From RESEARCH to REGULATIONS.(antioxidants)(Brief Article)(Statistical Data Included)

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Carotenoids, a large group of fat-soluble compounds, are responsible for many of the yellow, orange and red colors in plant and animal products. The colors of autumn leaves illustrate the vast number of carotenoid pigments found in nature.

Carotenoids are also powerful antioxidants that protect plants from oxidative damage. Several carotenoids protect humans by hindering free radical chain reactions caused by aging, smoking, pollution and other stresses. While there are more than 600 different carotenoids, only a few are active in the human body.

Commercially Available Forms

Several carotenoids are used commercially in dietary supplements and food:

* [beta]-carotene the most widely studied carotenoid, is permitted as both a color and a nutrient for use in foods, while most other carotenoids may only be used as natural or FDA-exempt colorants. [beta]-carotene is a precursor to vitamin A and is the premier carotenoid used in supplements.

* Apocarotenal is an orange carotenoid used mainly in the coloration of processed cheese or salad dressings. It has some vitamin A activity, though not as great as [beta]-carotene's.

* Canthaxanthin, a red, FDA-exempt color, is used in grapefruit juice, surimi and some tomato-based products to enhance color stability or provide consistency due to natural color variation in crops.

* Lycopene contributes the red color to tomatoes, where it is found in high concentrations. Also found in guava, watermelon and pink grapefruit, it is not yet permitted for use as a colorant or nutrient in foods, per se. It is, however, approved for use in "dietary supplements" under The Dietary Supplement Health and Education Act of 1994 (DSHEA).

* Lutein is approved for use in supplements under DSHEA. The FDA is being petitioned for GRAS status of lutein for food supplementation. Lutein, responsible for the yellow color in vegetables such as corn, is present in high amounts in foods like spinach and turnip greens. Lutein cannot be produced in the body. It must be obtained through the diet.

* Zeaxanthin, another carotenoid, is always found along with lutein. Zeaxanthin is not available in pure form on the market, but small quantities can always be found in combination with lutein. These two carotenoids are also found together concentrated in the macula of the human eye.

Carotenoid Nutrition Research

The American Cancer Society states that people who consume greater amounts of carotenoid-rich foods have a lower risk of getting cancer. However, results of randomized trials have shown that [beta]-carotene supplementation (at amounts rarely achieved in the diet) for up to 12 years had no overall benefit in prevention of cancer or cardiovascular disease and may even be harmful in some circumstances [1].

However, another recent study [2] showed a statistically significant decreased risk of total and prostate cancer in participants who took [beta]-carotene supplements and who had low plasma [beta]-carotene baselines. The study is consistent with the Lixian Study (1993), which found that the use of a supplement containing 15 mg [beta]-carotene (alone with vitamin E and selenium) significantly reduced the risk of gastric cancer in under-nourished Chinese.

These observations are consistent with a large body of epidemiological findings showing reduced risk of certain cancers in populations with a high intake of [beta]-carotene from fruits and vegetables.

Other recent studies have shown that diets rich in tomatoes and tomato products may be linked to reduced risk of prostate, cervical, and cancers of the digestive tract [3,4,5]. While it is probable that lycopene is the carotenoid responsible for the protective effect of tomatoes, there is not yet clinical proof that lycopene supplementation is justified. The National Cancer Institute is currently looking at larger-scale trials with lycopene supplementation.

Lutein and zeaxanthin, found in green leafy vegetables, are thought to play a major role in risk reduction for Age-related Macular Disease (AMD), which can cause blindness in those over 65 [6]. So far, research only shows associations between foods rich in lutein and reduced risk of AMD, but more and more ophthalmologists are recommending lutein supplementation. Formal dietary recommendations for lutein have not been issued, but 6 mg per day is thought to be a good starting point.

References

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