

Effects of Salt on Generation of Odor and Taste of Foods Due to Lipid Oxidation

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Summary

Photooxidation of lipids on the surface of dried seaweed that was previously exposed to visible light without specially adding photosensitizer was studied. Dried seaweed impregnated with methyl linoleate on the surface was divided into two parts. One part was exposed to a 500-watt tungsten bulb in a low temperature room at 5°C and then the impregnated lipids were extracted with *n*-hexane. The other part was stored in the dark as control. Positional isomers of hydroperoxides generated from the impregnated methyl linoleate were separated by high-performance liquid chromatography and further identified by mass-spectrometry. For the dried seaweed kept in the dark contained four hydroperoxide isomers, including 13-hydroperoxy-*cis*-9, *trans*-11-octadecadienoate (13-*c,t*-18:2-OOH), 13-hydroperoxy-*trans*-9, *trans*-11-octadecadienoate (13-*t,t*-18:2-OOH), 9-hydroperoxy-*trans*-10, *cis*-12-octadecadienoate (9-*t,c*-18:2-OOH), 9-hydroperoxy-*trans*-10, *trans*-12-octadecadienoate (9-*t,t*-18:2-OOH). For the dried seaweed exposed to light, the oxidized products contained not only above four isomers, but also 12-hydroperoxy-*cis*-9, *trans*-13-octadecadienoate (12-*c,t*-18:2-OOH) and 10-hydroperoxy-*trans*-8, *cis*-12-octadecadienoate (10-*t,c*-18:2-OOH). When fresh seaweed was exposed under sunlight, formation of 12-*cis,trans*- and 10-*cis,trans*-hydroperoxides of methyl linoleate was verified. The dried seaweed impregnated with ethyl eicosapentaenoate also formed certain hydroperoxide isomers due to singlet-oxygen oxidation, including 6-hydroperoxy-*trans*-4, *cis*-8, *cis*-11, *cis*-14, *cis*-17-ethyl eicosapentaenoate (6-*t,c,c,c,c*-20:5-OOH) and 17-hydroperoxy-*cis*-5, *cis*-8, *cis*-11, *cis*-14, *trans*-18-ethyl eicosapentaenoate (17-*c,c,c,c,t*-20:5-OOH). These results clearly showed that singlet oxygen oxidation of lipids occurred in the seaweed under exposure to the light, and it was concluded that this lipid oxidation was catalyzed by chlorophyll in seaweed as a photosensitizer.