

Fractionation process to produce a new milk ingredient enriched in phospholipids and sphingolipids.

Pascal Bodson^{a,b,c}, (Daniel Dalemans^d), Sabine Danthine^a, Christophe Blecker^a,

Jean-Paul Wathelet^c, Claude Deroanne^a, Michel Paquot^b

Gembloux Agricultural University, Passage des Déportés 2, 5030 Gembloux, Belgium.

^aDepartment of Food Technology (Head : Prof. C. Deroanne),

Contact e-mail : technoalim@fsagx.ac.be; URL: <http://www.fsagx.ac.be/ta>

^bDepartment of Industrial Biological Chemistry (Head : Prof. M. Paquot),

Contact e-mail : chimbioindus@fsagx.ac.be; URL: <http://www.fsagx.ac.be/cb>

^cDepartment of General and Organic Chemistry (Head : Prof. J-P. Wathelet),

Contact e-mail : wathelet.jp@fsagx.ac.be URL: <http://www.fsagx.ac.be/cg>

^dCoramn S.A. Route de la Gileppe, 4, B-4834 Goé, Belgium

With the financial support of the Walloon Region (DGA)

In Bovin milk, around 4% fat is stabilized in emulsion in the form of spherical globules surrounded by a biological membrane called the milk fat globule membrane (MFGM). This membrane consists of a complex trilayer structure composed for half of proteins, mainly enzymes, glycoproteins, and half of lipids. Nearly 30% of total MFGM lipids are polar lipids composed of phospholipids (in majority phosphatidylcholine and phosphatidylethanolamine) and sphingolipids (sphingomyelins, glycolipids and gangliosides). Milk polar lipids come mainly origin from MFGM and represent less than 1% of milk total lipids.

This study presents a fractionation process starting from pasteurized cream to obtain a new milk ingredient enriched in more than 35% of MFGM polar lipids reported to dry matter. The process consists of three steps : emulsion inversion, proteins extraction and ultrafiltration. Pasteurized cream is first concentrated by centrifugation until fat globules disrupt leading to milk fat recovery in the light phase and the MFGM fragments release in the aqueous phase called buttermilk. Proteins are extracted from this buttermilk by a thermo-calcic method coupled with pH adjustment. Proteins mainly caseins form a solid curd collected by centrifugal settling whereas polar lipids are released in the serum phase. An ultrafiltration of this serum draws off lactose, minerals and soluble proteins in the filtrate and concentrates the MFGM polar lipids into the retentate.

This product represents a new functional ingredient with high milk polar lipids content. It could be use as a textural agent for its technological properties : emulsifier, water retention and foaming stabilizer. Its specific phospholipids and sphingolipids composition could induce health benefit properties like blood cholesterol reduction, cancer prevention, prebiotic effect. Potential applications of this new ingredient belong as well to food, pharmaceutical or cosmetic areas.

