

CORRELATION BETWEEN THE ANTIOXIDANT EFFICIENCY AND THE ANTIOXIDANT DISTRIBUTION IN MODEL FOOD EMULSIONS

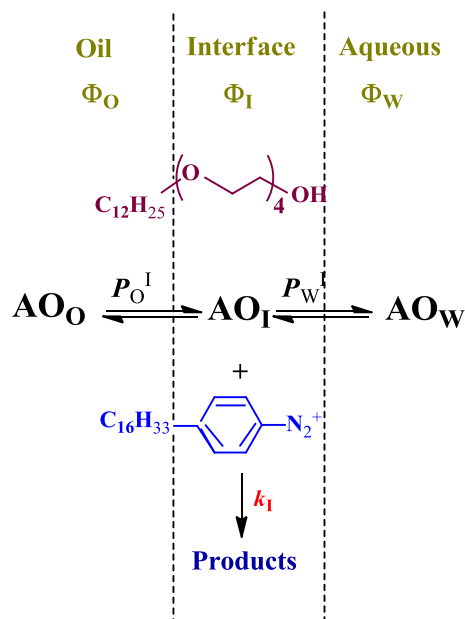
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Lipid oxidation chemistry in oil-in-water emulsions is thought to occur at the emulsion interfacial region. The efficiency of antioxidants in inhibiting lipid oxidation depends, among others, on the fraction of antioxidant present in this region and thus determining the antioxidant distribution between the oil, water and interfacial regions of the emulsion is critical in interpreting experimental results. Because it is physically impossible to separate the interfacial region from the oil and aqueous ones, determination of the antioxidant distribution must be carried out in the emulsion itself.

Here we report on the distribution and efficiency of two important antioxidants, hydroxytyrosol (HT) and hydroxytyrosol acetate (HTA). The distribution was determined by employing a recently developed a kinetic method, see scheme, that permits determining the partition constants between the oil-interfacial, P_O^I , and water-interfacial, P_W^I , regions of the emulsion. The efficiency was assessed by employing the Schaal oven test. Results suggest that there exists a positive correlation between the antioxidant efficiencies and their distributions. The results are relevant for interpreting the effects of lipophilization of antioxidants on their efficiencies.



Basic representation of the interfacial region of a model emulsion showing the distribution of the antioxidant and the reaction with the chemical probe 16-ArN₂⁺ in the interfacial region of the emulsion.