

Production of bioactive peptides from eggshell membranes

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Enzymatic proteolysis of food proteins may lead to the formation of peptides with regulatory functions thus playing an important physiological role. These peptides usually contain 3-20 aminoacid residues and can exhibit e.g. imunomodulatory, antithrombotic and antihypertensive activities. Eggshells and eggshell membranes (EM) are currently a waste and are becoming a major environmental problem. This work aims at exploring the possibility of using eggshell membranes to produce bioactive peptides which can have extensive use e.g. in the pharmaceutical and food industry. The membranes were previously separated from the shells and kept frozen until further use. EM were subjected to enzymatic hydrolysis using trypsin, pepsin and pancreatin; the enzymes were used either alone or sequentially. The hydrolysis was performed in a batch reactor with pH and temperature control. Different temperatures (ranging from 37 to 45 °C) and digestion times (0.5, 1 and 2h) were used and the pH was kept at the optimal level for each enzyme. At the end of the reaction the enzymes were inactivated by heat or a sudden pH change (depending on the enzyme). The formation of peptides from the EM was followed by HPLC using an RP18 column and UV detection. After a period of incubation, the peaks corresponding to the proteins of the non-hydrolysed egg-shell membrane gave rise to a new group of peaks due to the formation of several peptides in a pattern that indicates the presence of a wide range of peptides with higher polarity. Most of those peaks appear right from the beginning indicating preferencial cleavage points. In some of the assays an hour was sufficient to achieve total hydrolysis of the EM proteins while in other situations after two hours some original proteins were still present. Different fractions of the peptides were collected and are currently being tested in vitro for bioactivity.