Effects on milk quality of replacing soybean meal with Spirulina in a hay-based diet for dairy cows

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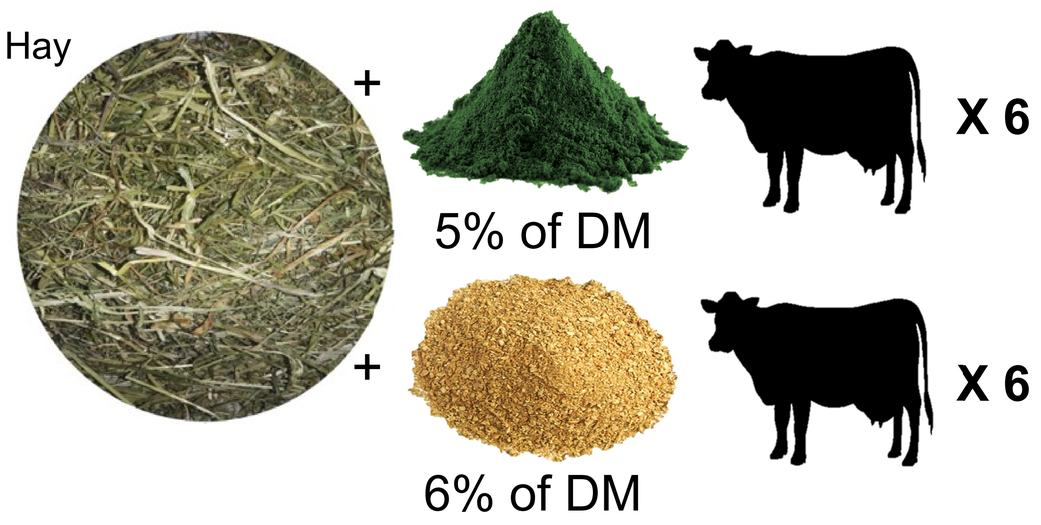
Introduction

- 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 contents of vitamins and unsaturated fatty acids, but also lead to off-flavours
- Effects on nutritional and organoleptic properties of milk and dairy products are unknown

Material & Methods

Feeding experiment

Two isoenergetic and isonitrogenous diets fed *ad libitum*



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

Realized nutrient composition of the diet (g/kg DM)	Spirulina Diet	Soybean Diet
Ether extract	2.49 ± 1.0	1.73 ± 2.0
Crude protein (N x 6.25)	149 ± 13.8	154 ± 13.8
NDF	460 ± 16.7	494 ± 30.1
ADF	290 ± 15.3	312 ± 16.5
ADL	43.2 ± 2.8	55.0 ± 7.4
Gross energy (MJ/kg DM)	16.5 ± 0.4	16.6 ± 0.05

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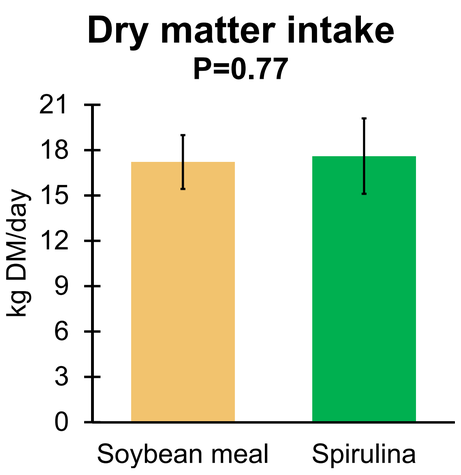
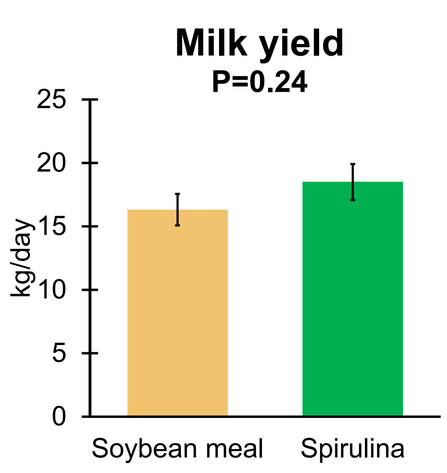
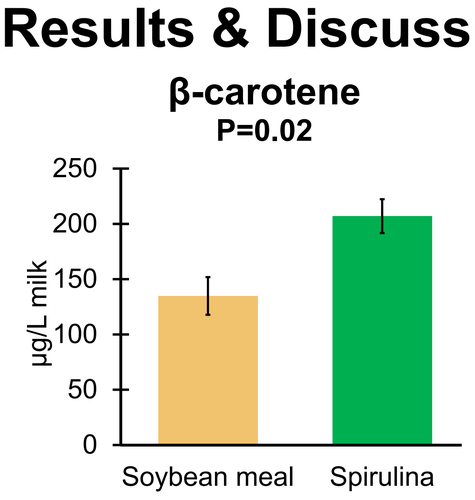
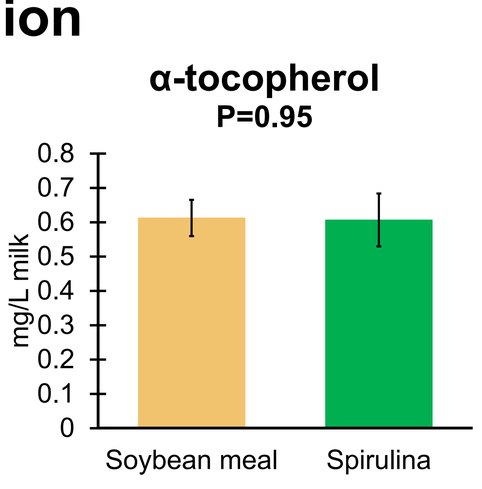
The substitution of soybean meal with Spirulina did not affect either feed intake or milk gross composition, but led to an increased β-carotene content and, consequently, to a higher yellowness of the milk.

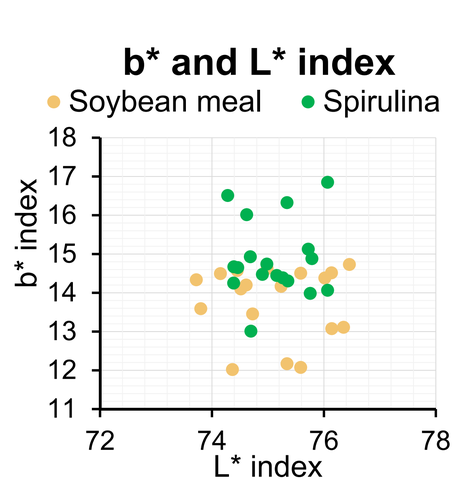
Results & Discussion

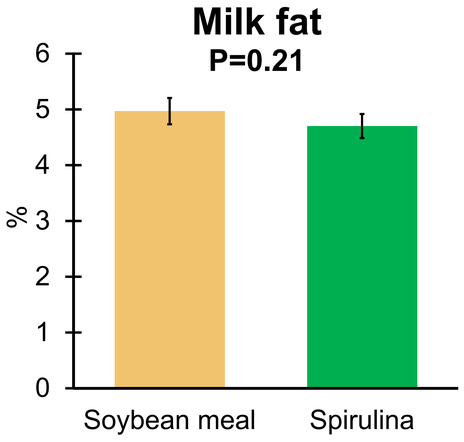


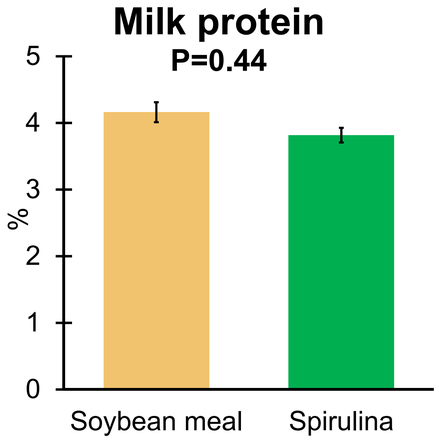












The substitution of soybean meal with Spirulina led to:

- **Unaffected dry matter intake and milk yield**
- **higher β-carotene** content in milk and consequently **higher yellowness** (b* index) of the milk
- **unaffected** content of **α-tocopherol and total extractable phenols**

The increased supply with antioxidants might improve the oxidative stability of milk and the antioxidant status of the cows.

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