ESU 009– Interaction of various environmental factors on the potential of such foods

Lecture 35

Environmental Factors which affects the potential of bioactive compounds

- During crop production

✓ Soil

✓Rainfall

✓Temperature

✓Pest infestation

✓Use of fertilizers

✓Geographic location

- Subsequent handling

✓ Contamination

✓Transportation

✓Storage

✓Processing

- All these factors affect both the bioavailability and the absolute levels of many bioactive compounds.

- For example, selenium content in broccoli is affected by a variety of environmental conditions.

- Efficiency of selenium uptake by plants depends on two main factors: soil selenium concentration and chemical form of selenium.

- Typically, the higher the concentration of selenium in soil, the higher the uptake by the plant.

- Higher levels of selenium in the plant also can increase the amount of the more bioavailable organic form of the nutrient.

- In another example, warm temperatures or drought during seed maturation have been reported to increase free α-tocopherol in soybeans.

- Food processing that include physical damage such as maceration, exposure to elevated temperatures and separation techniques can result in oxidation, thermal degradation and leaching of bioactive compounds in processed food.

- Thermal processing (boiling, microwaving, roasting, steaming, drying etc) and novel non-thermal processing (freezing, irradiation, high hydrostatic pressure, pulsed electric field, reverse osmosis, fermentation) affect the concentration of bioactive ingredients.

- Postharvest storage can also affect anthocyanin, phenolic compound levels and antioxidant capacity in fruits and vegetables.

- It has also been reported that the freezing process decreased both the total phenolic content and free radical scavenging capacity by 4-20% in four cultivars of raspberries.

- As antioxidant content is becoming an increasingly important parameter with respect to fruit and vegetable quality, it is of great interest to evaluate changes in antioxidant status during postharvest storage of horticultural crops.

- However, little information is available regarding the effects of storage conditions, such as temperature, on the changes of anthocyanins, phenolic compounds, and antioxidant capacity in raspberry fruit.

Thank you

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