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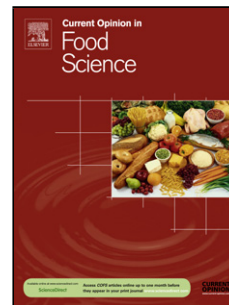
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1 Anthocyanidins regenerating xanthophylls. A quantum mechanical  
2 approach to eye health.

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9  
10 Abstract

11 The xanthophylls lutein and zeaxanthin accumulate in human retina and protect vision  
12 functions against blue light, singlet oxygen and triplet photosensitizers, but are easily  
13 degraded by free radicals involved in lipid oxidation in eye tissue. Polyphenols may  
14 regenerate xanthophylls from their initial oxidation products, the carotenoid radical  
15 cations, by electron transfer protecting the “yellow spot.” The reorganization energy  
16 of the donor/acceptor transition state should equal reaction free energy for optimal  
17 diffusion-controlled regeneration of the xanthophylls by polyphenols according to  
18 Marcus theory for electron transfer. Anthocyanidins match the reduction potential of  
19 xanthophyll radicals in contrast to the more reducing catechins and tocopherols,  
20 which overshoot energetically. Quantum mechanics may provide the explanation for  
21 the protective effect of blueberry on vision.

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