

OPTIMIZING COMPOST INGREDIENTS FOR WHITE BUTTON MUSHROOM (AGARICUS BISPORUS) PRODUCTION: EVALUATING CALCIUM SULFATE SUBSTITUTES

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The cultivated mushroom *Agaricus bisporus* is a predominant choice in Europe's mushroom consumption. The cornerstone of industrial-scale mushroom production is mushroom compost, a selective substrate crafted through controlled chemical and microbiological processes. Essential components of mushroom compost include horse manure, wheat straw, chicken manure, gypsum as an additive, and substantial water. Depending on regional practices, the base mixture might predominantly consist of horse manure with added straw, possibly straw with a bit of horse manure, or even straw without horse manure. This base is then blended with a specific quantity of chicken manure and gypsum. This study explores various potential substitutes for gypsum in the production of compost for white button mushrooms (*Agaricus bisporus*). During compost preparation, calcium sulphate was partially replaced with calcium carbonate, ammonium sulphate, and monocalcium phosphate. Compost parameters were observed to be similar in scenarios where calcium sulphate was supplemented with calcium carbonate in 8:2 and 6:4 ratios, both with and without the presence of ammonium sulphate, and in 3:1 and 1:1 mixtures of calcium sulphate and monocalcium phosphate, when compared to traditional gypsum-based processes. All experimental compost mixtures yielded comparable mushroom crops in cultivation trials. Notably, the 8:2 mixture of calcium sulphate and calcium carbonate demonstrated superior performance in cultivation trials relative to the 6:4 mixture. However, supplementing these mixtures with ammonium sulphate resulted in similar crop yields. Monocalcium phosphate also emerged as a promising partial gypsum substitute, showing comparable crop production in both 3:1 and 1:1 ratios to control samples. Complete replacement of gypsum with calcium carbonate led to a significant pH increase during the second phase of composting, adversely affecting mushroom mycelium growth. This research was supported by grant 2020-1.1.2-PIACI-KFI-2020-00111 from the National Research, Development and Innovation Office, Hungary. Additional backing came from the Doctoral Student Scholarship Program of the Co-operative Doctoral Program of the Ministry of Innovation and Technology, funded by the National Research, Development and Innovation Fund (grant No. KDP-2021-C1764158 to A. Misz).