RESEARCH AND APPLICATION OF POTATO SPROUT CONTROL PROGRAMS

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ABSTRACT

Sprout control in storage is vital for maintaining potato quality in long-term storage. The current and most common practice to inhibit or reduce potato sprouting in storage involves the use of CIPC (chlorpropham; Isopropyl N-(3-chlorphenyl) carbamate). The potato industry worldwide has been trending towards identifying effective sprout control programs by utilizing lower rates of CIPC, maximizing efficacy of CIPC application methodology, combing CIPC with other sprout suppressant products, and/or applying true alternatives to CIPC. Utilizing variety selection and cooler storage temperatures are also integrated into these sprout control programs when appropriate.

Various studies at the University of Idaho were performed to identify and evaluate effective sprout control programs that incorporate sprout suppressant products such as maleic hydrazide, essential oils, and 3-decen-2-one, applied either as single or combination treatments with CIPC. Efficacy in sprout control of single product programs depended upon product used, potato variety, storage temperature, timing and rate of application, number of applications, method of application and duration in storage. Additional research evaluations were made of sprout suppression products and included temperature of application, impact on processing quality, flavor and culinary cooking quality, disease suppression, storage material corrosion potential, compatibility of products in combination or true mixtures, and movement through a bulk pile.

One component of a sprout control program can be the use of foliar applied maleic hydrazide (MH). In general, regardless of MH rate, the length of time until dormancy break was extended by approximately 30 days with MH application compared to no treatment. Sprout development as measured by sprout weight per tuber was severely retarded with MH applications. Sprout weight was 6 to 16 times greater in the non-treated potatoes compared to the MH treated potatoes after 9 months in storage. Essential oils, such as clove oil, required applications at 3 to 5 week intervals after dormancy break (6 to 9 total applications) to suppress sprouting of Russet Burbank stored at 7.2°C for 9 months whereas the 3-decen-2-one product only required 2 applications to suppress sprouting under the same conditions. Sprout weight per tuber was reduced by 72% for ‘Russet Burbank’, 48% for ‘Russet Norkotah’, and 32% for ‘Chipeta’ after multiple clove oil applications over a 9-month period. Similar number of applications of mint oil, spearmint or peppermint, are necessary for sprout control comparable to clove oil. A cold aerosol application is the recommended means of application for mint oil compared to thermal aerosol as utilized with clove oil. No flavor or culinary quality was affected by applications of essential oils or 3-decen-2-one with the exception of spearmint oil. The novel sprout control agent 3-decen-2-one was effective at suppressing sprout development when applied at the initiation of sprouting although control was also observed when applied prior to visual sprouting and after sprout elongation had occurred.

Results demonstrate the usefulness of incorporating MH, essential oils, or 3-decen-2-one into an overall sprout suppression program either in combination with or without CIPC for long-term storage.

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storage. Sprout control programs utilizing CIPC and/or two sprout suppressant products were often more effective at season long sprout suppression compared to a single product application.