The water soluble antioxidant Trolox is frequently used as model antioxidant. It is often compared to Tocopherol with respect to their antioxidant activity in different systems. To interpret observations appropriately a better understanding of reaction mechanisms and the role of degradation products of Trolox is necessary. Therefore, the present study aimed at determining the stability of Trolox in o/w emulsions containing different emulsifiers. Furthermore, it should be elucidated in how far degradation products impact on the observed activity of Trolox in emulsions.

The antioxidant activity of Trolox was investigated in o/w emulsions containing different emulsifiers, and decreased in the order Brij 58 > CTAB > SDS. Two degradation products were isolated and identified as Trolox quinone and a keto-derivative. In addition to the stability of Trolox, effects of the degradation products on lipid oxidation were investigated. In emulsions with SDS the quinone and the keto-derivative contributed to the overall pro-oxidant effect of Trolox, whereas they had no effect in emulsions containing CTAB or Brij 58. It was concluded that the microenvironment at the o/w interface has a marked influence on the antioxidant and pro-oxidant effects of Trolox and its degradation products via molecular interactions and effects on the molecular mobility.