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Effect of postharvest application of carvone on potato tubers grown from true potato seed (TPS)

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Abstract

Dormancy duration is an important quality aspect of both ware and seed potato tubers and may be extended by the application of chemical sprout suppressants. The replacement of these synthetic compounds by essential oils with sprouting-inhibitory properties may contribute to the sustainable cultivation of potato.

The aim of this study was to examine how the postharvest application of carvone affects potato tubers grown from true potato seed (hybrid CIP IP 88008). Ten days after harvest, tubers were placed in air-tight glass containers and carvone was applied repeatedly (300 mL/1000 kg tubers) while untreated tubers were used for the control. The containers were stored at 5, 10 and 20°C and opened every two days for 10 minutes for aeration. The number of sprouts per tuber, rate of respiration, fresh weight loss and concentration of glucose, fructose and sucrose in tuber tissue from the buds ('eyes') and the parenchyma were recorded.

Carvone application did not affect bud dormancy duration at 5°C and buds did not sprout even after 98 days' storage. At 10 and 20°C, carvone application prolonged dormancy, but at 20°C a high percentage of rotted tubers (40%) was observed. At all storage temperatures, carvone reduced weight loss but increased the rate of tuber respiration. Carvone application did not affect sugar content at 5°C, but after 68 days of storage at 10°C the concentration of fructose increased and sucrose decreased. However, after 4 months of storage no differences in sugar concentration were recorded.

It is concluded that carvone application can effectively prolong bud dormancy during storage at 10°C. Even though the concentration of reducing sugars and the tuber respiration rate increased, there were no negative effects on the quality aspects of tubers (concentration of glucose, fructose and sucrose) after long term storage.
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