The Effect of Plant Extracts and Nano-Selenium on the Protein Profile of Mango seedling (Mangifera indica L.) Under Stress Conditions

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Abstract

This study was conducted at the Agricultural Research Station and Laboratories of the College of Agriculture, University of Basrah, Department of Horticulture and Landscape Design. Two year old seedlings of mango were planted in 25 Kg pots. The study involved a factorial experiment with two factors and six replications, resulting in 54 experimental units. The first factor consisted of three treatments: Moringa leaf extract (0,100 mg L-1), Damas leaf extract (100 mg L-1), and control. The second factor was nanoselenium at concentrations of 0, 25, and 50 ppm. The protein pattern of the leaves was analyzed using protein transfer technique on polyacrylamide gel using denaturing slab electrophoresis (SDS). The results showed that the protein profiles on the polyacrylamide gel varied in size, area, and height depending on the type of treatment. The treatments affected the properties of the protein bands, resulting in differences in protein quality due to changes in gene expression. The number of protein bands ranged from 4 to 9, depending on the type of treatment. Four protein bands were observed among the treatments: Moringa extract + Selenium 25 mg•L-1, Selenium 50 mg•L-1, and Selenium 25 mg•L-1. The highest number of protein bands with nine bands were recorded with the Damas extract + Selenium 50 mg L^{-} 1 treatment. Five protein bands were observed in the control, Moringa extract, and Damas extract. The stress conditions induced by the different treatments significantly affected. The molecular weight of the first protein band in all conditions ranged from 201.656 to 225.00 kilodaltons, indicating that the trees belonged to the same species and were from a common source.

Keywords: anti-transpiration, nano-selenium, protein pattern, mango, stress .

Introduction

The mango tree, Mangifera indica L., belongs to the Anacardiaceae family and is cultivated in tropical, subtropical, and temperate regions [1]. Mango trees originated in South Asian, particularly in eastern India. Mango is the second most produced tropical crop globally [2,3]. Mango fruits are highly valued for their nutritional, economic, and medicinal value due to their chemical composition, which includes dietary fibers, proteins, ascorbic acid, carbohydrates, fats, and essential nutrients. [4-6]. The optimal climate for mango tree growth is hot and humid, with a temperature range of 24 to 27°C. Mango trees require a cool and dry or cold and dry climate before flowering, and a dry climate during flowering and fruit set [7,8]. Studies have shown that high temperatures exceeding 35°C in mango trees lead to decreased pollen vitality and reduced fruit set [9,10]. Most plants grown in direct sunlight experience increased temperature and intense light, which leads to drought stress [11]. Water stress, a type of abiotic

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