Improving Plant-Based Meat Analogues With Yeast Protein: A Strategy for Enhanced Texture and Nutritional Value

Donghui Ma, Quanhong Li*

College of Food Science and Nutritional Engineering, China Agricultural University, Beijing, China

Email address:

18894314357@163.com (Donghui Ma), liquanhong66@163.com (Quanhong Li)

*Corresponding author

Abstract

Meat analogues (MAs) are increasingly regarded as sustainable alternatives to conventional meat, addressing environmental issues, health risks, and ethical concerns associated with meat consumption. However, MAs produced from plant proteins often fail to meet consumer expectations in texture and nutrition. Addressing this, our study explores the feasibility of incorporating yeast protein (YP) into MAs due to its high protein content, balanced amino acid profile, and ecological benefits. We assessed the structural and functional properties of YP through amino acid analysis, water absorption tests, differential scanning calorimetry, and gel rheology. Findings indicate that YP contains a high concentration of essential amino acids, with an essential to non-essential amino acid ratio of 0.88. It also exhibits low viscosity and high thermal stability, making it suitable for food applications. We combined YP with four plant proteins (soy protein isolate, mung bean protein, pea protein and chickpea protein) in equal proportions. These blends were processed using high-moisture extrusion under uniform conditions. The results show that YP, with its richness in essential amino acids, compensates for the deficiencies in plant proteins, significantly enhancing the digestibility and Essential Amino Acid Index of the MAs. It also reduces the particle size of the digested products. The addition of YP promotes the formation of intramolecular hydrogen bonds and β-sheets, facilitating the development of a protein cross-linking network, which improves the fibrosity, hardness, and chewiness of MAs. Overall, incorporating YP with plant proteins presents a viable strategy for producing high-quality MAs.

Keywords

Yeast Protein, High-Moisture Extrusion, Meat Analogues