

Kinetics of Color Changes in Virgin Olive Oil During Photooxidation

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The action of light has long been known to cause deterioration of vegetable oils, fats and fat containing products during storage and to breakdown of pigments and vitamins. Modern practices involve display of foods in brightly lit supermarkets, and obvious solution of excluding light is generally not employed for marketing or economic reasons. Color of olive oils is due mainly to the presence of chlorophylls and carotenoids. Photooxidation requires the presence of elements known as photo-sensitizers such as chlorophyll that can capture and concentrate the light energy. This energy can be transmitted to the oxygen present, converting it to a more active singlet state. Photooxidative activity of chlorophylls and their derivatives has been demonstrated in experiments on decolorized olive oils.

The aim of this study was to establish a mathematical model to describe the kinetics of color changes during photo oxidation of virgin olive oil as a function of light intensity and time. The color of the olive oil was measured using a Minolta Chromameter. The L-, a- and b-values are the three dimensions of the measured color which gives specific color value of the material. Oil color changes were directly related to a- and b- values. Evaluation of color from the chromatic ordinates L-, a-, b- of the absorption spectrum provides an additional attribute for the evaluation of virgin olive oil quality.