

## Production of novel health-promoting yoghurt-type products enhanced with microalgae nutrients

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### Objective

Dairy industries follow consumer demands for high quality health-promoting products of high protein and/or low-fat content. The current study focused on the research and development of innovative yogurt desserts enhanced with proteins and iron from microalgae. The partial replacement of saturated fatty acids with microalgae polyunsaturated fatty acids, was also investigated.

### Methods

A specific growth protocol of *Arthrospira (spirulina) platensis* was developed and appropriately optimized to produce biomass enriched in iron (Fe). High pressure processing was used to extract the protein content of spirulina. Milk lipids were partially removed to be substituted by spirulina lipids, which contain  $\omega$ -fatty acids. Based on analyses of quality, nutritional and sensorial characteristics, yoghurt sets of 200 g each were produced containing dried mixture of spirulina and spirulina-water-soluble-extract in a ratio of 3:1 w/w. A randomized cross-clinical study was performed for a spirulina response dose of 2, 4, 6 and 8 g dissolved in 50 g of glucose versus 50 g of pure glucose.

### Results

The addition in the spirulina growth medium of 183 mg/L Fe in the form  $\text{FeCl}_3$  led to the production of biomass with iron content of around 115 mg Fe/g dry biomass. High pressure at 300 MPa, 10 min, 20°C were the parameters selected for spirulina treatment, leading to higher extraction yields and purity extracts within ~2 h after processing. Based on the results of the randomized cross-clinical study, 8 g of spirulina led to a significant decrease in blood glucose concentrations (-9 mg/dL) and in arterial systolic blood pressure (-4%) 120 min post-test meal, respectively. The daily suggested consumption was set to 8 g for spirulina (including extract and dry form) and 100 mg Fe, split into 2 yoghurts per day. The produced yogurt desserts were of superior quality. The proteins and Fe content per yoghurt were estimated as 22.4 g and 50 mg, respectively.

### Conclusions

The novel yoghurt-type product is expected to be a health-promoting food of daily consumption, attractive to the consumers both for its organoleptic characteristics as well as for its healthy profile.