Investigation of dried mycelium (*Pleurotus eryngii*) powder as an alternative protein source for developing meat analogue

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Abstract: Population growth and limited natural resources are driving demand for alternative dietary proteins. To feed the world's growing population with the same finite resources, the global food supply must be raised. Alternative protein sources, such as fungal "Mycelium," might be regarded as an innovative, sustainable, and safe dietary protein to promote health, lowering carbon footprint and to overcome the hunger problem. The purpose of this work was to demonstrate the potential of *P. eryngii* mycelium species for the development of meat analogues. Mycelium was cultivated in the lab utilizing a submerged fermentation process, followed by cold-pressing (5 kN, 30 s) as a pretreatment to eliminate unbound moisture, lowering drying cost and time by 50-55 percent. To create a dried mycelium powder (for increasing shelf life), the pressed sample was freeze dried (FD) at -50 °C at 5 mbar pressure. Characterization of FD mycelium powder was performed. The FD mycelium powder was discovered to be high in protein (25%) and fiber (18%), as well as minerals like Fe (8 mg/100g), Zn, Se, Ca, and vitamin D_2, which can be used to create a functional meat analogue. The extrusion technology was used to create a low moisture meat analogue (LMMA) with a mycelium and pea protein isolate mixture (30:70) with a favorable expansion ratio (4.14), water/oil absorption capability (2.72 & 1.77 g/g sample), and textural consistency similar to pea protein-based LMMA. The FTIR data revealed well-defined peaks with decreased noise at 1600-1700 cm^{-1}, indicating higher protein concentration without any new peak generation/breakage.