



## COLORFUL LIFE HEALTHY LIFE

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The information provided in this article is to obtain a further understanding of the beneficial health effects of various food pigments naturally occurring in plant products. The bright colors of many vegetables contribute much to their appeal. The colors result from the various pigments contained in their tissues. Most of the pigments occur in plastids –specialized bodies lying in the protoplasm of the cell. Sometimes the water – soluble pigments are dissolved in the vacuoles and not generally distributed throughout the cell. These pigments display various colors and are made up of different phytochemicals commonly found in the food matrix such as orange ( $\beta$ -carotene), yellowish-green (lutein), green (chlorophyll), and blue-purple (anthocyanin). Lycopene is the red colored pigment abundantly found in red colored fruits and vegetables such as tomato, papaya, pink grapefruit, pink guava and watermelon.

Including a variety of colors in one's diet seems to equal better overall health, especially in relation to produce. "Epidemiological research suggests that food patterns that include fruits and vegetables are associated with lower risk for some diseases, such as cancer of various types (pharyngeal and laryngeal cancer), cardiac diseases, sleep disorders, kidney problems, etc. In biology, a plant pigment is any material resulting in color of plant or animal cells. It includes a variety of different kinds of molecules, including porphyrins, carotenoids, anthocyanin's and betalains. These pigments have very important role in our balance diet as well as in our life. As discussed earlier, these provides health benefits by providing nutritional advantage to diet. For instance, black currants have long been reported as having remarkable health benefit. It has been used in treatment of general fatigue, arthritis, kidney stones, gout, inflammation of the mouth, stomach and bowel, lung and cough ailments, and as diuretics. In a recent on black currants have shown their direct effects on health and well being. The study revealed that subjects who consumed anthocyanin reported to show improve blood circulation in cold hands, increased ability of plasma to suppress inflammatory response, reduces muscle stiffening, reduced sleep disturbances, decreased vascular inflammation and the risk of cardio vascular disorder, improved eye function and kidney function. It has been found that flavonoids in regularly consumed foods may reduce the risk of death from coronary heart disease in elderly men. The chief pigments of vegetables and fruits can be classified as fat soluble and water soluble. Fat soluble are chlorophyll and carotenoids, whereas water soluble are anthocyanin's and anthoxanthins. Chlorophyll provides green pigment to vegetables such as green leafy vegetables, capsicum, beans, peas and chilies. Carotenoids are a group of yellow, orange red widely distributed in nature in vegetables such as yellow corn, tomatoes, red capsicum, green capsicum and carrots. Anthocyanins are highly water soluble pigments that range in color from red to purple, the anthoxanthins are colourless or white. An important effect of flavonoids is the scavenging of oxygen-derived free radicals. In vitro experimental systems also showed that flavonoids possess anti-inflammatory, antiallergic,



antiviral, and anticarcinogenic properties. The effects of pigments on our health can be summarized as follows:

**Blue/Purple:** The blue/purple hues in foods are due primarily to their anthocyanin content. Examples: Eggplant (especially the skin), blueberries, blackberries, prunes, plums, pomegranates. Anthocyanins are antioxidants that are particularly heart healthy and may help support healthy blood pressure. According to Gloria Tsang, “The anthocyanins that give these fruits their distinctive colors may help ward off heart disease by preventing clot formation. They may also help lower risk of cancer.” Blueberries are considered to have the highest antioxidant activity of all foods.

**Green:** The natural plant pigment chlorophyll gives green color to the fruits and vegetables. Examples: Broccoli, cabbage, bokchoy, Brussels sprouts. Such foods are rich in isothiocyanates, which induce enzymes in the liver that assist the body in removing potentially carcinogenic compounds,” says Bowerman. Cruciferous veggies such as broccoli and cabbage contain the phytochemicals indoles and isothiocyanates, which may have anticancer properties. “Green vegetables are excellent sources of vitamin K, folic acid, potassium, as well as carotenoids and omega-3 fatty acids. “Folic acid is needed to prevent neural tube defects during pregnancy, and vitamin K is essential in blood clot formation. Diets high in potassium are associated with lowering blood pressure, and there is an inverse relationship between cruciferous vegetables and cancer, especially colon and bladder cancers.”

**Yellow/Green:** These foods exhibit a richness in lutein. Examples: Avocado, kiwifruit, spinach and other leafy greens, pistachios “Lutein is particularly beneficial for eye health. Another reason to grab some yellow/green kiwifruit at the grocery store, says Kasik-Miller, is its high amount of vitamin C.

**Red :** Lycopene is the predominant pigment in reddish fruits and veggies. A carotenoid, lycopene is a powerful antioxidant that has been associated with a reduced risk of some cancers, especially prostate cancer, and protection against heart attacks. Examples: Tomatoes and tomato products, watermelon, pink grapefruit, guava, cranberries. And although some nutrients, such as vitamin C, are diminished with the introduction of heat, Hoy says, “The benefits of eating produce are not dependent on eating raw foods. In fact, cooking enhances the activity of some phytochemicals, such as lycopene. “In addition to vitamin C and folate, red fruits and vegetables are also sources of flavonoids, which reduce inflammation and have antioxidant properties. Cranberries, another red fruit [whose color is due to anthocyanins, not lycopene], are also a good source of tannins, which prevent bacteria from attaching to cells.

**Yellow/Orange** represents the beta-cryptoxanthin and vitamin C. Orange group foods are also rich in beta-carotene, which are particularly good antioxidants. Examples: Carrots, mangoes, cantaloupe, winter squash, sweet potatoes, pumpkins, apricots. Beta-cryptoxanthin, beta-carotene, and alpha-carotene are all orange-friendly carotenoids and can be converted in the body to vitamin A. Commonly called the eyesight foods. Tsang notes that the beta-carotenes in some orange fruits



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and vegetables also play a part in preventing cancer, particularly of the lung, esophagus, and stomach and may also reduce the risk of heart disease and improve immune function. Kathy Hoysays eating a variety of foods helps ensure the intake of an assortment of nutrients and other healthful substances in food, such as phytochemicals, noting that color can be a helpful guide for consumers. “Nutrients and phytochemicals appear to work synergistically, so maintaining a varied, colorful diet with healthful whole foods is a pragmatic approach to optimal nutrition”. Hence we conclude that, plant pigments are invaluable and wonderful gift of nature to the human being and can be a natural cure to many health problems if included in diet routinely.

## REFERENCES

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