



# 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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### ► Table of Contents

News from the Initiative - Mary Jo Feeney.....	1
Mushroom Research.....	1
News from Australia - Glenn Cardwell.....	3
News from Spain - Maria Luisa Tello Martin.....	4
News from the United States - Heidi Gengler.....	6

### News from the Initiative - Mary Jo Feeney

#### ► MHGI Website

Eighty-two different countries visited the [Mushrooms and Health Global Initiative website](#) during 2012. Over half of the visits were from North America (51%) followed by Oceania (19%) and Europe (18%). Remember to use and refer others to this authoritative website for scientific information linking mushrooms and health.

#### ► Mushrooms and Health Report 2012 and 2014

Biennially since 2008 Dr. Peter Roupas and the team at CSIRO Food and Nutrition Sciences ([Commonwealth Scientific and Industrial Research Organisation](#)) have collected, reviewed and evaluated the science linking mushrooms and health for the *Mushrooms and Health Report*. The 2012 Report currently posted on the website will be updated again in 2014.

82 different countries visited the Mushrooms and Health Global Initiative website in 2012.

"The role of edible mushrooms in health: Evaluation of the evidence" by Dr. Roupas' team, published in the *Journal of Functional Foods*, was number 3 among the Top 25 Hottest Articles (most downloaded) during July-September 2012. <http://top25.sciencedirect.com/subject/agricultural-and-biological-sciences/1/journal/journal-of-functional-foods/17564646/archive/40/>.

### Mushroom Research

#### ► Review of chemical and nutrient composition

Kalac P. [A review of chemical composition and nutritional value of wild-growing and cultivated mushrooms](#). *J Sci Food Agric* 2013; 93: 209-218.

The author comments in the introduction that until the last decade knowledge of the composition and nutritional value of culinary mushrooms – particularly those grown in the wild – was limited. This was understandable as culinary mushrooms were perceived only as a delicacy and with consumption in developed countries marginal, there was little interest. This has changed as the number of research papers is now several times higher than 10-15 years ago. This review citing "weightiest articles up until 2009" includes sections on the chemical composition

and nutritional value of proteins/amino acids, lipids, carbohydrates and fibre, minerals, vitamins and provitamins. The review also includes discussion of flavour and taste compounds, pigments, phenolics, and other various constituents.

The author concludes that although information on the chemical composition of culinary mushrooms, particularly wild-growing mushrooms, has dynamically expanded during the last decade, data can hardly be generalized owing to the high number of consumed species and variability within species. Some species probably contain components with various, as yet unrecognized, biological effects.

#### ► **Selenium in mushrooms**

Falandysz J. [Review: On published data and methods for selenium in mushrooms. \*Food Chem.\* 2013; 138:242-250.](#)

Selenium (Se) is an important micronutrient in human nutrition. Development of suitable analytical methods to determine both total Se and its organic chemical compounds is important. This article outlines and discusses selected data published on selenium in several species of mushrooms in light of performance of analytical methods used.

#### ► **White button mushrooms, bacterial microflora and pathogen resistance**

Varshney J *et al.* [White button mushrooms increase microbial diversity and accelerate the resolution of \*Citrobacter rodentium\* infection in mice. \*J. Nutr.\* March 1, 2013. Published online Jan. 23, 2013, doi:10.3945/jn.112.171355.](#)

Read these abstracts for research on mushroom composition and health.

White button mushrooms (WB) or control diets (CTRL) were fed to C57BL/6 mice for 6 weeks to investigate effects on bacterial microflora, urinary metabolome, and resistance to the gastrointestinal (GI) pathogen *Citrobacter rodentium*. Mice fed a diet containing 1g WB mushrooms/100g diet exhibited changes in microflora at 2 weeks and changes stabilized at 4 weeks. Compared to the CTRL-fed mice, this amount (1g WB/100g diet) increased diversity of the microflora and reduced potentially pathogenic bacteria in the GI tract. Bacteria from the Bacteroidetes phylum increased and the Firmicutes phylum decreased in mushroom-fed mice compared to control. Changes in the microflora were reflected in the urinary metabolome that showed a metabolic shift in the WB-fed compared to the CTRL-fed mice. These changes were associated with fewer inflammatory cells and decreased colitis severity in the GI mucosa following *Citrobacter rodentium* infection compared with CTRL. The clearance of *C. rodentium* infection did not differ though Ifn- $\gamma$  and Il-17 were higher in the colons of the WB-fed mice compared with CTRL. According to the researchers, adding modest amounts of WB mushrooms to the diet changed the composition of the normal flora and urinary metabolome of mice and these changes resulted in better control of inflammation and resolution of infection with *C. rodentium*.

#### ► **Vit. D<sub>2</sub> from light-exposed mushrooms**

Calvo MS, *et al.* [Vitamin D<sub>2</sub> from light-exposed edible mushrooms is safe, bioavailable and effectively supports bone growth in rats. \*Osteoporos Int\* 2013;24:197-207.](#)

Researchers fed weanling female rats one of five diets all formulated on AIN-93 G. Control diets contained no mushrooms with or without vitamin D<sub>3</sub>. Other diets contained 2.5% and 5.0% of UVB-exposed or unexposed mushrooms. Safety of high levels of D<sub>2</sub> was assessed by animal growth and Von Kossa staining

for soft-tissue calcification. Bioavailability was determined from changes in circulating levels of 25(OH)D and parathyroid hormone (PTH). Measures of femur bending properties, size, mineralization and microarchitecture determined efficacy in support of bone growth. Diets with 2.5% and 5.0% light-exposed mushrooms significantly raised 25(OH)D levels and suppressed PTH levels compared to control-fed rats or rats fed 5.0% mushrooms not exposed to light. Microarchitecture and trabecular mineralization were only modestly higher in light-treated mushroom-fed rats compared to controls. Von Kossa staining revealed no soft tissue calcification despite very high plasma 25(OH)D. The researchers concluded that vitamin D<sub>2</sub> from UVB-exposed mushrooms is bioavailable, safe, and functional in supporting bone growth and mineralization in a growing rat model without evidence of toxicity.

► **AHCC mushroom supplement and influenza vaccination**

Roman BE, Beli E, Duriancik DM and Gardner EM. [Short-term supplementation with active hexose correlated compound improves the antibody response to influenza B vaccine](#). *Nutrition Research* 2013; 33: 12-17.

Active hexose correlated compound (AHCC), a dietary supplement from *Basidiomycetes* mushrooms, is comprised largely of alpha-1,4-glucans. AHCC has been shown to provide improved protection from flu in mice. In this pilot study, investigators hypothesized that AHCC could improve immune response of healthy individuals to influenza vaccine.

Blood was drawn pre-vaccination and 3 wk post-vaccination. Immediately post-vaccination the AHCC group began supplementation of 3 g AHCC per day. AHCC supplementation improved some lymphocyte percentages and influenza B antibody titers over the control. The researchers comment that although AHCC has been shown to protect mice from primary infections, a protective effect in humans from influenza infection is difficult to prove. Such studies on a preventive role of AHCC against common colds and influenza infections require large numbers of participants and would need to record occurrence and severity of infections.



**News from Australia - Glenn Cardwell**

► **Doctors & Nurses**

The last of our current program with the General Practitioner and Practice Nurse Convention and Exhibition was held in Melbourne, Victoria in November. This was the fourth time we have presented at this particular conference that attracts 1500 doctors and nurses. Glenn Cardwell gave four workshops on “Superdiets & Superfoods” and a nutrition quiz, with many



A strong mushroom message is delivered to doctors and nurses at conferences.

of the questions featuring mushrooms. The quiz is a very effective way of promoting our mushroom messages. There were three rounds of eight questions, with prizes given out after each round.

#### ► Dietitians Association Australia

Australian Mushrooms were a sponsor for Australia's Healthy Weight Week (AHWW 20-27 January 2013) conducted by the Dietitians Association of Australia (DAA). There is a [free downloadable recipe booklet](#), including three recipes that feature mushrooms, prepared by celebrity chef Luke Mangan. Naturally, we promoted AHWW in every way we could to alert the public to the value of the mushroom in weight control.

DAA ran a competition asking members of the public why they would want an appointment with an Accredited Practising Dietitian. One person in every state and territory in Australia won a free consultation, a mushroom cookbook, our health brochure and an apron. The dietitian also received the mushroom cookbook. The winners will be profiled over the coming weeks through DAA and Australia Mushrooms Growers Association (AMGA) social media.

#### ► Social Media

Mushrooms continue to take a strong presence in social media, with a range of powerful health messages on *Facebook* and *Twitter*. Each message is based on mushroom research outcomes and is presented in simple, consumer friendly terms. The number of Australian consumers that follow social media grows steadily and we plan to further increase the reach of the messages.

There is an ongoing effort to engage strongly with bloggers. Campaigns such as *Mushrooms Go Pink* and *Summer Mushrooms* have been well supported by bloggers as we deliver the health message to the widest possible audience. Bloggers repeatedly use the health related information in other postings, providing their audience with even more reasons to include mushrooms as a regular part of a healthy diet.

#### ► School Canteen Managers

Glenn Cardwell gave a presentation to school canteen managers in Western Australia and was pleased to find that many include mushrooms on the menu, especially in home-made pizza and pasta sauces. The canteen managers also took a tour of a local mushroom farm, to appreciate what it took to get this remarkable food to market.

Mushrooms were a key sponsor for Australia's Health Weight Week 2013.



### News from Spain - Maria Luisa Tello Martin

#### ► Mushroom Passion Days

The celebration of the *Mushroom Passion Days* from 1st to 4th of November in Autol (La Rioja, Spain) raised awareness and disseminated gastronomic and nutritional components of cultivated mushrooms.





# Autol, "Capital del Champiñón"





A press conference to the media kicked off numerous activities during *Passion Days*. A big tent hosted a large sampling of cultivated species called "Tribute to mushroom". Moreover an exhibition of old photographs of the work in the cellars was displayed and an audiovisual projection of mushroom cultivation process as well. The pictures showed the history of the mushroom cultivation.

*Mushroom Passion Days* have been a participation success and the organizers hope that this event continues next year.

In the opening ceremony there was a mushrooms taste with wine from the winery Marqués de Reinoso. In addition, on the streets of the town there was installed a handmade market and a shop window competition.



The greater attraction of the *Mushroom Passion Days* was the "tapas" route. Fifteen bars or restaurants created a special "tapa" elaborated with mushrooms as a main ingredient.

The elderly home and the women's association organized a recipe contest. There were also activities for the little ones organized by the Scout group and the Parent-Teacher Association. Children were entertained with a kids-cooking workshop where they learned that the mushroom is one of the most versatile foods.

From Thursday to Sunday, a tourist train facilitated crops and winery tours. On Saturday, a live popular cooking was held with contributions from renowned Spanish chefs and cooks of restaurants and hotels in the region. On Sunday, the days concluded with a marathon and a live concert.





## News from the United States - Heidi Gengler

### ► Nutrition is the Backbone of Mushroom Coverage in Media Trends

The Mushroom Council's (Council) ability to leverage mushrooms' nutrient profile has been instrumental in securing media coverage and inserting this superfood into new and ongoing food trends.

### ► Meatless and Less Meat Cuisine

The Council introduced Swapability in 2012 and the cooking application inspired a new perception of mushrooms, not only as a meat replacement but also as a meat extender and complement. In the photo, Hungry Girl, also known as Lisa Lillien,



showcased this spectrum of applications on the "Doctor Oz" show, using multiple recipes to demonstrate how mushrooms can serve as a partial or complete meat replacement to suit a wide range of palates.

In a recent article in [Today's Dietitian](#), Mondays Campaign president Peggy Neu praised the Council as a leader in its efforts to educate and share meal solutions for consumers who want to go meatless. ABC's "The Chew," [SELF](#) and [Martha Stewart Living](#) magazines, have also heralded mushrooms for their role on a meatless plate.

### ► Experts Establish Food and Nutrition Dialogue

Over the years, the Council has built an arsenal of partners and mushroom advocates with whom it regularly shares updates about mushrooms' health benefits and emerging research. As a result, this network of prominent dietitians continues to bring the mushroom story to life across their personal nutrition platforms and agendas.

- NBC nutrition expert Joy Bauer highlighted mushrooms as a "skinny food for a skinny you" in a segment on "TODAY."
- "Guy-atitian" Dave Grotto promotes mushrooms as one of the best foods to eat in 2013 ([Chicago Daily Herald](#), [Fresno Bee](#)).
- The "Nutrition Twins" cited mushroom research in their round-up of [flu-fighting foods](#).
- In a [Lowdown on Vitamin D](#), "The Doctors" identify mushrooms as a food source.

### Approachable Superfoods

Mushrooms continue to gain traction as an everyday every way superfood. Practicality is key for consumers looking to create good-for-you meals. On the spectrum of superfoods, mushrooms are a simple way to add nutrients to the plate. The [New York Times](#) praised mushrooms for their simplicity and versatility, noting "Omnivore, vegetarian and vegan diners all prize them." Similar mentions appeared on the "Rachael Ray Show," in the [Huffington Post](#) and [Real Simple](#) and [Shape](#) magazines.

Mushrooms' nutrient profile has been instrumental in securing media coverage and inserting this superfood into new and ongoing food trends.

## 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

### 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](mailto: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
- 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