Effects of homogenisation and pasteurisation of cow's milk on postprandial lipid metabolism in sensitive individuals

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Introduction

Commercial milk is homogenised for the purpose of physical stability. Homogenisation reduces the fat droplet size. The milk fat globule size of raw milk spans from < 1 to 20 µm, with an average of 3-5 µm. Upon homogenisation the globule size is reduced around to 0.03-2 µm. Because breaking of the fat globules during homogenisation creates new interface that cannot be entirely covered by milk fat globule membrane, new membrane is formed by other surface active components like caseins and whey proteins that adsorb to the droplet interface.

Some people appear to experience cow's milk related symptoms even when neither lactose intolerance nor cow's milk allergy can be diagnosed. It has been suggested that processing of cow's milk can be involved in the induction of gastrointestinal symptoms. The consumption of unpasteurised raw milk has increased in popularity despite the fact that raw milk may contain pathogens.

Aim

The aim of the study was to investigate whether milk homogenisation and the resulting smaller size of milk fat globules could be one reason for stomach problems in sensitive adults.

In this study processed (homogenised, pasteurised) and raw milk was served to cow milk sensitized but otherwise healthy subjects to compare the two milks and to investigate the postprandial lipid metabolism. Ingestible SmartPill capsule was used to objectively confirm possible stomach problems caused by the two milks.

Methods (figure 1)

- Randomized double blind cross-over
- 11 milk sensitive female and male subjects
- 18-68 years old, BMI 18,5 – 30 kg/m²
- Blood samples 0 – 240 min

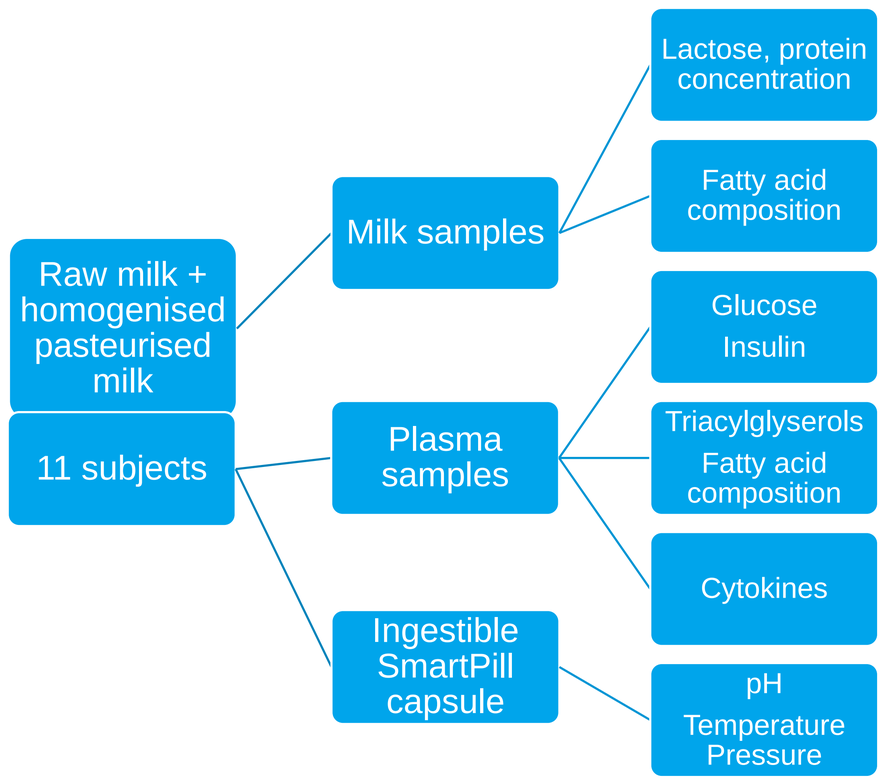

Figure 2. Processed milk fat globules, magnification 400x

Figure 3. Raw milk fat globules, magnification 400x

Results

Postprandial lipemia did not differ between the two milk types, but significant differences were found in the postprandial plasma fatty acid composition. No significant difference was found in the amount of gastrointestinal symptoms or in the Intestinal pressure after the consumption of native and processed milk. However, the obtained results on pressure in the large intestine (P = 0.068) as well as reported symptoms (P = 0.103) suggest that further studies in this area are needed with a bigger subject group and with longer exposure times to differently processed milk types

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