

## Use of Brewer's Spent Grain for Production of High-Value Mushrooms

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**Introduction:** Brewer's Spent Grain (BSG) is a processing waste generated in large quantities by the beer brewing industry. It is estimated that over 38 million tons of BSG is produced worldwide each year, and is usually used as animal feed, composted, or disposed of in landfills. BSG contains valuable nutritional components and could be an ideal substrate for cultivating high-value specialty mushrooms. These mushrooms are often grown on mixtures of sawdust and wheat bran.

**Purpose:** The main objective of this project was to determine the efficiency of using BSG as a primary substrate for growing oyster mushrooms (*Pleurotus ostreatus*).

**Methods:** For oyster mushroom production, grain spawn was produced by inoculating sterilized proso millet with *P. ostreatus* and allowing it to colonize the grain for 2 weeks at room temperature (RT) with frequent agitation. Grain spawn was used to inoculate bagged sterilized substrates, which were then colonized by mycelium for two weeks at RT. Substrate bags were punctured and placed in a humidified growth chamber for 4 weeks at RT to allow fruiting and sample collection. Fresh BSG samples were obtained from Iron Monk Brewing Co. and dried at 65°C for 48 hours. BSG-based substrates were compared to a standard hardwood sawdust substrate. All substrates were supplemented with wheat bran, birdseed, gypsum and lime. Each substrate treatment was replicated with ten substrate bags and all treatments were duplicated.

**Results:** All substrates successfully produced oyster mushrooms. The biological efficiency (mushroom biomass produced / initially inoculated substrate mass) for two of the three BSG substrates had efficiencies equal to or greater than the control sawdust-bran substrate. In addition, a proximate analysis showed that mushrooms grown on two of the BSG substrates had higher protein content than those grown on controls.

**Significance:** BSG is currently a waste product that is underutilized, and if it can be used successfully for mushroom production, BSG could become an asset for breweries rather than a liability.

**Keywords:** BSG, oyster mushrooms, substrate, biological efficiency