Yeast strain offers hope in fight against acrylamide

By Elaine Watson, 22-Apr-2010

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Canadian firm Functional Technologies is seeking partners to help commercialise a radical new approach to tackling acrylamide formation in baked goods based on a proprietary strain of yeast.

The yeast works by degrading asparagine: an amino acid found in starchy foods that reacts during cooking to form acrylamide. As it could simply replace traditional baker's yeast, bread was an obvious starting point, said the firm, which specialises in developing novel ingredients from yeast and algae. "*In our proprietary yeast, we have greatly enhanced the yeast cell's innate ability to degrade asparagine and reduce its presence prior to the heating process*."

In other sectors such as potato crisps or baby food, the yeast would have to be used in a product wash, "*where it flows in solution around the raw potato pieces or cereal to consume the asparagine prior to cooking"*, added the firm. As this could potentially impart some yeast taste to the products in question, processing procedures might need to be altered in some cases in order to address changes in flavour in some products, it acknowledged.

In recent years, firms such as Novozymes and DSM have developed enzymes designed to reduce asparagine. However, Functional Technologies' yeasts would work at lower temperatures and at a wider pH range, it said. It was also easier to monitor what was going on using yeast than enzymes, it claimed.

"*The yeast cells are much easier to detect during processing with simple procedures, one of the drawbacks of enzyme treatments. For example, in processing cut potatoes, producers currently do not have a rapid-detection method to determine the level of enzyme remaining in the dip, how much has been picked up by the product, or how much is still needed to treat subsequent batches.*

"Therefore, it can be problematic to manage the enzyme process for asparagine mitigation with a high degree of confidence. In contrast, our analytical technologies enable us to know exactly how much yeast remains and how efficacious we have been in asparagine reduction."

Sector-specific partnerships

Due to the variety of potential applications –"*outside of bread, different foods and processing methods will likely require unique protocols and, potentially, different yeast strains*" – the company believes the best approach is to partner with companies in the food industry on a sector-by-sector basis. "*For production, sales, marketing and distribution, we foresee entering into licensing and royalty agreements with the large yeast manufacturers and/or food ingredient companies*", it added.

There is no formal launch date as yet, as scientists were still "*focusing on the research work and initial testing for different food products"*, the firm told Foodmanufacture.co.uk.

The strain should not raise any regulatory issues, however, claimed the firm: "*There shouldn't be any regulatory hurdles given that our yeast enhancements occur via self-cloning, and the changes that result from this are considered benign by regulatory and scientific authorities in Europe and the US."*

When starchy foods are baked, toasted or fried, reducing sugars such as glucose and fructose can react with asparagine via the Maillard reaction to produce acrylamide, which has been found in a wide range of foods including bread, cookies, crackers, baby food, breakfast cereals, French fries and crisps.

Several methods have been explored to reduce acrylamide formation, from changing the pH to reducing heating temperatures and times, using enzymes to convert asparargine into aspartate (so it's not available to form acrylamide), binding asparagines to make them inaccessible, adding amino acids, removing compounds from the recipe that may promote acrylamide formation and finally breeding cereal crops containing less asparagine.