

The effect of raw materials composition and extrusion parameters on the texture properties of high-moisture meat analogs made of faba bean, yellow pea, and soybean protein concentrates and their mixtures

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The transition toward more sustainable diets with a higher intake of plant-based foods has been identified as a crucial factor in improving health and reducing the environmental burden on the current food system. A vital role in this growth has been played by manufacturers' attempts to meet consumer expectations of meat-like products and thus gain acceptance through utilizing extrusion cooking technology. While soybean has dominated the scene of meat analogs since its evolution because of its nutrition and functional properties, faba bean and yellow pea exhibited a high potential to replace soybean due to their high nutrition, availability for good practice cultivation, and functional properties. This study investigates the effect of extrusion parameters and altering raw material composition on the texture of High-Moisture Meat Analogs (HMMAs) made from faba bean, yellow pea, and soybean protein concentrates and their mixtures using an Augmented Simplex Centroid (ASC) design of experiment. The most important elements influencing the textural qualities of meat analog were identified. The ash, fiber, and protein content, as well as the source protein's water-holding capacity, had the most significant impact on the textural qualities of the HMMAs. Three extrusion process parameters were investigated in the preliminary trials (target moisture content, extrusion temperature, and screw speed), and two extrusion process parameters were examined in the main experiments (target moisture content and screw speed). The extrusion process parameters significantly affected the texture of HMMAs. In conclusion, it is possible to manufacture texturized HMMAs from faba bean or yellow pea protein concentrates by replacing the soy with different ratios giving a wide variety of texturization properties and qualities that can be utilized commercially as complete meat muscle-like cuts; chicken-, red meat-, or fish-like products or other processed meat analogs.