

Title Environmentally friendly method for the control of sprouting and tuber-borne diseases in stored potato

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Abstract

Effective sprout control is a major component of managing stored potato (*Solanum tuberosum* L.) quality. Sprouting causes weight loss and tuber softening, and is associated with the conversion of starch to sugar, which is undesirable for the processing industry. Chlorpropham (CIPC) is the most commonly used post-harvest sprout inhibitor in Israel and the United States. Alternatives to CIPC are needed for both organic and export markets, where produce treated with CIPC is not permitted. Essential oils have been shown to reduce sprouting and pathogen viability in potatoes and can be applied to certified organic crops. In this study, we developed a scalable method to inhibit potato tuber sprouting by fogging with a commercially available product of raw material extracted from natural spearmint. Experiments were conducted in four cultivars that differ in their length of dormancy. Tubers were fumigated with three doses of mint oil, using an applicator that creates a thermal fog circulated by the ventilation system. Monthly thermal fogging with mint oil inhibited sprouting for 9 months in all treated cultivars. In nontreated tubers, sprout weight was more than 4% of tuber weight. Moreover, thermal fogging after sprouting stopped sprout elongation. Treated tubers lost only 3% of their weight compared to more than 7% in nontreated tubers. Two days exposure of *Rhizoctonia solani* mycelia and sclerotia to the mint oil vapor controlled up to 100% of the propagules in vitro. These experiments indicate the potential of mint oil vapor as an environmentally friendly agent for the control of sprouting and diseases in stored potatoes.