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EFFECT OF ANCYMIDOL AND PHLOROGLUCINOL ON THE NUMBER AND THE QUALITY OF SHOOTS IN THE MICROPROPAGATION OF DATE PALM (*PHOENIX DACTYLIFERA* L.)

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ABSTRACT

The disadvantages of practical date palm micropropagation are tissue browning, low callus proliferation rate, low multiplication efficiency, and vitrification. The aim of the study was to determine the effect of ancymidol (Ancy) and phloroglucinol (PG) on the growth and some biochemical components of the 'Barhee' date palm cultured *in vitro*. The combination of 0.75 mg·l^{-1} Ancy and 50 mg·l^{-1} PG was found to be the most effective in terms of callus regeneration rate (89%) and number of shoots (14.3). A reduction in browning was observed in tissues cultured on media supplemented with 0.75 mg·l^{-1} Ancy in combination with 25 or 50 mg·l^{-1} PG. The medium supplemented with 0.75 mg·l^{-1} Ancy and 50 mg·l^{-1} PG eliminated shoot vitrification. Effective micropropagation was associated with increased carbohydrate and protein content. In this study, the genetic stability of plants obtained by micropropagation was confirmed by DNA-based RAPD fingerprinting. The results may indicate that the micropropagation protocol used in this study was suitable and applicable to the production of genetically stable date palm plants on a mass scale.

Key words: callus browning, callus induction, endogenous hormones, genetic stability, RAPD, shoot vitrification

INTRODUCTION

The date palm (*Phoenix dactylifera* L.), belonging to the Arecaceae family, is a monocotyledonous, dioecious, perennial tree of great ecological, social, and economic importance. Date fruits contain many chemical components of high nutritional and medicinal value. Date palms can be propagated by seeds or vegetatively by offshoots; however, these methods are ineffective for large-scale propagation, making micropropagation the sole practical approach. Monocotyledonous shoot meristems are of basal origin, and stems lacking cambium tissue are particularly culture-responsive (Jasim et al. 2009). Tissue culture technology can produce the maximum possible number of plants in a limited time and space that are true to type and agronomically equal to or superior to conventionally propagated plants (Al-Mayahi 2022a, b; Al-Mayahi 2023). In plant tissue culture experiments, there is a constant need to search for new compounds whose addition to the culture medium can lead to better or more efficient *in vitro* growth (Al-Mayahi 2021).

Growth regulators that inhibit the biosynthesis of gibberellins are known as growth retardants or gibberellin biosynthesis inhibitors. For plant scientists, growth retardants, with their typical and additional biochemical effects, are valuable tools for better understanding the purposes of their action. Some of them, ancymidol, flurprimidol, and paclobutrazol, have an N-containing heterocycle. Ancymidol [α-cyclopropyl-α-(4-methoxyphenyl)-5-pyridinemethanol] is a pyrimidine analog. Its action blocks the monooxygenase enzyme that catalyzes the oxidation of *ent*-kaurene, an essential step in the pathway between *ent*-kaurene and gibberellins (Rademacher 2016). Ancymidol has a strong effect on various developmental processes, e.g., shoot proliferation, promotion of chlorophyll accumulation, and increased levels of endogenous cytokines (Rajiv et al. 2018).

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