Geophysical Research Abstracts
Vol. 21, EGU2019-12865, 2019
EGU General Assembly 2019

Fatty acid profiles and carbon and nitrogen isotopic signature change in *Daphnia* fed experimental diet consisting of algae and methanotrophic bacteria (MOB)

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Organic matter is transferred across different trophic levels in aquatic systems. Algae and methanotrophic bacteria can significantly contribute to diets of non-selective filter-feeding zooplankton in aquatic ecosystems. Thus, zooplankton feeding on algae and bacteria forms one biological process that controls the cycling of carbon in aquatic systems. Food quality, in terms of fatty acid (FA) content, is an important factor that may govern the efficiency of carbon transfer in this crucial trophic step from primary producers to consumers therefore affecting also carbon cycling.

We studied survival, growth and FA composition of *Daphnia magna* during a 7-day growth experiment. *Daphnia* were fed with ten algae and MOB mixtures grown in different CH_4 and CO_2 concentrations and temperatures in closed bottles. Stable isotope ratios of C and N were analysed from algae and MOB mixtures and from *Daphnia*.

Algae and MOB diet did not affect survival of *Daphnia*. In general, the FA profiles of *Daphnia* indicated that they acquired most of their lipids from the algal part of their diet. In contrast, in the treatment with high share of MOB in the diet, *Daphnia* accumulated large amounts of MOB-origin FA, but the *Daphnia* were small and their total FA content was low when the share of MOB was high. FA composition of *Daphnia* was not affected by the feed growing temperature.

Algae and MOB mixture δ^{13}C value range was 7.5 ‰ thus indicating usage of CH_4. There was a clear correlation between feed and *Daphnia* δ^{13}C values, but not between δ^{13}C values of feed and amounts of MOB-origin FAs in *Daphnia*.

Trophic level isotopic enrichment of carbon in *Daphnia* was clear (1 – 3 ‰). However, δ^{15}N values did not always follow trophic level related isotopic enrichment.