

# zeaxanthin

## it's not all the same

**ZeaONE™** is a new dietary, free-form zeaxanthin naturally sourced from marigolds. Although other zeaxanthin ingredients are sourced naturally, they aren't all equal. Knowing the difference between non-esterified (free) and esterified forms can help you ensure your product is delivering the benefits your customers need.

### Making the Distinction

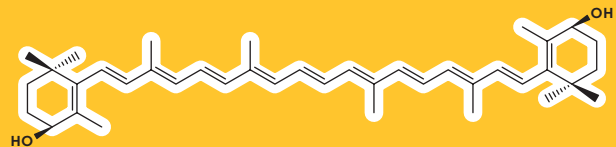
Dietary zeaxanthin can be either in a free or an esterified form, and the difference between them is significant. Free-form zeaxanthin, like ZeaONE, is directly absorbed into the bloodstream, zeaxanthin esters are not.<sup>1</sup>

Before esters can be bioavailable, the body must first solubilize them in fat and then de-esterify them by enzymatic cleavage of the fatty acids by a complex process that can vary greatly among individuals and can affect absorption.<sup>1,2</sup> Simply put, if the zeaxanthin is not optimally absorbed, it will not be delivering all of its intended benefits to consumers.



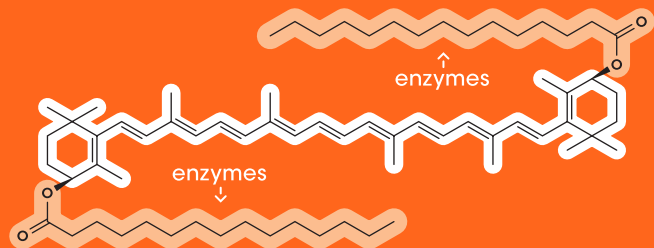
#### Free Zeaxanthin

Like the form found in ZeaONE—the same form that makes up 93% of all zeaxanthin in the diet.



#### Zeaxanthin Esters

Like the form found in paprika peppers. Conversion rate of esters to free is unknown.



# 93%



Most of the zeaxanthin in our diets is free-form zeaxanthin, like ZeaONE™.

## The Bottom Line

Our bodies don't make zeaxanthin, but through our diet and/or supplements it is absorbed and selectively deposited in the eye, brain, skin and even breastmilk.<sup>7-10</sup> Research has shown that only free-form zeaxanthin, like ZeaONE, is found in these tissues—zeaxanthin esters is not.

Even though esters can be converted to free-form by our bodies, the rate of conversion is not well-studied and the mechanism, for the most part, is unknown. Since esters require extra work from our bodies in order to use them, free zeaxanthin—like that found in the vast majority of dietary sources—is the body's preferred form.

**Don't leave your customer's eye health up to chance. Choose a source that delivers zeaxanthin the way nature intended—choose ZeaONE.**

## See the Difference

	ZeaONE™ Zeaxanthin	Zeaxanthin Esters
Naturally sourced from marigolds	✓	
Dietary(3R, 3'R)-Zeaxanthin	✓	✓
Absorbed directly by the body	✓	
Requires additional conversion step; rate is unknown and varies by person		✓
Found in retina, macula, lens, etc.	✓	
Same dietary free-form as was clinically proven to reduce the risk of progression of age-related macular degeneration (AMD) <sup>3*</sup>	✓	
Same dietary free-form as was clinically proven to improve visual performance <sup>4*-6</sup>	✓	

\*Test article OPTISHARP® Zeaxanthin

1. Pérez-Gálvez, A., and Mínguez-Mosquera, M. I. (2005) Esterification of xanthophylls and its effect on chemical behavior and bioavailability of carotenoids in the human. *Nutrition Research* 25, 631-640. 2. Chung, H. Y., Rasmussen, H. M., and Johnson, E. J. (2004) Lutein bioavailability is higher from lutein-enriched eggs than from supplements and spinach in men. *J Nutr* 134, 1887-1893. 3. AREDS2 Research Group. (2013) Lutein + zeaxanthin and omega-3 fatty acids for age-related macular degeneration: the Age-Related Eye Disease Study 2 (AREDS2) randomized clinical trial. *JAMA* 309, 2005-2015. 4. Stringham, J. M., and Hammond, B. R. (2008) Macular pigment and visual performance under glare conditions. *Optom Vis Sci* 85, 82-88. 5. Richer, S., Park, D-W., Epstein, R., Wrobel, J.S. and Thomas, C. (2012) Macular Re-pigmentation Enhances Driving Vision in Elderly Adult Males with Macular Degeneration. *J. Clin. Exp. Ophthalmol* 3, 217-221. 6. Richer, S. P., Stiles, W., Graham-Hoffman, K., Levin, M., Ruskin, D., Wrobel, J., Park, D.W., and Thomas, C. (2011) Randomized, double-blind, placebo-controlled study of zeaxanthin and visual function in patients with atrophic age-related macular degeneration: the Zeaxanthin and Visual Function Study (ZVF) FDA IND #78, 973. *Optometry* 82, 667-680 e666. 7. Bernstein, P.S., Khachik, F., Carvalho, L. S., Muir, G. J., Zhao, D.Y., and Katz, N. B. (2001) Identification and quantification of carotenoids and their metabolites in the tissues of the human eye. *Exp Eye Res* 72, 215-223. 8. Johnson, E. J., Vishwanathan, R., Johnson, M. A., Hausman, D. B., Davey, A., Scott, T.M., Green, R. C., Miller, L. S., Gearing, M., Woodard, J., Nelson, P.T., Chung, H. Y., Schalch, W., Wiltwer, J., and Poon, L. W. (2013) Relationship between Serum and Brain Carotenoids, alpha-Tocopherol, and Retinol Concentrations and Cognitive Performance in the Oldest Old from the Georgia Centenarian Study. *J Aging Res* 2013, 951786. 9. Hata, T.R., Scholz, T.A., Ermakov, I.V., McClane, R. W., Khachik, F., Gellermann, W., and Pershing, L. K. (2000) Non-invasive raman spectroscopic detection of carotenoids in human skin. *J Invest Dermatol* 115, 441-448. 10. Khachik, F., Spangler, C. J., Smith, J. C., Jr., Canfield, L. M., Steck, A., and Pfander, H. (1997) Identification, quantification, and relative concentrations of carotenoids and their metabolites in human milk and serum. *Anal Chem* 69, 1873-1881.



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