UCD Impact Case Study

UCD helps Monaghan Mushrooms secure a new market for Vitamin-D enhanced mushrooms

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HEALTH · ECONOMIC · SCIENTIFIC · TECHNO-LOGICAL

SUMMARY

Vitamin D deficiency is thought to play a role worldwide in the development of several chronic diseases. Only low levels of Vitamin D occur naturally in food, and vitamin D enhancement of food is not straightforward. The UCD Institute of Food and Health and the UCD Conway Institute formed a research collaboration with Monaghan Mushrooms to assess the supplementation of Vitamin D in the diet through the use of Vitamin-D enhanced mushrooms.

Using UVB radiation, Monaghan Mushrooms has increased the concentration of vitamin D in mushrooms. UCD researchers demonstrated that consumption of 15 micrograms per day of vitamin D2 in the form of a mushroom powder enhances circulating vitamin D2 levels in the blood.

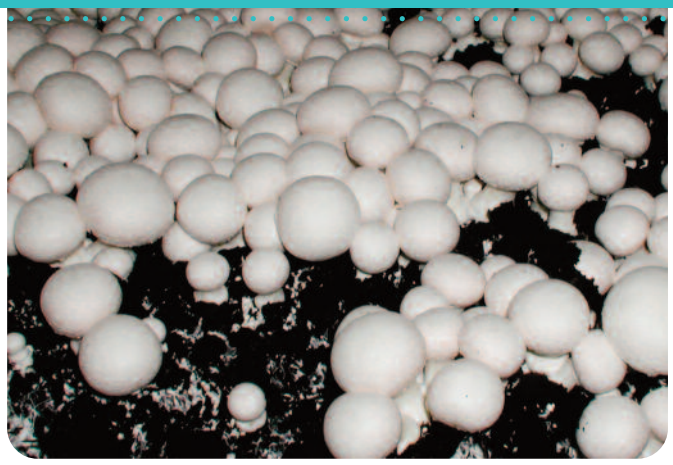
Stemming in part from this research, Monaghan Mushrooms partnered with Marks & Spencer in 2014 to sell 'Vitamin D Mushrooms'. In May 2016 Marks & Spencer had sold a milestone 500,000 packs of this special type of mushroom, and saw almost a 50% growth in its sales of Vitamin D mushrooms since their launch in late 2014. In August 2016, Monaghan Mushrooms announced that the vitamin-D enhanced mushrooms will also be available in all Dunnes Stores and SuperValu supermarkets.

UCD research demonstrated that consumption of 15 micrograms per day of vitamin D2 via a mushroom powder enhances circulating vitamin D2 levels in the blood.

DESCRIPTION

Vitamin D deficiency is associated with weakened bones, and there is increasing evidence that it also plays a role in the development of several chronic diseases, from psoriasis to various cancers. Recently the UK's Scientific Advisory Committee on Nutrition (SACN) supported a reference nutrient intake (RNI) of 10 micrograms of vitamin D per day. 90% of the Irish population obtains less than this, with 75% of the population having an average intake of less than half the RNI.

Vitamin D3 is produced in human skin exposed to UV light. Vitamin D2 is found in foods and is produced in plants exposed to UV. The UCD Institute of Food and Health and the UCD Conway Institute formed a research collaboration with Monaghan Mushrooms to assess the supplementation of Vitamin D in the diet through the use of Vitamin-D enhanced products such as mushrooms.



The Vitamin D2 content of button mushrooms (Agaricus bisporus), as shown here, can be increased by manipulating the conditions under which they are grown. Photo courtesy of Dr Helen Grogan, Teagasc.

Using UVB radiation, Monaghan Mushrooms increased the concentration of vitamin D2 in mushrooms. UCD researchers then undertook a study to determine whether daily consumption of these vitamin D2-enhanced mushrooms increases vitamin D status in healthy adults. This work, which was published in a peer-reviewed publication, demonstrated that consumption of 15 micrograms per day of vitamin D2 via a mushroom powder enhances circulating vitamin D2 levels in the blood. The concentration of vitamin D2 in the serum of volunteers who had eaten the vitamin D2-enhanced mushrooms was 8.9 nanomoles per litre after four weeks, compared to only 4.3 nanomoles per litre in the serum of volunteers who ate a placebo mushroom powder. This indicates clearly that the vitamin is bioavailable in this form. Although the total vitamin D was not increased overall in the volunteers, the study showed that increased supplementation or consumption of the vitamin-enhanced mushrooms for longer durations may potentially lead to improved total vitamin D status.

DETAILS OF THE IMPACT

Economic Impact

Monaghan Mushrooms is based in Tyholland in Co. Monaghan, and supplies major grocery retailers such as LiDL, SuperValu, Tesco, Sainsbury's, ASDA, Waitrose, and M&S. Following the research undertaken in collaboration with UCD, Monaghan mushrooms obtained a deal with M&S to supply vitamin D-enhanced mushrooms. In May 2016, M&S had sold a milestone 500,000 packs of a special type of mushroom developed by Monaghan Mushrooms incorporating the research developed by UCD, called 'Vitamin D mushrooms'. This product was launched in 2014 and, recently, M&S reported that they are responsible for almost 50% of the growth in its mushroom category. In August 2016, Monaghan Mushrooms announced that the vitamin-D enhanced mushrooms will also be available in all Dunnes Stores and SuperValu supermarkets.

Health Impact

Consumption of vitamin D2-enhanced mushrooms significantly increased serum 25(OH)D2 levels, indicating that the vitamin was bioavailable in this form. A recent review by SCAN in the UK has highlighted the importance of obtaining sufficient vitamin D from dietary sources (www.gov.uk/government/publications/sacn-vitamin-d-and-health-report).

The incorporation of these vitamin D2 enhanced mushrooms offers a solution to consumers to ensure that they are meeting their daily vitamin D needs. It is a safe and easy method for consumers to meet vitamin D needs. Furthermore, it offers vegetarian and vegans an alternative to commonly fortified dairy foods and oily fish.

Future health impacts may derive from increased supplementation or for longer durations which might lead to increased total vitamin D levels. If successful it would give the public the opportunity to obtain their vitamin D from an alternative source.

Scientific Impact

This study showed the potential of vitamin D enhanced mushrooms to increase serum 25(OH)D2 levels in the consumer. It clearly demonstrated that this form of vitamin D is bioavailable and offers the potential to increase vitamin D intake in adults. Dietary sources of vitamin D are extremely important during the winter months when we do not synthesize vitamin D. Enhancing the range of products from which people can obtain vitamin D, is an important step towards ensuring that we meet the recommended daily intake.

Further research could determine whether a longer duration of regular consumption, or a greater quantity of the mushroom powder, would increase total vitamin D status.

Technological Impact

The study validated the potential of the technological adaptation used by Monaghan Mushrooms – using UV lamps over greenhouse-grown mushrooms to increase Vitamin D2 content. This type of research should provide an incentive to further develop the application of scientifically-based technological solutions to the horticultural sector.

RESEARCH REFERENCES

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