

# Green Potatoes Causes and Concerns

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Concern about the potential health effects associated with eating green potatoes is not unusual or unwarranted, and it is important that both sellers and consumers understand the causes of potato greening. This color change is a consequence of exposure to light, which may occur at various stages throughout the life of a potato. For example, exposure to sunlight can occur as a result of inadequate soil coverage during the growth stage or exposure to artificial light during storage or while on the retail store shelf.

When a potato is exposed to light, metabolic activity in the skin increases as it prepares to send out shoots. As a result, chlorophyll is formed, which causes the green color. Chlorophyll, a natural plant pigment, is tasteless and harmless. Health concerns associated with green potatoes are not related to chlorophyll but to solanine, a potentially toxic alkaloid that develops in the same area as the chlorophyll.

Green potatoes often contain higher levels of solanine than normal potatoes, and the amount of solanine increases with the length of exposure to and the intensity of light. The bitter taste associated with green potatoes comes from solanine, which can also irritate the gastrointestinal tract. If enough solanine is eaten, it may cause symptoms such as vomiting and diarrhea. However, because of the bitter taste, it is rare for someone to eat enough solanine to actually get sick.

The amount of greening is not a direct measure of a potato's solanine content because synthesis of chlorophyll and solanine are separate processes, and factors that affect greening of potatoes include



more than just light exposure. Greening is affected by the variety, maturity and age of the potato, the intensity, quality and duration of light, and temperature.

Potato varieties differ in their sensitivity to light exposure; for example, white-skinned varieties often green more readily than the red or russet varieties. The latter can also green, but the color change may be masked and not as easily detected. Immature and recently harvested potatoes green more readily because they have a thin outer skin or have not completed "skin set." Current retail packaging may also contribute to increased greening. Traditionally, potatoes were packaged in burlap and other opaque materials; however, consumers want to view produce prior to purchase so packaging has transitioned to transparent bags, which allow exposure to light during storage and display. Potatoes also develop more greening with higher air temperatures, e.g., 68°F versus 41°F.

Consumers should be aware that some greening of potatoes without solanine production

is not unusual and is more prevalent in some varieties than others. Although excessive greening may indicate that solanine is present, a bitter taste will verify its presence.

Greened potatoes do not necessarily need to be discarded. The concentration of solanine is greatest in or directly beneath the skin, and peeling is an effective way to remove the solanine-affected tissue. Additionally, cooking in steam or water reduces solanine levels by 30 to 40 percent.

Growers and retailers should reduce factors that contribute to greening. While green potatoes may not develop sufficient solanine to be a health concern, the green color decreases marketability and consumer acceptance. Preventative steps

to reduce greening include selecting the proper varieties, seeding at the proper depth, hilling to cover exposed tubers, reducing exposure to natural light and eliminating exposure to artificial light during storage.

Consumers should note that chlorophyll and solanine are natural products produced by potatoes under a variety of conditions and that the presence of a green color should be used as a sign that solanine may be present. Consumers should inspect potatoes at the store before purchasing, and store them at home in a cool, dark place with good air circulation. Other control measures for small green areas on potatoes include peeling and cooking.

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**Lydia Clayton**, Extension Faculty, Agriculture and Horticulture. Originally prepared by Wayne Vandre, former Extension Horticulturist.



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