

Dottorando: Giovanni Ventre

Titolo del progetto: “Study, characterization and recovery of bioactive components from milk and whey”

Waste and byproduct of the manufacturing processes represent a major challenge for food companies. Such matrices, in addition to require high disposal costs, possess a strong impact on the environment, in particular when they are treated with illegal methods. However, food waste, in particular from dairy industry, can be a valuable source of bioactive molecules. The aim of this work was focused on the recovery, characterization and optimization of the dairy waste. In particular, we investigated the components of milk after expiration date and scotta. For this purpose, starting from the expired milk, through a pilot plant based on ultrafiltration principle, it was possible to increase the protein fraction of the milk that was subsequently used for the formulation of a functional stracchino soft cheese. The cheese was then subjected to an in vitro digestion gastrointestinal and the resulting peptides were tested on IEC-6 cells (intestinal epithelial cells, CRL-1592) to evaluate their antioxidant potential. An additional matrix on which we focused was the scotta, which is the main product of the processing of ricotta cheese. Scotta, like whey, is a source of pollution being characterized by high BOD (Biochemical Oxygen Demand). This matrix, however, is rich in bioactive components such as peptides. In this regard, we have isolated a peptide fraction with weight $\leq 3,000$ Daltons which was subsequently characterized by liquid chromatography coupled to high resolution mass spectrometry (LC-HRMS). Numerous peptides identified possess healthy properties, including anti-hypertensive, anti-microbial and anti-oxidant. During the extraction process of the peptides, we developed recovery methods for other components including riboflavin, lactose and fatty acids. The results show how these methods could be applied to recover dairy waste products and turning them as sources for applications in the field of nutraceutical, cosmeceutical and pharmaceutical.