5th International Conference on Food Digestion, Rennes, France, 4-6 April 2017

# The microalgae *Phaeodactylum tricornutum* as a potential carotenoid source for human nutrition

Andrea Gille[1*], Rebecca Hollenbach[1], Andreas Trautmann[2], Clemens Posten[2], Karlis Briviba[1]
[1]*Max Rubner-Institut, Federal Research Institute of Nutrition and Food, Department of Physiology and Biochemistry of Nutrition, Karlsruhe*
[2]*Karlsruhe Institute of Technology (KIT), Institute of Process Engineering in Life Sciences, Section III: Bioprocess Engineering, Karlsruhe*
[*]andrea.gille@mri.bund.de

Microalgae can contribute to a balanced diet due to their nutrient composition. Beside numerous essential nutrients, carotenoids are in the focus for using microalgae biomass in food products. The aim of this study was to investigate the diatom *Phaeodactylum tricornutum (P. tricornutum*) as a potential carotenoid source for human nutrition.

Photoautotrophically cultivated *P. tricornutum* was used to assess carotenoid content, bioaccessibility (*in vitro* digestion model) und cellular uptake in Caco 2-cells. Furthermore, the effect of sonication on the bioaccessibility of carotenoids was investigated.

The results indicate that *ß*-carotene, zeaxanthin and fucoxanthin were the main carotenoids found in *P. tricornutum*. Moreover, they show a good bioaccessibility (ß-carotene: 25%, zeaxanthin: 27%, fucoxanthin: 57%), which could be further improved by sonication. In line with the micellization, fucoxanthin was the most abundant carotenoid in Caco 2-cells followed by zeaxanthin. In contrast, ß-carotene could not be detected in cells.

Thus, *P. tricornutum* represents a good carotenoid source for potential use in food even without processing. In addition, the carotenoid bioaccessibility can be enhanced by applying processing methods such as sonication.