

Color is in the eye of the beholder

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In some regions of Central Europe, salad dressing is made preferably with pumpkin seed oil, which has a strong characteristic nutty flavor and striking color properties. Indeed, in a bottle it appears red, but it looks green in a salad dressing or mixed with yoghurt.

Samo and Marko Kreftj's paper examines the remarkable two-tone (or dichromatic) color of pumpkin seed oil, by the use of a combination of imaging and CIE (International Commission on Illumination) chromaticity coordinates. The paper also explains why human vision perceives substances like pumpkin seed oil as dichromatic or polychromatic (exhibiting a variety of colors).

Two phenomena explain the perceived shift in color of pumpkin seed oil from red to green:

Firstly, the distinctive change in color shade of the oil is due to a change in oil layer thickness. As the oil layer thickens, the oil changes its appearance from bright green to bright red. The observed color is neither dependent on the angle of observation nor on the direction or type of light.

Secondly, the shift in color is due to the unique characteristics of the cells in the human retina. Our eyes have two types of photoreceptor cells: rods and cones. Rod photoreceptor cells are very sensitive and operate in dim illumination conditions. Cone photoreceptor cells function well in bright light conditions. They are also the basis of color perception in our visual image. It is the presence of multiple classes of

cone cells, each with a different spectral sensitivity, that gives us the ability to discriminate colors.

Citation: Kreft S & Kreft M (2007). Physicochemical and physiological basis of dichromatic colour. *Naturwissenschaften* (DOI 10.1007/s00114-007-0272-9)

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