УДК 637.523.4

4. RAPESEED MEAL AS AN ALTERNATIVE SOURCE OF VEGETABLE PROTEIN

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Plant-based meat analogues have received great interest from consumers who want to reduce their meat consumption. It is recognized that over-consumption of meat products is not only unhealthy but can also lead to environmental issues and ethical concerns about animal welfare. Shear cell technology has been reported to produce anisotropic fibrous meat analogues using (mixtures of) protein isolates or concentrates from soy, peas, wheat, and fababean [1]. Plant-based meat analogues from sources such as legumes, oilseeds and cereals are gaining importance to address consumer demands and sustainability in future food supply. An important breakthrough would be the increased use of underutilized protein-rich by-products in meat analogue applications.

Rapeseed meal is a by-product obtained after oil extraction but it is seldom used for food applications. It has been suggested as an interesting alternative plant protein source due to its high protein content (35%–40%) and well-balanced amino acid profile [2]. The commercial value of this by-product would also increase significantly by making it suitable for application in meat analogues. Highly refined rapeseed protein isolates have been proposed as binders for meat products. A recent consumer study showed that the use of rapeseed protein as a main ingredient for meat analogues has gained consumer interest and attention [3].

The formation of fibrous materials in shear cells is favoured when plant materials consist of two immiscible phases that deform and align upon shearing. Two immiscible phases can be achieved through mixing purified ingredients with different water holding capacities (WHCs) (i.e., soy protein isolate [SPI] and wheat gluten [WG]), or they can be present naturally in a single but less purified ingredient, such as soy protein concentrate (SPC) (i.e., proteins and polysaccharides). Rapeseed

protein concentrate (RPC) is obtained from rapeseed meal after aqueous ethanol washing. As a result, the composition of RPC is similar to that of SPC in that it contains both proteins and polysaccharides. The polysaccharides mainly originate from the hulls and the cotyledon in rapeseed meal and are present as cellulose, hemicellulose and pectins. RPC has been studied in a shear cell before for fish feed to partially replace other plant protein sources, but at lower temperature than normally used to make fibrous materials. A solid, homogeneous material was obtained. It showed potential to solidify, which is one of the requirements to become a suitable meat analogue ingredient [4].

Thus, the aim of this study was to investigate the structuring potential of RPC-only and RPC-WG mixtures for meat analogue production in a shear cell using different temperatures and ratios of RPC and WG. WG is often used in plant protein mixtures to enhance fibre formation in meat analogues. The structural properties of the product was compared with that from SPC and an SPC-WG mixture by texture analyser using the uniaxial tensile test. The morphology of the structure was visualized by confocal laser scanning microscopy (CLSM). The air porosity of the sheared product was analysed by X-ray microtomography (XRT).

Literature

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