EFFECT OF ROOT EXUDATES OF SOME VEGETABLE PLANTS ON GERMINATION AND SEEDLING DEVELOPMENT OF TOMATO

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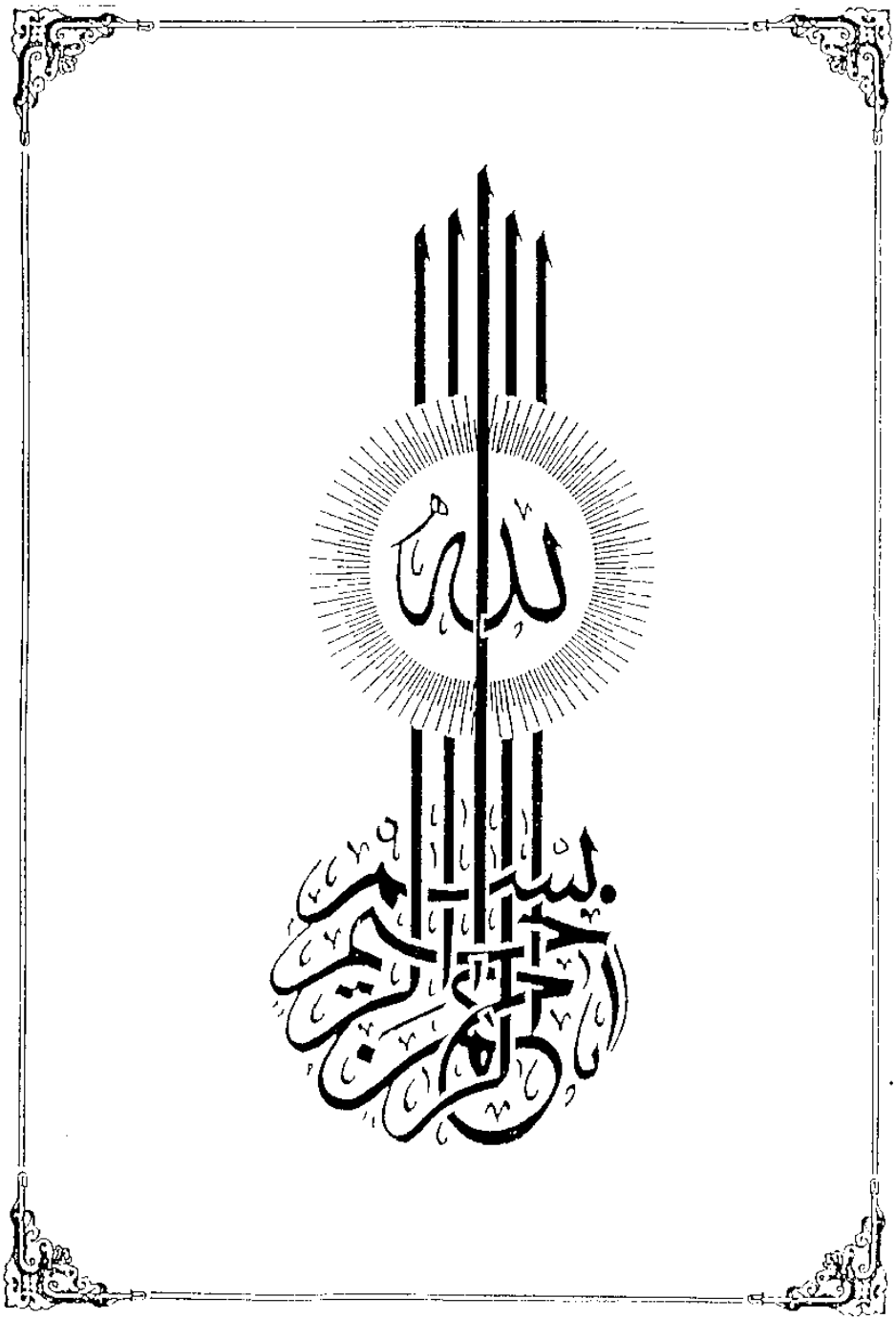

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ABSTRACT

The influence of root exudates of some vegetable crops of cucurbitaceae, cruciferae, leguminosae and solanaceae families on tomato seed germination and seedling development has been studied. The root exudates of some plants of cucurbitaceae and cruciferae significantly decreased the germination percentage of tomato seeds as well as the germination rate index (GRI). The germination percentage of tomato seeds was significantly decreased by the root exudates of four families crops. On the other hand, the (GRI) of the tomato seeds was significantly decreased by the root exudates of cucurbitaceae, cruciferae and solanaceae

crops. However the (GRI) of the seeds was significantly increased when planted after cucurbitaceae and leguminosae crops. The seedling development of tomato was significantly decreased when planted after cruciferae crops.

Chemical analysis showed that: a) The total free phenols differed according to the vegetable crops. The highest amount was obtained from radish root exudates and the lowest was from pepper and broad bean. b) The roots of four families exuded different kinds of amino acids. The highest number of free amino acids (19) was from squash and eggplant root exudates, while the lowest number (14) was from cabbage and broad bean. The common amino acids exuded from the roots of the four families were : Alanine, valine, theronine, glycine, isoleucine, leucine, serine, proline, cystine, hydroxy proline, methionine, aspartic acid, phenylalanine, histidine, glutamic, tyrosine, ornithine, lysine, tryptophane and arginine.

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INTRODUCTION

I. INTRODUCTION

Although plant exudation is not a recently discovered phenomenon; little knowledge is known about its influence on growth and behaviour of plants in the field through the rotation, succession and the intercropping systems. However, some of the composition of root exudates are well determined. Some of the major substances of roots exudates are amino acids, sugars, glycosides, organic acids, vitamins some of enzymes, alkaloids nucleotides and inorganic iones (Rovira and Harris, 1961 ; El-Habbasha and Behairy, 1972 and 1973b). In addition, there is also a source of exudates from seeds and some germinating grains. The seed exudates, as root exudates, may liberate organic compounds in the medium in which they grow. One of the questions which may find out its answer is : How does the root exudates influence the germination of seeds and the development of seedlings. More studies must be done to aid in solving some of the fundamental problems of rotation, succession and intercropping systems of different crops. It was observed that some plants affected harmfully the growth of other plants (El-Habbasha and Behairy, 1973a). In addition, it was also found that the number and kinds of amino acids secreted from root systems of vegetable seedlings

vary greatly among crops of the same family and within the varieties of the same crop (Behairy and El-Habbasha, 1976).

The aim of the present work is to find out :

a) The effect of root exudates of some vegetable crops of different families on seed germination of tomato.

b) The effect of these exudates on tomato seedling growth.

c) Consideration was given to determination of phenolic compounds and amino acids of the root exudates of same crops under investigation.