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Fattyacidomics and minerals: profiling the effects of recombinant bovine somatotropin on milk composition

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ABSTRACT

Growth hormone or somatotropin (ST) is a species-specific polypeptide hormone produced in the pituitary gland of vertebrates. When administered exogenously to dairy cattle, it has galactopoietic effects and is capable of increasing the milk yield. The commercial production of recombinant bovine ST (rbST) enabled large-scale applications in farms, enhancing significantly milk production. While it is banned in the European Union (EU), several countries permit the trade and use of recombinant somatotropins in animal husbandry. The literature reflects the existence of effective analytical methods to trace rbST presence in milk and other matrices [1]. However, very little effort has been invested into defining the impact this treatment may have on the quality of the dairy products obtained. In this context, *profiling* and *omic* technologies offer a good opportunity to assess various components simultaneously in food [2]. This study is meant to profile the measurable effects of rbST on the nutritional properties of milk.

A group of nine cows was separated; 6 animals were treated every two weeks with a dose of Lactotropina[®] (i.e. 500 mg of rbST), for a period of 8 months, while the other 3 were used as controls. Milk samples (> 400 milk samples) were collected freshly, at different time points (first milking of the day). Fifty fatty acids were measured using GC-FID, gross composition was obtained by infrared spectroscopy in a certified Spanish laboratory (*Laboratorio Interprofesional Galego de Análise do Leite – LIGAL*) and minerals (Ca, P, K, Na, Mg) were measured by ICP-MS.

The implementation of univariate and multivariate statistics showed a tendency towards a less saturated fatty-acidome in the milk collected from animals treated with rbST, with higher concentrations of omega-6 and monounsaturated fatty acids. Conversely, the short chain fatty acids and various omega-3 were higher in controls. In addition, less calcium and protein content and more potassium was observed in milk from treated animals, in comparison to the control population. Thanks to this multi-component profiling of milk, a clear impact of somatotropin treatment on milk qualities was observed. The obtained results should be particularly interesting for those countries that permit the use of this hormone in dairy production.

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References:

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