

How to deal with food deprivation under three temperature regimes: a lipid perspective of the intertidal copepod species *Platychelipus littoralis* (Harpacticoida)

Werbrouck, E., Van Gansbeke, D., Vanreusel, A., De Troch, M.

Marine Biology Research Group, Ghent University, Krijgslaan 281/S8, 9000 Ghent, Belgium

Intertidal herbivores are confronted with variable environmental conditions including fluxes in food supply and weather conditions (e.g. temperature). One strategy to cope with these periods of resource limitation is the efficient storage and utilization of lipid reserves. Lipids are major energy storage products in copepods (Crustacea), which constitute an important link between primary producers and higher trophic levels. However, information on the time span of lipid depletion, and in particular of their building blocks i.e. fatty acids (FA) is lacking. Temperature potentially regulates the rate of lipid breakdown and may determine which FA are catabolized during starvation. Consequently, temperature may affect the organism's capacity to bridge periods of resource limitation and also which FA are retained in the copepod and passed on to higher trophic levels. This study monitored the dynamics and the FA composition of the reserve and membrane lipids of an intertidal benthic copepod (*Platychelipus littoralis*, order Harpacticoida) that was starved during 3, 6 and 14 days under three temperature regimes (4, 15 and 24°C). Along with these biochemical parameters, the physiological condition of the copepods was studied by quantifying alterations in body weight and survival. Copepod body weight stayed relatively stable over time and mortality only occurred after 14 days of starvation under 24°C. In contrast, the reserve lipids (115±10 µg FA/ mg DW) declined already substantially after 3 days with the strongest changes observed at 15°C (9±5 µg FA/ mg DW), followed by 4°C (23±1 µg FA/ mg DW) and 24°C (76±7 µg FA/ mg DW). While the decline in reserve lipids was moderate in copepods starved under 24°C, their FA composition changed profoundly, owing to the relative increase of 16:0 and 18:0 at the expense of 16:1ω7 and 20:5ω3. These biochemical changes allow the copepod to adjust its energy household and will be further discussed.

Keywords: temperature, copepod, lipids, fatty acid, starvation