

BIOAVAILABILITY AND SAFETY OF THREE MICROALGAE IN C57BL/6 MICE

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Introduction: Microalgae are rich in essential nutrients such as carbohydrates, vitamins and minerals. In addition, microalgae have a significant amount of protein, omega-3 fatty acids and carotenoids. Therefore, they could provide the basis for a balanced diet, lead to an improvement in quality of life and help preserving resources.

Objectives: The microalgae *Chlorella vulgaris*, *Nannochloropsis oceanica* and *Phaeodactylum tricornutum* are characterized by different protein and lipid contents. Previous studies were able to show the anti-oxidative and anti-inflammatory effects of those species [1–2]. Until now, however, no information about the bioavailability or safety of whole algal cells are available. Within the Bioeconomy Research program of Baden-Württemberg, we examine the potential of those microalgae for human nutrition.

Methods: In this project we assessed fatty acid and protein bioavailability as well as the safety of whole microalgae after ball mill disruption in C57Bl/6 mice. The algae were supplemented in 5, 15 and 25% to the feed and were fed for 14 days ad libitum.

Results: We did not observe any significant differences in body weight and weight of different organs, nor in feed consumption or health scores. Histological staining's of liver and gastrointestinal tract show no toxic effects. The protein bioavailability was analyzed using the Dumas method and does not differ significantly from the control diet. Fatty acids in the liver were analyzed by gas chromatography. It can be shown that the fatty acids of the different microalgae are bioavailable as accumulating in liver. The omega-3 eicosapentaenoic acid level rises significantly in the *Nannochloropsis oceanica* and *Phaeodactylum tricornutum* group.

Conclusion: These data provide basis information on the safety and bioavailability of the microalgae *Chlorella vulgaris*, *Nannochloropsis oceanica* and *Phaeodactylum tricornutum* as potential new food .

References: [1] Guzmán S., et al. *Phytotherapy research: PTR*. 2003;17(6):665–670.

[2] Andrianasolo E.H. et al. *P. J. of natural products*. 2008;71(7):1197–1201.