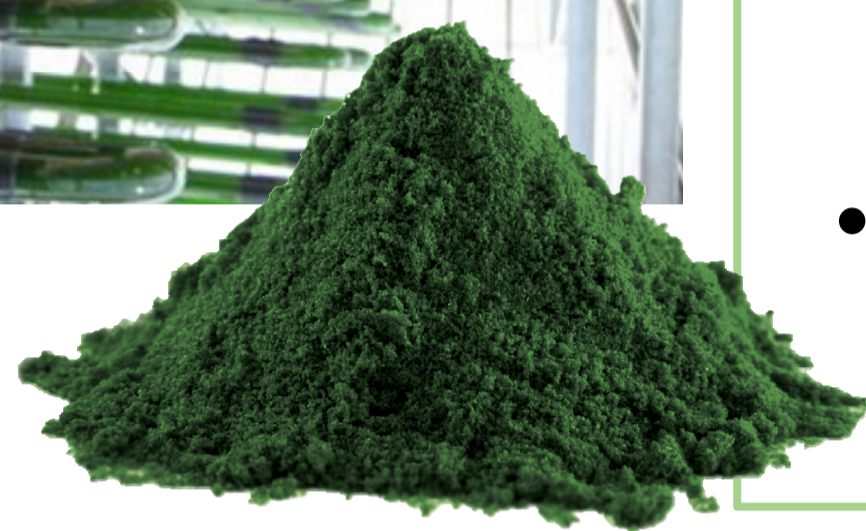


Does the supplementation of dairy cows with Spirulina improve protein supply and affect milk fat composition and sensory quality of milk and milk products?

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Introduction

- The cyanobacterium **Spirulina** (*Arthrospira platensis*) is a promising novel protein source replacing **soybean meal** extensively used in dairy cows' diets
- Its high proportion of beneficial fatty acids might improve the nutritional quality of the milk by increasing the content of unsaturated fatty acids, but also lead to off-flavours
- Effects on organoleptic properties of milk and dairy products are uncertain

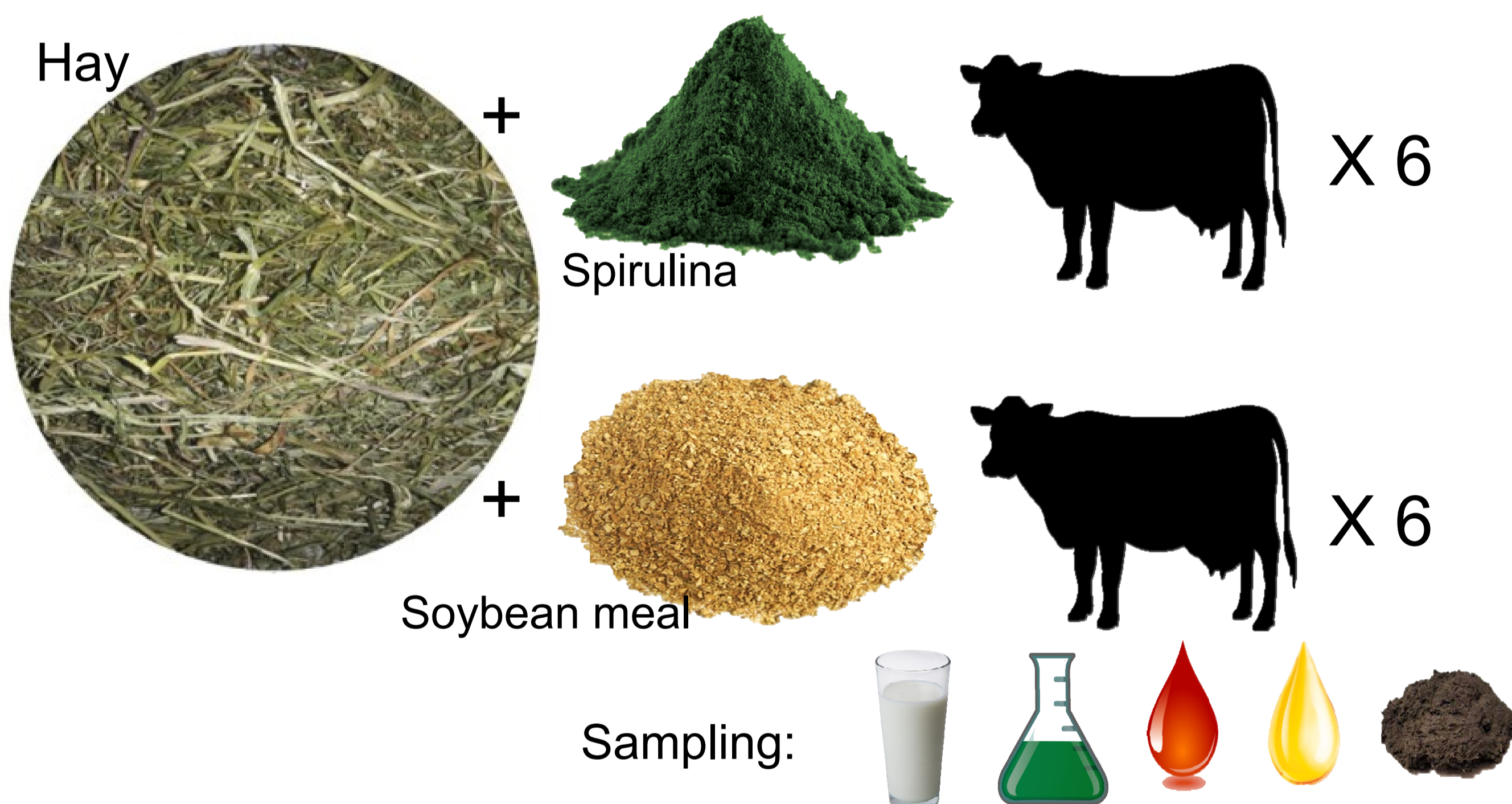


Research aim

- Assessment of the applicability of Spirulina as a substitute for soybean meal in dairy cow rations, with particular interest to the ruminal fermentation, metabolic status of the cow and the milk sensory and nutritional quality

Feeding experiment

Two isoenergetic and isonitrogenous diets



Material & Methods

- Free-stall barn equipped with individual automatic feeding troughs
- 15 days of adaptation to the diet and 15 days of sampling period

Nutrient composition in literature (% of dry matter, DM)	Spirulina	Soybean meal
Ash	6.4 – 7.7	6.2 – 9.0
Crude lipids	5.1 – 7.4	0.5 – 3.7
Crude protein	65.1 – 72.9	51.2 – 54.6
True protein	61.4 – 62.6	51.1 – 52.0
Non-protein nitrogen	3.70 – 10.3	2.7 – 3.4
Gross energy (MJ/kg DM)	22.5 – 22.6	18.7 – 20.1

Laboratory analysis

Milk

- Fat, protein, lactose and casein content (FTIR-spectroscopy)
- Fatty acid profile (GC-MS/FID) and antioxidative capacity
- Volatile aromatic compounds (HS- or SPME-GC-MS)
- Rennet coagulation properties (Lattodinamografo)
- Sensory analysis by a trained sensory panel



Rumen fluid

- Volatile fatty acids (HPLC), ammonia, pH
- Identification of rumen microbiota by Next Generation Sequencing



Blood, urine, faeces

- Characterization of metabolic and antioxidative status of the cow
- Assessment of protein and fibre digestibility



Relevance in the World Food System

- Is spirulina an efficient alternative source of protein and nitrogen supply for dairy cows, which is produced independently of arable land?
- Reducing land use for dairy production, and use of food-competing feed components in dairy cow diets to face the challenges of the WFS to match the demand of the increasing world population for healthy and sustainable dairy products.

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