VALORISATION OF CHEESE WHEY THROUGH A COMBINATION OF PHYSICAL AND ENZYMATIC TECHNOLOGIES

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Whey, a by-product of the cheese industry, has for long been considered as a waste product and looked upon seriously by environmentalists owing to its high polluting power. Nowadays, whey is used in a wide variety of functional applications in the food industry.

The incorporation of whey proteins in many food products as a functional ingredient, has received increasing attention from researchers and industry, possibly due to their numerous functional and nutritional properties (De Wit, 1998). One of the main functional properties of whey proteins is its ability to form gels upon heating, because they can provide the final food product with desired structure and/or texture. Modification of whey proteins based on enzymatic hydrolysis has a broad potential for designing functionality for specific applications (Foegeding *et al*. 2002).

In addition, enzymatic hydrolysis has expanded the field for applications to the production of bioactive peptides, which exert numerous bioactivities, e.g. antioxidant, immunomodulatory, antihypertensive and antithrombotic (Korhonen and Pihlanto, 2006; Moosavi-Movahedi, 2013). Since enzymes are usually highly specific in their mode of action, careful enzyme selection means they can be used to produce whey hydrolysates for different food applications. In recent years, production of bioactive peptides is generally achieved by the use of proteases from microbial or animal origin. Plant origin proteases have been much less explored.

Cardosins isolated from flowers of *Cynara cardunculus* have been used as milk coagulant in the manufacture of traditional cheeses in Spain and Portugal. Due to its natural origin and easy extraction, cardosins might be also of interest for the production of functional foods. Acting on whey proteins, cardosins hydrolysed mainly α-Lactalbumin (α-La), but ß-Lg appears not to be hydrolysed to a significant extent (Barros 2006).

The production of bioactive peptides from milk whey using cardosins extracted from dried flowers of *Cynara cardunculus* will be presented. In this process essentially pure ß-Lactoglobulin (ß-Lg) was obtained as by-product. The capacity of ß-Lg to form heat-induced gels is widely recognised and used to provide a desired structure, texture and stability in food systems. Gels also allow retention of large quantities of water and other molecules inside the food matrix. The impact of the proteolysis process on the r-ßLg structure and how in turn this determined its heat-induced gelation will be shown. The viscoelastic, mechanical and water retention properties of the ß-Lg gels will also be discussed.

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