

Orange Capsicums and Chillies as a Potential Source of Dietary Zeaxanthin, an Important Macular Carotenoid for Eye Health [†]

Rimjhim Agarwal ^{1,2,*}, Hung Hong Trieu ¹, Robyn Cave ² and Stephen Harper ³ and Tim O'Hare ^{1,2}

¹ Centre for Nutrition and Food Sciences, QAAFI, St. Lucia, Queensland 4072, Australia; h.trieu@uq.edu.au (H.H.T.); t.ohare@uq.edu.au (T.O.)

² School of Agriculture and Food Sciences, The University of Queensland, Gatton, Queensland 4343, Australia; r.cave@uq.edu.au

³ Department of Agriculture and Fisheries, Gatton, Queensland 4343, Australia; Stephen.Harper@daf.qld.gov.au

* Correspondence: rimjhim.agarwal@uq.edu.au

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Abstract: Zeaxanthin is a dietary carotenoid accumulated in the macula in order to reduce photoreceptor oxidation by blue light. Damage caused to photoreceptor cells in the human eye leads to macular degeneration, which is the leading cause of blindness in developed countries. Zeaxanthin, an orange pigment, is rarer in western diets as compared to the yellow pigment, lutein, the other important macular carotenoid. Orange capsicums (*Capsicum annuum*) have been reported to be an excellent source of zeaxanthin, but there are limited reports about its occurrence both within, and in other closely related species (*C. baccatum*, *C. chinense*). In the current investigation, yellow, orange and red coloured accessions of *C. annuum*, *C. chinense* and *C. baccatum* were analysed for their carotenoid profiles to identify high zeaxanthin accessions. A carotenoid extraction protocol and ultra-high-performance liquid chromatography-photometric diode array-mass spectrometry (UHPLC-PDA-MS) analysis was optimised to identify and quantify carotenoids in the capsicum accessions both before and after saponification. Interestingly, out of 22 varieties tested, only the 'Orange Belle' orange capsicum demonstrated a high accumulation of zeaxanthin. Other accessions exhibiting orange colour accumulated different orange carotenoid pigments to zeaxanthin, such as violaxanthin, beta-carotene, and beta-cryptoxanthin. Yellow coloured accessions accumulated a high concentration of lutein or alpha-carotene, while red cultivars were highest in capsanthin and capsorubin. The present findings suggests a need for further studies to identify high zeaxanthin germplasm which can be cross-bred with orange capsicums for future biofortification, in order to help increase the daily dietary intake of zeaxanthin in western diets.

Keywords: Capsicums; Chillies; *Capsicum annuum*; *Capsicum chinense*; *Capsicum baccatum*; zeaxanthin; eye health; macular degeneration



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