



Supplementation of cyanobacterial food with polyunsaturated fatty acids does not improve growth of *Daphnia*

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ABSTRACT: The hypothesis that the low food quality of nontoxic, ingestible cyanobacteria for *Daphnia* is due to the absence of long-chained polyunsaturated fatty acids (PUFAs) was tested. *Synechococcus elongatus*, which is well assimilated by *Daphnia* and is deficient in PUFAs, was chosen as a model food organism. A newly devised method was used to load single fatty acids and mixtures of fatty acids on beads of bovine serum albumin, which then were added as supplements to cyanobacterial suspensions. Growth rates of juvenile *Daphnia galeata* on *Synechococcus elongatus* were low and were not enhanced by the addition of C18-PUFAs and C20-PUFAs singly or together on beads. Supplementation of lipids from the green alga *Scenedesmus obliquus* significantly enhanced growth of *D. galeata*, indicating that the low quality of cyanobacterial carbon is due to a deficiency in a lipid other than PUFAs. The low food quality of *Synechococcus elongatus* was partly mitigated when the animals first fed on *Scenedesmus obliquus*, suggesting that the storage of algal lipids provides a mechanism to cushion the effect of short episodes of cyanobacterial dietary deficiencies on the growth of *D. galeata*.

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