

ABSTRACT

Post-harvest treatment with gibberellic acid has been found to extend dormancy in Dioscorea spp. Ten experiments were conducted to determine the levels of gibberellic acid and conditions of treatment required to achieve maximum extension of dormancy in tubers of D. alata cv. 'White Lisbon'. The effect of gibberellic acid on the physical characteristics and composition of treated tubers (during storage) was also studied.

Response to gibberellic acid varied in the four cultivars of D. alata studied: 'Uvini Futera', 'Murapoi White', 'White Lisbon' and Murapoi Off White'. Treatment with 250 ppm GA₃ for 22 hours resulted in an extension of dormancy ranging from 4 weeks in tubers of 'Murapoi Off White' to 21 weeks in tubers of 'Uvini Futera'.

The extension of dormancy produced in response to GA₃ declined as the period between harvest and treatment lengthened; however treatment of tubers on breakage of dormancy resulted in a reinduction of dormancy for a period similar to that achieved by treatment within one week of harvest.

Gibberellic acid extended dormancy in 'White Lisbon' tubers when applied at concentrations of 50 to 2000 ppm. The response to a given concentration of GA₃ increased as the duration of treatment lengthened, until the optimum duration was reached. Treatment with GA₃ for periods longer than optimum resulted in no further response, or in some

cases, a decline in response. The maximum extension of dormancy obtained in response to GA₃ was 14 weeks (100%) by treatment of tubers with solutions of 500 ppm for 9 hours or 2000 ppm for 1 hour.

Pre-washing of tubers increased the response to gibberellic acid. Solutions of 500 to 1,000 ppm could be reused for six separate one-hour treatments on successive batches of tubers with no reduction in response. Addition of n-dimethylamino succinamic acid to the treatment solution did not enhance the response of tubers to gibberellic acid.

Treatment with gibberellic acid significantly reduced weight loss during storage by delaying sprouting, reducing the rate of sprouting, and decreasing the number and weight of sprouts produced. Gibberellic acid had no effect on the moisture content, density, hardness, total sugar or crude protein content of treated tubers; however, the starch content of treated tubers increased during storage.

A preliminary economic analysis of the impact of gibberellic acid on the final cost of stored tubers revealed that for treatment to be economically feasible, concentrations of 100 ppm or lower must be used.