

Lipid molecular species composition of two freshwater microalgae *Nitzschia palea* and *Scenedesmus costatus* by HPLC-ESI-MS/MS

Nicolas Mazzella¹

¹INRAE

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Abstract

This work reports the polar lipid profiles of two freshwater algae: the diatom *Nitzschia palea*, widespread alga that typically inhabits freshwater ponds and rivers, and the *Scenedesmus costatus*, a common green alga. HILIC-ESI-MS/MS analysis was used to determine and quantify the major phospholipids and glycolipids, and their relative molecular species, extracted from the two microalgal cultures. Glycolipids were eluted first, followed by phospholipids partially co-eluting with the sulfoglycolipids. We also studied the fragmentation pattern in the negative ionization mode for galactolipids. The most intense daughter ion corresponded to the fatty acyl chain located at the sn-2 position, which allowed us to determine the stereospecific distribution of the following fatty acids on the glycerol backbone. For green algae, 18:3 fatty acid was frequently occurring in both phospholipids and galactolipids. We also found 16:4 in some molecular species of mono- and digalactosyldiacylglycerol (MGDG and DGDG). The most abundant and characteristic molecular species of MGDG in green algae exhibited the combination (18:3/16:4), whereas DGDG was more saturated than MGDG and contained mainly 18:1, 18:2, or 18:3 at sn-1 and shorter fragments 16:0, 16:1, 16:2, and 16:3 at sn-2. It is also remarkable that in the diatom, the phospholipids contained mainly molecular species with saturated or monounsaturated fatty acids such as 16:0, 16:1 and 18:1. In contrast, MGDG and DGDG contained a higher proportion of polyunsaturated fatty acids, such as the unique and abundant MGDG (20:5/20:2).

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