

Abstracts

Effect of cyclodextrins on the ORAC method for measuring the bioactivity of phytochemicals

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ABSTRACT: Cyclodextrins are cyclic oligosaccharides made up by glucose units. Their hydrophobic internal cavity and hydrophilic surface allows them to form inclusion complexes by encapsulating low polar molecules inside. This molecular encapsulation is widely use in biomedicine to improve the water solubility of bioactive compounds. For this reason, cyclodextrins have been used to modify the water-based ORAC method to measure the antioxidant activity of lipophilic phytochemicals. However, the literature shows some discrepancy between authors on the role played by these encapsulating agents in the medium. In this work, the effect of cyclodextrins on the ORAC method is investigated in the presence and absence of the antioxidant oxyresveratrol, a hydrophobic stilbene that is naturally synthesised in mulberry trees. By means of a physicochemical and computational approach, it was concluded that cyclodextrins are able to modify the fluorescent signal of the ORAC method both in the presence and in the absence of the antioxidant oxyresveratrol. This interference was dependent on the type of cyclodextrin and the concentration. It seems that the main cause of this undesirable effect is the encapsulation of other reagents in the medium, in particular fluorescein and AAPH. These results are of interest for future studies in which the antioxidant activity of poorly water-soluble biomolecules is analysed.

KEYWORDS: Antioxidant; Solubility; ORAC; Cyclodextrin; Encapsulation; Interference

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