SELECTED VALUABLE COMPONENTS IN "SOYMILK" VERSUS COW MILK – A COMPARISON

Bernd Raba, Gregor Fiechter, Matthias Schreiner, and Helmut K. Mayer

Department of Food Science and Technology, Food Chemistry Laboratory, BOKU - University of Natural Resources and Applied Life Sciences Vienna, Muthgasse 11, A-1190 Vienna, Austria

"Soymilk" is a beverage made from soybeans [*Glycine max (L.) Merr.*] and has become an important factor in human nutrition, due to the absence of cholesterol and lactose. The composition of "soymilk" is different from bovine milk in many aspects, such as fatty acid profiles, fat, protein as well as soluble sugar content. Furthermore, "soymilk" has a significant content of *phyto*-oestrogens (isoflavones) that are inexistent in cow milk, and plays an important role in human nutrition by now.

The major objective of this study was to establish an appropriate methodology to determine the selected composition of "soymilk", and to compare "soymilk" products with cow milk.

For the fatty acid profiles, "soymilk" was lyophilized, derivatized by transmethylation and analysed via GC-FID. Cow milk was extracted, subjected to alkaline transmethylation to minimize loss of short-chained fatty acids and also analysed by GC-FID.

As expected, "soymilk" was rich in omega-3-fatty acids (e.g., alpha-linolenic acid), whereas short-chained fatty acids were not present. In contrast, a high percentage of saturated and mono-unsaturated fatty acids were detected in cow milk.

Fat content of both milks was analysed by the method of *Röse-Gottlieb*, a gravimetric reference method. The main result was that cow milk showed a higher fat content than "soymilk".

Protein content was analysed using the *Kjeldahl* method. While cow milk had a protein content of approximately 3.5%, “soymilk“ contained around 4.8% protein. Moreover, minor differences in non-protein-nitrogen (NPN) content could be observed.

Soluble sugars were determined by HPLC-RID using a mixture of acetonitrile and water as mobile phase. The applied chromatographic system provided an efficient separation of five sugars (glucose, fructose, sucrose, raffinose and stachyose), of which sucrose represented the main component. In “soymilk”, probiotic sugars were found at appreciable levels, but were not present in cow milk. For lactose-intolerant persons, “soymilk” is a good alternative to cow milk, which has a high lactose content of about 4.7%.

Regarding phyto-oestrogens, 40 mg/100 g were found in “soymilk”. The isoflavone composition was characterised via a newly established ultra performance liquid chromatography (UPLC™) method. Quantitative amounts were determined as total aglycones after enzymatic hydrolysis utilizing *ß-Glucuronidase* from *Helix pomatia* juice.

Many research studies have indicated that consumption of functional foods, that are rich in isoflavones, are associated with a wide variety of health benefits, including prevention of breast and prostate cancer, cardiovascular diseases and reduced symptoms of diabetes and postmenopausal bone loss. These functional foods include also ”soymilk“.

In general, “soymilk” turned out to be a valuable food and may be regarded as an option in human nutrition, in particular in certain cases (e.g., lactose intolerance).
However, taking into account recent literature, “soymilk” can definitively not be considered as an adequate substitute for bovine milk, especially regarding nutritional needs for young children.