



## The Colour of Fruits and Vegetables An Indication of Food Safety?

### *Are Green Potatoes Safe to Eat?*

A green pigment may sometimes be found under the skin of potatoes, and is not a safety hazard. However, unpeeled potatoes which are dark green in colour likely contain the toxin solanine. This toxicant cannot be washed away or broken down by cooking. Peeling will reduce the level of toxin in the potato but does not guarantee that it is safe to eat. Consumption of potatoes containing solanine may result in the rapid onset of gastrointestinal disturbances, including bleeding, and neural disorders such as breathing difficulties and increased sensory sensitivity. Although solanine poisoning can be fatal, most individuals recover in less than 3 hours.

### *Why do Potatoes Turn Green?*

Solanine develops when potatoes are exposed to light; for example when the plant is improperly hilled in the field or potatoes are stored in light.

### *Are all Colour Changes Poisonous?*

No! Fruits and vegetables contain several pigment classes that behave differently during harvesting, processing and storage. Chlorophylls are water soluble pigments responsible for the green colour of nearly all fruits and vegetables. Acidic conditions caused by bacterial spoilage, food additives, or the leakage of plant cell fluids may convert the green chlorophyll to an undesirable brown colour associated with pheophytins.

Carotenoids are fat soluble pigments responsible for the yellow, red and orange colour of many fruits and vegetables. They are not water soluble and are relatively heat stable. Therefore there is no extensive loss or change during processing. However, the carotenoids are sensitive to photo-oxidation and may lose their bright colour under long exposure to light and oxygen.

### *Blue Garlic? Pink Pears?*

The anthocyanins are the most interesting group of natural pigments. Anthocyanins are water soluble pigments sensitive to both pH and heat. The unique feature of this group is that certain sub groups display a different colour at different pH values. This explains why garlic may change from white to blue/purple during pickling and why pears may turn pink when canned.

Other natural pigment changes may occur in fruits and vegetables. Quinones may undergo non-enzymatic reactions to produce brown, grey, and black pigments called melanins. Maillard reactions, caramelizations and ascorbic acid oxidations can produce similar changes. The enzyme polyphenoloxidase causes enzymatic browning. In potatoes, this enzyme reacts with the pigment anthoxanthin to produce black discolouration on cut or cooked surfaces.

Most colour changes are associated with natural reactions that make the food cosmetically unappealing or organoleptically unpalatable. However, some foods remain palatable despite colour changes. Although the health risk is low, these foods should be treated with caution.