Abstract

The rising demand for sustainable protein alternatives has increased interest in mycoprotein as a promising ingredient for meat analogue products. *Aspergillus oryzae*-derived mycoprotein has a high protein content and natural fibrous structure which is suitable for meat analogue applications. However, the biomass is produced in a wet form with high moisture content and limited storage stability, making drying an important post-fermentation step. The study aimed to evaluate the effects of different drying methods on the hydration, structural, and textural properties of *A. oryzae*-derived mycoprotein for meat analogue applications. Wet, oven-dried, and freeze-dried mycoprotein samples were analyzed for moisture content, water activity, hydration properties, rehydration behavior, color, and microstructure using scanning electron microscopy (SEM). The rehydrated mycoprotein was then applied as a 25% beef substitute in beef meatball model systems prepared using boiling and frying methods, followed by analysis of cooking yield, color, and texture profile. Freeze-dried mycoprotein showed lower moisture content and water activity than oven-dried samples, indicating higher storage stability. Moreover, freeze-dried samples showed higher water absorption, oil absorption, and rehydration properties while maintaining water holding capacity and lightness values similar to wet mycoprotein. SEM analysis also showed a more porous microstructure in freeze-dried samples, whereas oven drying resulted in a denser and more compact matrix. In meat analogue applications, drying and cooking methods influenced cooking yield, color, and texture properties of the meatball model systems, with oven-dried and fried samples producing firmer and chewier textures, while freeze-dried samples showed intermediate textural properties with improved hydration performance.

Keywords: *Aspergillus oryzae*, drying methods, meat analogue, microstructure, mycoprotein