

Title Differential effect of ethylene on sugars in UK-grown potato cultivars during storage
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Abstract

Long-term storage of potatoes allows year-round availability of the crop. Managing potato tuber dormancy and sprout suppression is of considerable importance for both the pre-packing and processing markets, as well as for the seed industry. Sprouting is a major cause of loss during storage, since it reduces the number of marketable potatoes. Storing potatoes at low temperatures (e.g. 2-4°C) and the application of sprout suppressants are effective methods of extending potato storage life. However, low temperature storage can elevate the rate of conversion of starch to sugars, with a subsequent increase in potato tuber sweetness. Potatoes containing high levels of sugars are unsuitable for processing at high temperatures of 170-190°C (e.g. frying), because the sugars react with amino acids and produce an undesirable brown colour, as a result of the Maillard reaction. This is known as fry colour darkening. Ethylene is effective in extending potato storage life when used at concentration of 10 µl l⁻¹ and has recently been approved by the UK Pesticides Safety Directorate for use in commercial potato storage facilities. However, ethylene has been reported to detrimentally affect texture and flavour of potato tubers cv. Marfona, Maris Piper and King Edward. Most ethylene research on potato has been undertaken using cv. Russett Burbank, particularly in the USA and Canada. There is not enough work concerning the different potato cultivars grown in UK and how sugar concentration is affected by ethylene and storage conditions. In this study, the effect of ethylene on sugar concentration in five UK-grown potato cultivars viz. Marfona, Estima, Desiree, Sylvana and Fianna was examined. Potato tubers were harvested and arrived at the storage facilities at Sutton Bridge Experimental Unit within 2 h. The tubers were initially stored at 15°C and then slowly cooled to 6°C over a period of two weeks. Tubers were then placed in trays and stored in the presence or absence of ethylene (10 µl l⁻¹) at 6°C for CA. 6 weeks. The aim of the present study was to investigate how ethylene concentration and storage temperature affected sugar concentration in different UK-grown potatoes. Different potato varieties that matured at different times showed variable sugar concentrations during storage in the presence or absence of ethylene.