

Title Effect of ultraviolet-A irradiation on the quality of harvested agricultural products during the drying process

Author H. Aoki, K. Sukegawa and Y. Daikokuya

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Abstract

Harvested agricultural products are traditionally dried by exposure to direct sunlight. Sun drying is weather-dependent and, thus, drying time may be limited. Hot-air drying is expensive and may also affect taste. Thus, ultraviolet-A (UV-A) irradiation is investigated as a possible factor for the superior taste of sun-dried products. The effect of UV-A on the free amino acid content of postharvest green tea leaves and rice husks was investigated in order to develop a UV-A irradiation drying system. Postharvest samples were subjected to hot-air drying with simultaneous irradiation at red, green, blue, UV-A, and UV-C wavelengths and with no irradiation. The total free amino acids of 17 free amino acids and total catechin content in the leaves was measured by HPLC. The antioxidant activity of the leaves was measured using stable radical DPPH and was expressed as the Trolox concentration. UV-A exposure produced an increase in the mean content of 17 free amino acids in green tea leaves. Irradiation at visible blue and UV-A wavelengths of green tea leaves caused a larger increase in antioxidant activity than other treatments. In the case of rice husks, UV-A irradiation produced larger increases in amino acid content of 16 free amino acids in rice bran compared to that in both sun drying and hot-air drying alone treatments. There were a few differences in both the gelatinization characteristics of the polished rice and the germinating rate of husks. However, the superior taste of sun-dried products may be attributable to the improved decomposition of proteins by UV-A irradiation.