Effects of sugars and amino-oxyacetic acid on the longevity of pollinated
Dendrobium Pompadour flowers

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ABSTRACT

Experiments were carried out to investigate the effects of different types and concentration of sugars and amino-oxyacetic acid (AOA) and their combination in extending the vase-life of pollinated Dendrobium Pompadour flowers. The results obtained showed that the most effective treatments in extending the vase-life of pollinated Dendrobium Pompadour flowers and delaying the post-pollination symptoms were 0.05 mM AOA and the treatment which combined 0.05 mM AOA with 4% glucose. Both treatments showed a vase-life of up to 13 days, about 2 days more than that of the control. Furthermore, positive effects were also observed in a delay of weight loss, improved water uptake, change in petal thickness and colour. A combination of 0.05 mM AOA and 2% sucrose extended the vase-life of flowers up to 7 days. Inclusion of 4% glucose and 2% sucrose alone only prolonged the vase-life of flowers two days more compared to that of the control. Holding solutions containing sugars alone only prolonged the vase-life of flowers for just two days more compared to control. As has been studied in other experiments, pH of 5.0-7.0 was maintained during the vase-life of pollinated Dendrobium Pompadour and also delayed the post-pollination symptoms.

Keywords: Amino-oxyacetic acid, Dendrobium Pompadour, pollination, sugar, vase-life.

INTRODUCTION

The life span in orchids varies according to cultivar species, ranging from a day to as long as six months. Many factors can be attributed to the reduction in vase life. In several species, flowers are long lived when not pollinated but show petal withering or discision following pollination (Ketsa and Khoua, 9). Dendrobium Pompadour is one such species of orchid that undergoes pollination-induced senescence. The visible cues of the pollination induced senescence are upward movements of the petals withering in full closure of the petals and thinning of petals discoloration of petals.

The production of ethylene induced by pollination is a cascade of events similar to that of natural senescence. One very crucial onset of event is the action of endogenous sugars which leads to the death of flowers. The loss of endogenous sugars following pollination is parallel to the reduction of endogenous sugars in cut flowers. To circumvent the problem of pollination-induced senescence and its symptoms, two strategies can be employed, i.e., by inhibiting the action of pollination-induced ethylene (Ichimura et al. and Nicholas, 5), and by allowing a continuous carbon supply in order to prolong vase-life (Finger and Veziroglu, 3). Ethylene inhibitors have been vastly studied and proven to be effective in prolonging vase-life of cut flowers. Compounds such as amino-oxyacetic acid (AOA) and aminooxyethylglycine (AVG) effectively delay senescence of climacteric flowers by inhibiting the action of 1-aminocyclopropane-1-carboxylate synthase (ACCS) (Liao et al., 12). Maintaining continuous supply of exogenous sugars have been proven to prolong vase-life in many species, such as rose, chrysanthemum (Yakinova et al., 16) and snapdragon (Ichimura and Hisamitsu, 6). Rattanawisalanon et al. (13) indicated that vase-life of Dendrobium “Jew Yu-Yew Tew” flowers was extended when treated with a combination of sugar and AOA. This experiment attempts to explore the effects of AOA and sugars on pollination-induced senescence and observe the visible cues that follow shortly after pollination.

MATERIALS AND METHODS

Dendrobium Pompadour flowers were obtained from the glasshouse of University of Malaya. Individual flowers were cut at the pedicels and placed in water vials containing 20 ml distilled water (control) or treatment solutions. Pollination was done by placing the pollen onto the stigmas using hair brush. Experiments were carried out at ambient temperature (27 ± 2°C) under natural light conditions (600 lux) and a relative humidity of 75-85%. All experiments were done with three replications.

Amino-oxyacetic acid (AOA) was tested at 0.25 and 0.05 mM, glucose and sucrose were used at 2, 4 and 6%. Inclusion of 100 mg/l of chloramphenicol was used.