

Assessment of pre- and post-harvest anti-sprouting treatments to replace CIPC for potato storage

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Abstract

To avoid losses from sprouting during potato storage, the anti-sprouting agent chlorpropham [CIPC] has been widely used over the past few decades. However, the European Union recently decided not to authorize the renewal of CIPC, prompting the value chain to find alternative treatments. We assessed for three years the potential of pre- and post-harvest anti-sprouting treatments to replace CIPC using four potato-processing varieties. Pre-harvest application of maleic hydrazide [MH] and post-harvest applications of 3-decen-2-one, 1,4-dimethylnaphthalene [1,4-DMN] and CIPC were performed following supplier's recommendations. In addition, we evaluated the potential of 3-decen-2-one and 1,4-DMN to prolong the efficacy of pre-harvest MH treatment anti-sprouting activity during storage. All molecules significantly reduced sprouting after seven months of storage compared with the untreated control group. MH, 3-decen-2-one, 1,4-DMN and CIPC displayed respectively 86.9%; 77.9%, 73.6% and 99.8% of efficacy to control sprout weight and 79.4%; 73.4%, 68.4% and 96.9% of efficacy to control sprout length. Our results suggest that using 3-decen-2-one and 1,4-DMN in combination with MH do not bring additional benefit to control sprouting. Because differences in dormancies could be observed between varieties, we also showed that the efficacy of post-harvest treatments is genotype-dependent, while MH pre-harvest treatment is effective equally for all varieties. Applications of CIPC and MH led to detectable residues in tubers, while no residue of 1,4-DMN has been detected in tubers treated with this molecule (< LOQ). We concluded that treatments with MH, 1,4-DMN and 3-decen-2-one are valuable alternatives to CIPC to control sprouting of processing potatoes.