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Acrylamide Yeast Technology
Questions and Answers

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How does your technology work?
Simply put, our yeast metabolizes asparagine faster than regular yeast. And acrylamide is formed when this same asparagine, an amino acid found in all starchy, high-carbohydrate foods like bread, potatoes and grain, reacts with the heat of cooking, be it frying, baking, roasting or toasting. Yeast has a natural but limited ability to degrade asparagine. 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. A much lower level of asparagine means there is much less acrylamide formed and present in the final products consumed by people.

In bread-making and any product in which baker's yeast is used currently, our enhanced yeast would simply replace traditional yeast, greatly reducing the amount of acrylamide in bread and other baked goods. In other industries, such as potato chips or baby food, where yeast is currently not used, it would likely be used in a product "wash," where the yeast flows in solution around the raw potato pieces or cereal to consume the asparagine prior to cooking. Since this is a new process for non-baking markets that may possibly impart some yeast taste, processing procedures in manufacturing various food products may need to be altered in order to address any changes in flavour.

When will a product be ready for market?
We are not announcing that at the moment but will provide more information in the near future. Right now we are focusing on the research work and initial testing for different food products. We believe the best and quickest results can be accomplished if we undertake development work in conjunction with food industry partners. Outside of bread, different foods and processing methods will likely require unique protocols and, potentially, different yeast strains. Each market (or submarket) requires its own knowledge base. Once organized, it is not (necessarily) difficult work, but it takes time. The market requiring the least amount of development work is of course bread, where a direct substitution of yeast could be made. The bread yeast market is a global market estimated to be worth between $2.0 and $3.5 billion. Much of the testing will be in the areas of product taste and appearance and how to mitigate changes in these areas (if they occur). There should only be minor regulatory hurdles.

How big is the market?
The potential market for an acrylamide solution is very large. We see applications in the processing for many widely consumed foods, including the following:

Bread
Cookies
Crackers
Potatoes: French Fries, potato chips, formed potato products
Battered foods
Baby food

Many of these markets would open up new opportunities for yeast in markets that currently do not use yeast.

What is the risk for children?
There is no special risk for children except that children consume more food per kilogram of body weight than do adults and therefore are considered by the authorities to face approximately twice the exposure to acrylamide that adults face.

What is your commercialization plan?
Simply put, partnerships. We are looking to partner with established companies in separate food categories, and for production and marketing purposed for majors in the yeast and food ingredients area. Due to the of variety of potential uses, the company believes the best approach to commercialization is to partner with medium- and large-sized food industry companies for product and protocol development appropriate to specific product categories. Since the new market for yeast could be much larger than current global yeast production, it is expected that multiple yeast producers could be used.

For production, sales, marketing and distribution, we foresee entering into licensing and royalty agreements with the large yeast manufacturers and/or food ingredient companies.

Which food companies are you talking to? In what areas?
We have just started discussions with a few companies and are bound by confidentiality not to disclose more at this time. We are hoping — possibly in conjunction with one or more commercial yeast or food ingredient company partners — to work with a number of food companies in different categories.

How much will the product cost?
It is difficult to say, but certainly at a premium to current bulk yeast costs.

What sort of efficacy have you received to date?
The efficacy is quite good in preliminary testing to this point and we expect to improve results with further testing. In terms of our record to date, with our ethyl carbamate-reducing yeast we were able to achieve reductions of EC of up to 90% in the final end product. We are targeting similar achievements for this yeast but the development work still has to be done.

What kind of experience do you have in this area?
We have years of scientific research and development experience in developing enhanced yeast that reduces the production of the carcinogen ethyl carbamate. Our success there is that we have reduced EC levels by up to 90% in peer-reviewed and published studies. In terms of

commercialization, we are currently marketing those EC-reducing yeasts along with our hydrogen sulfide-reducing yeasts as commercial products in the wine industry.

Therefore, we are very knowledgeable about what we are doing and what is needed to commercialize our exciting discovery.

Which areas offer the biggest opportunity?
It is difficult to say exactly at the moment. It depends on how much yeast is required for the different processes undertaken for different food products — we can only know this number by working with our partners. Many of theses markets are very large ($10 billion+ per market in many cases), with products that enjoy large gross profit margins; hence the potential is very attractive. Bread or baker's yeast (global market estimated at $2.0 – $3.5 billion annually) is the single largest short-term opportunity because there are no conversion issues, i.e., our proprietary yeast, once in final version, could be substituted directly into the process, replacing conventional baker's cream yeast. It is likely that all other product areas will require more product and protocol development work.

How quickly could your yeast be working in bread?
Since the usage of our yeast simply replaces the use of traditional baker's yeast in the baking process, no changes are required in that industry; it's simply a matter of replacing current yeast strains with our yeast strain (once fully tested) in the manufacturing process. This can be done fairly quickly.

What regulatory hurdles do you face?
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 U.S.

This sounds a lot like your ethyl carbamate solution. What are the similarities?
Urea-degrading and asparagine-degrading are very similar mechanisms in that they harness and enhance the yeast cell's own natural functions. Since the company has worked many years in this area to develop significant in-house knowledge and product expertise — including commercialization and product testing — it is well positioned to develop new yeast strain products quickly.

How does your treatment differ from the enzyme treatment method?
There are many benefits of using yeast over enzyme treatments in reducing asparagine. While we expect our cost of production to be very reasonable as compared to enzymes, we also know that our yeasts will work at a lower temperature range and a wider pH range. The yeast cells will also be much easier to detect during processing with simple procedures (one of the drawbacks of the current enzyme treatments). For example, in processing cut potato products, 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 effectively treat subsequent batches. Therefore, it can be problematic to manage the enzyme process for asparagine mitigation to a high degree of confidence. In contrast, our advanced analytical technologies enable us to know exactly how much yeast remains and how efficacious we have been in asparagine reduction.

Are there any hazardous or non-hazardous byproducts produced?
No, no hazardous byproducts are produced but non-hazardous byproducts are formed.