



MUSHROOMS AND HEALTH GLOBAL INITIATIVE BULLETIN

An ISMS Global Initiative to increase the worldwide consumption of mushrooms through the collection, evaluation and dissemination of scientifically validated information.

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News from the Initiative - Mary Jo Feeney

The *Bulletin* is your resource for examples of how mushroom research is communicated through media stories, events and partnerships in different countries/locales. Participation and involvement by all segments of the mushroom industry are critical to communicate compelling reasons for consumers to eat more mushrooms. Industry organizations, universities and/or other sponsored research centers encourage communication among scientists, indeed an important function. This differs from the Initiative's supply chain and media/health influencer communications focus. An external communications focus is important because market research indicates that consumer awareness of specific health attributes of mushrooms leads to increased mushroom consumption.

In this issue, read how South Africa introduced mushrooms to new consumers; how Spain partnered to have mushrooms served for an entire week on a hospital's restaurant menu; how Australia posted mushroom information in doctors' waiting rooms; and how the US is planning its first Mushrooms and Health Summit. Be sure to visit the Mushrooms and Health website for more information on nutrition and health: www.mushroomsandhealth.com.

Mushroom Research

► Photobiology and bioavailability of vitamin D in mushrooms

Keegan R-JH, Lu Z, Bogusz MJ and Holick MF. [Photobiology of vitamin D in mushrooms and its bioavailability in humans](#). *Dermato-Endocrinology* 2013; 5: 1. This is an Open Access article.

Mushrooms exposed to sunlight or UV radiation are an excellent source of dietary vitamin D₂ because they contain high concentrations of the vitamin D precursor, provitamin D₂. When mushrooms are exposed to UV radiation, provitamin D₂ is converted to previtamin D₂. Once formed, previtamin D₂ rapidly isomerizes to vitamin D₂ in a similar manner that previtamin D₃ isomerizes to vitamin D₃ in human skin. Continued exposure of mushrooms to UV radiation

results in the production of lumisterol₂ and tachysterol₂. The concentration of lumisterol₂ remained constant in white button mushrooms for up to 24 h after being produced. However, in the same mushroom tachysterol₂ concentrations rapidly declined and were undetectable after 24 h. Shiitake mushrooms not only produce vitamin D₂ but also produce vitamin D₃ and vitamin D₄.

Comparing the bioavailability of vitamin D₂ in mushrooms with the bioavailability of vitamin D₂ or vitamin D₃ in a supplement revealed that ingestion of 2000 IUs of vitamin D₂ in mushrooms is as effective as ingesting 2000 IUs of vitamin D₂ or vitamin D₃ in a supplement in raising and maintaining blood levels of 25-hydroxyvitamin D, a marker for vitamin D status. Therefore, mushrooms are a rich source of vitamin D₂ that can increase and maintain blood levels of 25-hydroxyvitamin D in a healthy range. Ingestion of mushrooms may also provide the consumer with a source of vitamin D₃ and vitamin D₄.

UV exposed mushrooms are effective in raising blood levels of 25-hydroxyvitamin D.

► **Anti-inflammatory activities of mushrooms**

Gunawardena D, Shanmugam K et al. [Determination of anti-inflammatory activities of standardised preparations of plant- and mushroom-based foods](#). *European Journal of Nutrition*. Published online 08 May 2013.

The investigators systematically screened a variety of 115 common dietary plants and mushrooms for their anti-inflammatory activity in murine N11 microglia and RAW 264.7 macrophages, using nitric oxide (NO) and tumour necrosis factor- α (TNF- α) as pro-inflammatory readouts. Ten food samples including lime zest, English breakfast tea, honey-brown mushroom, button mushroom, oyster mushroom, cinnamon and cloves inhibited NO production in N11 microglia, with IC₅₀ values below 0.5 mg/ml. The most active samples were onion, oregano and red sweet potato, exhibiting IC₅₀ values below 0.1 mg/ml. When these ten food preparations were retested in RAW 264.7 macrophages, they all inhibited NO production similar to the results obtained in N11 microglia. English breakfast tea leaves, oyster mushroom, onion, cinnamon and button mushroom preparations suppressed TNF- α production, exhibiting IC₅₀ values below 0.5mg/ml in RAW 264.7 macrophages. The investigators maintained that the anti-inflammatory activity in these food samples survived 'cooking'. Provided that individual bioavailability allows active compounds to reach therapeutic levels in target tissues, these foods may be useful in limiting inflammation in a variety of age-related inflammatory diseases and could be a source for the discovery of novel anti-inflammatory drugs.

► **Selenium in oyster mushrooms**

Bhatia P, Aurelib F et al. [Selenium bioaccessibility and speciation in biofortified *Pleurotus* mushrooms grown on selenium-rich agricultural residues](#). *Food Chemistry* September 2013. Vol. 140 (1-2): 225 - 230.

The researchers studied the ability of *Pleurotus florida* - an edible species of oyster mushrooms - grown on wheat straw from the seleniferous belt of Punjab (India), to mobilize and accumulate selenium from the growth substrate. Selenium concentration was 800 times higher compared with control samples grown on wheat straw from non selenium-rich areas. The bioaccessible selenium was mainly present as selenomethionine, a good bioavailable source of selenium, which accounted for 73% of the sum of the detected species. According to the investigators, the study

demonstrates the feasibility of producing selenium-biofortified edible mushrooms using selenium-rich agricultural by-products as growth substrates.

► **Morel extracts help protect liver**

Nitha B, Fijesh PV, and Janardhanan KK. [Hepatoprotective activity of cultured mycelium of Morel mushroom, *Morchella esculenta*](#). *Experimental and Toxicologic Pathology*. 2013 Jan; 65 (1-2): 105-112.

The liver is an important organ for detoxification. Liver diseases are becoming serious health problems worldwide. Most of the hepatotoxins induce tissue injury after having been metabolized to free radicals and cause subsequent cell damage. Carbon tetrachloride (CCl₄), a selective hepatotoxic chemical agent, is one of the most widely used toxins for the experimental induction of liver fibrosis in laboratory animals. The researchers investigated the hepatoprotective activity of cultured mycelium of morel mushroom, *Morchella esculenta*, against CCl₄ and ethanol induced chronic hepatotoxicity by challenging the animals with CCl₄ and ethanol. The extract was administered at two concentrations (250 and 500 mg/kg body weight). Hepatoprotection was evaluated by determining the activities of liver function marker enzymes and antioxidant status of liver and by histopathological observations of liver tissue.

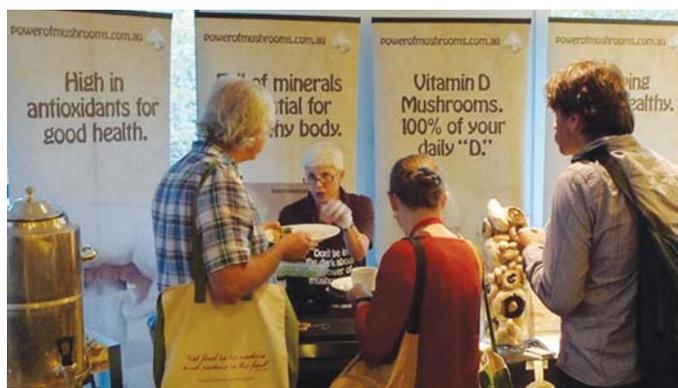
Administration of both ethanol and CCl₄ elevated the levels of liver function enzymes, GOT, GPT and ALP in serum drastically. The treatment with the extract decreased the elevated serum GOT, GPT and ALP activities in a dose dependent manner. The extract also restored the depleted levels of antioxidants in liver consequent to CCl₄ and ethanol challenge. The results indicated that aqueous-ethanolic extract of *M. esculenta* mycelium possessed significant hepatoprotective activity. The conclusion is also supported by the biochemical determinations and histopathological observations. The findings suggest the potential therapeutic use of morel mushroom mycelium as a novel hepatoprotective agent.



News from Australia - Glenn Cardwell

► **Nutrition in Medicine Conference**

This conference was held in Sydney 3-5 May and gave us an opportunity to talk to doctors and health care professionals with a specific interest in nutrition and health. As usual we provided tastings and signed people up to our health professional newsletter. Everyone was encouraged to take our science-based nutrition brochure and our poster outlining 10 reasons why everyone will benefit from eating more mushrooms.



Delegates at the Nutrition in Medicine Conference enjoy the power of mushrooms.

► **Dietitians Conference**

For the 5th consecutive year we ran the very popular mushroom breakfast for 150 dietitians. I say it is "very popular" because it is the first breakfast to be fully subscribed every conference since the 2nd year. Fast Ed Halmagyi, featured in the photo on page 4, entertained the audience while creating some truly

5th Dietitians
Mushroom
Breakfast was
the most
successful yet.

superb mushroom dishes. Pennie Taylor, one of the authors of the CSIRO [Mushrooms and Health Report](#), presented her scientific insights while compiling the report. In addition, Glenn Cardwell explained why the latest science was important to dietitians and their clients. Over half signed up to our newsletters and requested our poster. This was a good result because most of the remainder were already on our mailing list.

The May edition of the Dietitians Association of Australia newsletter also included a mushroom promotion on the health benefits of mushrooms. The newsletter goes to more than 5000 members of the Dietitians Association of Australia.

► Doctors Program

The first stage of the doctors program in Adelaide, South Australia, has been completed. Posters and recipes were given to willing doctors' practices to place in their waiting rooms. During July, the team returned to each practice to provide more recipe leaflets and ask them how well the information has been received.

The Queensland mushroom promotion team also offered recipes and posters to every doctor and health professional they met through their sponsorship of local seminars and conferences. The promotion team too has been very successful in signing up health professional support for promoting mushrooms via posters and recipe leaflets in patient waiting rooms.

► Health Professional Brochure

This very popular brochure, updated for the 4th time, has been very important to us because it gives health professionals confidence that all we say about the mushroom is based on published research. Although we could easily include 150 references, space allows us room to list only 50 references. This and the [Mushrooms and Health Report](#) form the basis for all the nutrition information we offer to both health professionals and the public.

Our health
professional
brochure
summarises
mushroom
health benefits.



► Talking Research

Our last two e-newsletters to health professionals have briefly outlined the mushroom research presented at the Experimental Biology conference in April (see links to abstracts in the [May Bulletin #22](#)) and the value of mushrooms to those with diabetes for Diabetes Awareness Week in July.



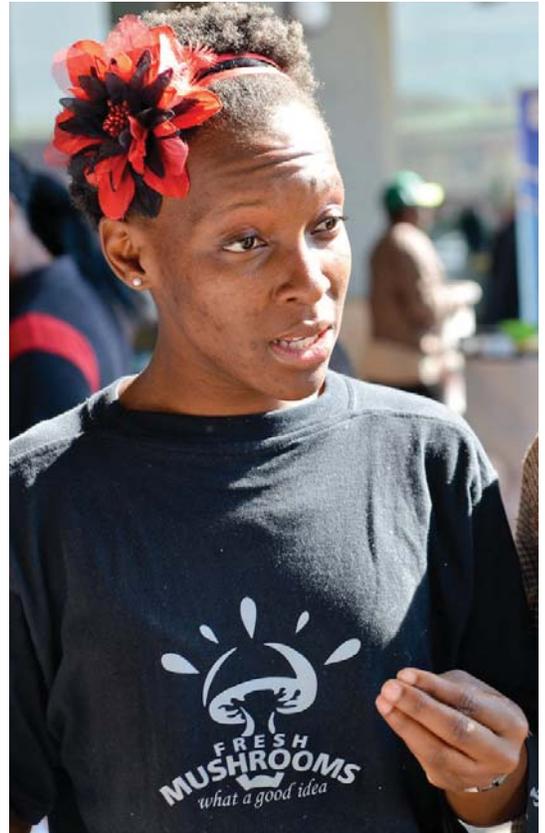
News from South Africa - Julliet Ramatshila

► South Africa's Black Middle Class Gets a Taste of Fresh Mushrooms

Traditionally mushroom consumers in South Africa were white due to the economic skew of the country and the lack of mushroom promotion into the black market. However, since the black population makes up around 80% of the total population, it has become essential to promote mushrooms to this new and very powerful consumer market.

Research commissioned by the South African Mushroom Farmers' Association (SAMFA) during the 3rd quarter of 2012 indicated that mushrooms very often did not have a place in the shopping basket of the new consumer and despite a healthy interest in other vegetables, consideration levels of mushrooms are low. Good news was that there were few negative perceptions of mushrooms and those who had been exposed to mushrooms liked the taste. One negative perception was costs. Research also indicated that education around the various mushrooms would drive awareness whilst tastings would drive purchase. To this end SAMFA is embarking on a series of mushroom demonstrations in key townships including Soweto to bring mushrooms to the attention of a huge new consumer audience. Mushroom demonstrators fluent in the vernacular and from the community were trained on all aspects of mushrooms from flavour to variety, health and swapability.

Demonstrations take place in township shopping centres outside major retailers during the last weekend of each month and this will be done on a monthly basis throughout the year. Shoppers are treated to live mushroom cooking



Consumers were fascinated by the health benefits of mushrooms – 158 punnets were sold in a market where none were sold previously.

demonstrations, mushroom tasting, and lots of spot prizes whilst the demonstrators educate on the versatility, flavour and nutrient value of mushrooms. They position mushrooms as a kitchen staple, with other vegetables, that adds flavor and nutrients to every meal, reduce calorie and fat intake and are effective substitutes for meat. Hand-outs include recipe leaflets with quick, easy and cost-effective ideas that also contain educational information about mushrooms. The aim of the demonstrations is to encourage consumers to taste.

During the first weekend of demonstrations over 700 potential new consumers tasted mushrooms over the two days and according to statistics 158 punnets were sold in a market where nearly no mushrooms were sold previously. Feedback from the demonstrators was that consumers were fascinated by the health benefits of mushrooms, delighted that store bought mushrooms were 100% safe to eat and of those who tasted mushrooms (many for the first time), an almost 100% approval rate for the taste of mushrooms was achieved.



News from Spain - Maria Luisa Tello Martin

► XVII Vegetable Gastronomic Days

During the week of April 22nd to the 28th XVII Vegetable Gastronomic days was held in Calahorra (La Rioja - Spain), where ASOCHAMP (our mushroom growers association) participated in several actions and events. Under the partnership initiated in 2009 between Calahorra Hospital Foundation (FHC) and ASOCHAMP, an exhibition opened on Monday April 22nd. The display - "Mushrooms and Fungi: health source" - was held in Calahorra's Hospital hall and remained the whole week for patients and others to visit. The menu of the hospital's restaurant was based on mushrooms the whole week. In this edition The Rioja



Ecological Agricultural Production Regulatory Board (CPAER) also collaborated given information about the benefits of the ecological products. A piece of different mushroom species was shown both in compost package as in trays.



The weekend April 27th and 28th, the Vegetable Market opened its doors during which stakeholders visited the different stands where quality products could be bought. During these days ASOCHAMP and CTICH (research and technological centre on mushroom business) showed the growing process of different kinds of fungi in a simulated growing room. CTICH researchers answered visitors' questions and gave brochures with mushrooms' health information and cookbooks with delicious fungi recipes. On Sunday 28th at 12.30, ASOCHAMP made its traditional mushrooms tasting together with Rioja's wine. The market brings the public the opportunity to learn about mushrooms in a relaxed and fun atmosphere.

► Mushroom Tasting In the Mall

To promote mushroom consumption a free mushroom tasting was held in a big commercial store in Logroño (La Rioja, Spain) during the lunch time in June 7th and 8th. More than 800 servings of cooked white button mushrooms (*Agaricus bisporus*) were distributed. In addition people could see several panels with mushrooms' excellent properties: Healthy and Nutritive and Tasty and Versatile.

This initiative promoted by ASOCHAMP and the commercial supermarket ALCAMPO had a great welcome among customers who visited the establishment these days. Such events raise awareness of organoleptic, culinary and health qualities of mushrooms.

Tasting events raise awareness of mushroom's organoleptic culinary and health qualities.





► Exploring Mushrooms' Health Benefits at Scientific Meeting

Mushrooms & Health SUMMIT

The Mushroom Council is preparing to host a Mushrooms and Health Summit in Washington D.C. on September 9-10, 2013 to explore and share the international science linking mushrooms and health. The Summit will provide nutrition researchers and influencers the opportunity to discuss the state of current research as well as identify future research possibilities on mushrooms and health.

This first Summit for the U.S. mushroom industry will convene the world's top scientists, researchers and nutrition experts to provide a broad range of perspectives and discussions around mushrooms from spore to spoon. Presentations from experts at leading institutions throughout the world will share information about:

- Mushrooms' historical cultural use and unique nutrient, bioactive and mechanistic properties
- Trends in global mushroom use, consumption and economic contribution
- Emerging science linking mushrooms to health
- The role of mushrooms in dietary guidance

Visit mushroomhealthsummit.com or email info@mushroominfo.com to learn more about the event. There is no registration fee but attendees are responsible for their travel and other expenses.

► **Partnership Educates Nutrition Audience about Mushroom Health Benefits and Vitamin D**

As part of ongoing partnerships with Academy of Nutrition and Dietetic subgroups, the Mushroom Council co-sponsored a webinar with the National Organization of Blacks in Dietetics and Nutrition (NOBIDAN) Academy Member Interest Group (MIG) to educate over 70 registered dietitians about Vitamin D – with an emphasis on this nutrient's importance for black audiences. Following successful collaboration for Experimental Biology in April, Dr. Michael Holick partnered with the Council to share his highly visual presentation about vitamin D and discussed his latest mushroom/vitamin D research. Follow-up encouraged attendees to find more information and resources on <http://www.mushroominfo.com/>.

► **Research Presented at Experimental Biology Ignites Media Buzz**

Research supported by the Mushroom Council and presented at Experimental Biology in April as abstracts were amplified through Council media outreach efforts. Following a [press release](#), and targeted media outreach, stories garnered six million media impressions in outlets such as [Forbes](#), [New York Daily News](#), [Everyday Health](#), [Women's Health](#), [Fitbie](#) and [Yahoo!Shine](#). Headlines proclaimed mushrooms as a "Secret Ingredient for Weight Loss," "Slimming Meat Substitute," and "Surprising Source of Vitamin D."

Over 6 million media impressions resulted from media coverage of mushroom research at Experimental Biology.

Mushrooms get social

Australia

Power of Mushrooms website
My Mushrooms blog
Mighty Mushroom Twitter
Mushroom Lovers Club
Facebook
Power of Mushrooms YouTube

Canada

Mushrooms Canada website
Mushrooms Canada blog
Mushrooms Canada Twitter
Mushrooms Canada Facebook
Mushrooms Canada Pinterest
Mushrooms Canada YouTube

Italy

Italian Association
Fungicoltori (AIF) website
Italian Association
Fungicoltori (AIF)
info@fun.go.it email
Funghincucina Twitter
Funghincucina Facebook
Funghincucina Pinterest

Netherlands

Champignonidee website
Champignonidee Twitter
Champignonidee Facebook
Champignonidee Pinterest
Champignonidee YouTube
Champignonidee Google+

South Africa

SAMFA website
Fresh Mushrooms Twitter
MushroomsSA Facebook

Spain

CTICH website
Championidea website
Asochamprioja Twitter
Asoc Prof Cultivadores
Champiñon de La Rioja,
Navarra y Aragon Facebook
Asochamprioja YouTube
ASOC.PROF.CULT Champiñón
DE LA RIOJA Google+

United Kingdom & Ireland

More to Mushrooms website
More to Mushrooms Twitter
More to Mushrooms Facebook

United States

Mushroom Info website
The Mushroom Channel blog
Mushroom Channel Twitter
Mushroom Channel Facebook
Fresh Mushrooms Pinterest

Be sure to visit the Mushrooms and Health website
<http://www.mushroomsandhealth.com/>

Send what's happening in your country to communicate the benefits of mushrooms to consumers, shoppers, households, doctors, health professionals and the media to info@mushroomsandhealth.com.

Note: The *Bulletin* provides links to other sites for your convenience and information. These sites contain information created, published, maintained or otherwise posted by organizations independent of the Initiative which does not endorse, approve, certify or control these sites and does not guarantee the accuracy of the information contained on them.

► Initiative project team

- Greg Seymour, President, ISMS; General Manager AMGA, Australia; Manager, Mushrooms and Health Global Initiative
- Bart Minor, President, Mushroom Council, United States
- Mary Jo Feeney, Mushrooms and Health Global Initiative Operations Manager, Bulletin Editor, United States
- Glenn Cardwell, Accredited Practising Dietitian, Nutrition Impact P/L, Australia
- Chris Rowley, Communications Consultant, Australia
- Juan Valverde, Food Science Programme Manager, Monaghan Mushrooms Group, Ireland
- Heidi Gengler, Vice President, Edelman Public Relations, United States

► Strategic communications group

Members of the Strategic Communications Group strengthen the Initiative's communication capability and develop a local public relations presence in each country whose industry is contributing financially to the project. Members of this group help facilitate stories about mushrooms and health appearing in their local media, monitor mushroom nutrition and health research, liaison with scientists, media and other influencers, and provide feedback to the Initiative. They include:

- Michal Slawski - United Kingdom
- Franz Schmaus - Germany
- Ignace Deroo - Belgium
- José Antonio Jiménez Hernandez - Spain
- Kent Stenvang - Denmark
- Elizabeth O'Neil - Canada