# C6-Aldehyde Formation by Fatty Acid Hydroperoxide Lyase in the Brown Alga *Laminaria angustata*

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Some marine algae can form volatile aldehydes such as *n*-hexanal, hexenals, and nonenals. In higher plants it is well established that these short-chain aldehydes are formed from C18 fatty acids via actions of lipoxygenase and fatty acid hydroperoxide lyase, however, the biosynthetic pathway in marine algae has not been fully established yet. A brown alga, *Laminaria angustata*, forms relatively higher amounts of C6- and C9-aldehydes. When linoleic acid was added to a homogenate prepared from the fronds of this algae, formation of *n*-hexanal was observed. When glutathione peroxidase was added to the reaction mixture concomitant with glutathione, the formation of *n*-hexanal from linoleic acid was inhibited, and oxygenated fatty acids accumulated. By chemical analyses one of the major oxygenated fatty acids was shown to be (*S*)-13-hydroxy-(*Z*, *E*)-9, 11-octadecadienoic acid. Therefore, it is assumed that *n*-hexanal is formed from linoleic acid via a sequential action of lipoxygenase and fatty acid hydroperoxide lyase (HPL), by an almost similar pathway as the counterpart found in higher plants. HPL partially purified from the fronds has a rather strict substrate specificity, and only 13-hydroperoxide of linoleic acid, and 15-hydroperoxide of arachidonic acid are the essentially suitable substrates for the enzyme. By surveying various species of marine algae including Phaeophyta, Rhodophyta and Chlorophyta it was shown that almost all the marine algae have HPL activity. Thus, a wide distribution of the enzyme is expected.

*Key words: Laminaria angustata,* n-Hexanal, Fatty Acid Hydroperoxide Lyase