

# Selenium Enrichment of *Grifola frondosa* (Dicks.:Fr.) S.F.Gray (Maitake) Mushrooms

Robert B. Beelman & Daniel J. Royle

Departments of Food Science and Plant Pathology, The Pennsylvania State University, USA

*Grifola frondosa* (Dicks.:Fr.) S.F.Gray (Maitake) is a popular culinary mushroom that is well known to contain unique  $\beta$ -glucans, which have potent immune-modulating and antitumor properties. However, they generally contain low levels of important micronutrient minerals, such as selenium. Selenium has recently generated great interest in nutritional and medical research, because it serves as a cofactor for the enzyme glutathione peroxidase, which is involved in quenching free radicals. Thus, the objective of this study was to determine if *G. frondosa* can be enriched with selenium by addition of sodium selenite to the growth substance, as was done previously with *Agaricus bisporus* (J.Lge) Imbach. Two separate crops were grown using a sawdust-based synthetic medium with various levels of selenium added by addition of appropriate amounts of sodium selenite prior to pasteurization and inoculation. Basidiomes were harvested from the treated substrates, weighed for yield determination, freeze-dried for

solids determination, and then analyzed for selenium content using graphite-furnace atomic absorption spectrophotometry. Yield was not significantly affected by addition of selenium to the substrate, but basidiomes were harvested 5–7 days earlier when selenium was added. No selenium ( $<0.5 \mu\text{g/g}$ ) was detected in the untreated (control) substrate and the basidiomes harvested from it. Selenium increased in the basidiomes in direct response to levels added to the substrate. Treated substrates contained 0.6, 2.4, and  $7.2 \mu\text{g/g}$  (d.w.) selenium and basidiomes harvested from them contained 0.6, 2.2, and  $9.3 \mu\text{g/g}$  (d.w.), respectively. These results indicate that *G. frondosa* can be predictably enriched with selenium in a manner similar to *Agaricus bisporus* to become an excellent nutritional source of selenium. Also, production of Maitake extracts or powders for nutraceutical or medicinal purpose that can contain significant levels of selenium in addition to  $\beta$ -glucans would be possible.