake as a healthier dietary approach.

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