Effect of NAA and Chitosan in rooting branches resulting from stem nodes plantation of Kumquat (*Citrus japonica) in vitro*

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Abstract:

The research was conducted in a Plant Tissue Culture Laboratory, Agricultural Research Department, Ministry of Science and Technology, from December 10/1/2019 to December 30/1/2021, to study the effect of adding auxin NAA at concentrations (1, 2, and 3) mg L^{-1}, and interaction with Chitosan at concentrations (10, 15, 20 and 25) mg L^{-1}, to the culture media MS, to determine the optimal concentration in rooting the branches resulting from the multiplication of micro branches of the Kumquat plants (*Citrus japonica*), produced from *in vivo* development of the stem nodes. The results of the study showed that the planting of Kumquat branches in MS media supplemented with 2.0 mg L^{-1} NAA was a high significant response on rooting percentage (92.0%) and roots number (3.20 plant $root^{-1}$), added 15 mg $L^{-}1$ chitosan to the culture media prepared with 2.0 mg L^{-1} NAA was a significantly increased in same parameters (rooting percentage 80% and roots number 5.60).

Key words: Kumquat (*Citrus japonica*), Chitosan, rooting branches.

Introduction

Citrus fruits are among the fruits of high nutritional value, it is grown in tropical and subtropical regions of the world. The genus Citrus includes more than 162 species of citrus, belongs to Rutaceae family, Kumquat (*Citrus japonica*) is one of the most important types of citrus,. Its name came from the Chinese language, which was two words, the first being Kum, which means golden, the second is Quat, which means good fortune [1].

The method of propagation of kumquat by seeds is not favored by Orchids owners, its difficult to grow plants from seeds, because it needs a long time for the purpose of vegetative growth, called Juvenile phase, plants resulting from planting seeds were late in fruiting, when compared with plants produced by vegetative propagation, early in fruiting [2].

Many researchers have resorted to the method of *in vitro* micropropagation, it has many advantages, including obtaining large numbers and matching the mother plant, the resulting plants were early fruiting, Propagation by tissue culture technique, under sterile and controlled conditions, therefore, it produces plants that are free of pathogens, was an advantage in addition to the advantages of *in vitro* propagation [3, 4].