Scientists aim to overcome allergic reactions to soy

If you're allergic to soy, help is on the way. Two University of Illinois studies show that fermenting soy dramatically reduces its potential allergenicity and also increases the number of essential amino acids in soy products, making them a healthy and a safe choice for consumers.

"When we fermented soy seeds, flour, or meal by introducing certain microorganisms, inmmunoreactivity was significantly reduced—by as much as 99 percent. This shows that we have the potential of developing nutritious, hypoallergenic soy products," said Elvira de Mejia, a U of I associate professor of food science and human nutrition.

The scientist achieved these results when she challenged the blood plasma of persons allergic to soy with protein extracts from both fermented and unfermented soy products. Plasma samples were obtained from the World Health Organization.

"Why do we see this reduced immunoreactivity? During the fermentation process, proteins are broken down into very small pieces, pieces that can't be identified by the antibodies that produce the allergic reaction," de Mejia explained.

Because of soy's health benefits, de Mejia would like to make sure soy foods can be safely eaten by all people. Soy is a source of high-quality protein, oil, B vitamins, fiber, and essential fatty acids, and it also contains phytochemicals that may help prevent chronic diseases, including heart disease, some cancers, osteoporosis, and diabetes, she said.

And, although soy allergy affects only 0.5 percent of the population, that figure may be rising. Because soy is used as in ingredient in many food products, de Mejia said that a technique that can eliminate its allergenicity is widely sought.

In the two U of I studies, which were done in collaboration with the Instituto de Fermentaciones Industriales (CSIC) in Madrid, Spain, soy was subjected to both solid and liquid fermentation by exposing samples to a number of microorganisms, including bacteria, molds, and yeast.

L. plantarum-fermented soy flour showed the highest reduction in immunoreactivity—96 to 99 percent—depending upon the sensitivity of the human plasma, the scientist said.

"Our next step will be to optimize the fermentation conditions to produce zero-tolerance allergens," she said.

De Mejia noted that fermentation had also improved the essential amino acid composition in the soy products and produced new peptides that may be beneficial.

"We want to evaluate some of the bioactive peptides that were produced during fermentation because we believe they may have other benefits. In particular, we're interested in their effect on lipogenesis, so we'll be testing these hydrolysates in adipose cells," she said.

The increase in the number of small bioactive peptides was attributed to partial digestion of large soybean peptides by enzymes secreted by the microorganisms used in fermentation, she said.

Plaimein Amnuaycheewa, a master's degree student in de Mejia's lab, is currently working on the allergenicity project, and Cristina Martinez-Villaluenga, a Marie Curie fellow, is working with allergenicity

and adipogenesis.

Source: University of Illinois at Urbana-Champaign