Technology Offer

Process of purification of osteopontin and glycomacropeptide from whey

Field of use
Biotechnology, food science, whey protein isolation.

Current state of technology
Current solutions do not use monolithic columns. Most require whey of certain characteristics, such as the absence of glycomacropeptide for isolation of osteopontin, and do not use whey as a side product of milk processing.

Intellectual property
University of Ljubljana, Arhel Ltd.

Developed by
University of Ljubljana, Biotechnical Faculty and Arhel Ltd.

Reference
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Background

Whey, particularly acid whey, often represents a major part of wastewater from the dairy industry and thus a significant burden for the environment, although it contains many valuable ingredients.
Osteopontin and glycomacropeptide are whey proteins with great economic potential. Both are used in functional foods, medical foods and as dietary supplements. Osteopontin, for example, is important for child development and is added to infant formula, while glycomacropeptide is deficient in the amino acid phenylalanine and is therefore used in the diets of people with phenylketonuria.
Finding ways to utilize whey plays a crucial role in environmental protection as well as future human nutrition, and may also be an additional source of income for dairies.

Description of the invention

Microfiltered and/or optionally concentrated but otherwise unchanged whey from the dairy or other source is passed through a strong anion exchange monolithic HPLC column that retains osteopontin and, in the case of sweet whey, also glycomacropeptide. After loading the whey, the individual bound proteins are eluted stepwise with solutions of increasing ionic strength. This procedure yields highly pure osteopontin (>90 %) and glycomacropeptide (> 70%).

Main advantages

The invention uses monolithic HPLC columns, which offer several advantages for the isolation of proteins compared to particle-based columns: more efficient mass transfer due to convective flow, higher flow rates, and longer lifetime.
The invention allows the simultaneous isolation of high-purity osteopontin and glycomacropeptide without altering the whey. As a result, the whey can subsequently be used for other applications and poses less burden to the environment than prior to the isolation process.
The source of the proteins can be any type of whey or milk-derived feed, as long as it contains osteopontin and/or glycomacropeptide.
The process utilises environmentally-friendly chemicals.

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