KINETICS OF ION TRANSPORT IN PLANT

By

ESSAM MOHAMED ABD-EL MONIEM MOHAMED

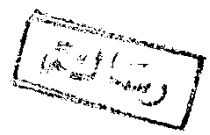
A thesis submitted in partial fulfillment

of

the requirements for the degree of

DOCTOR OF PHILOSOPHY

in



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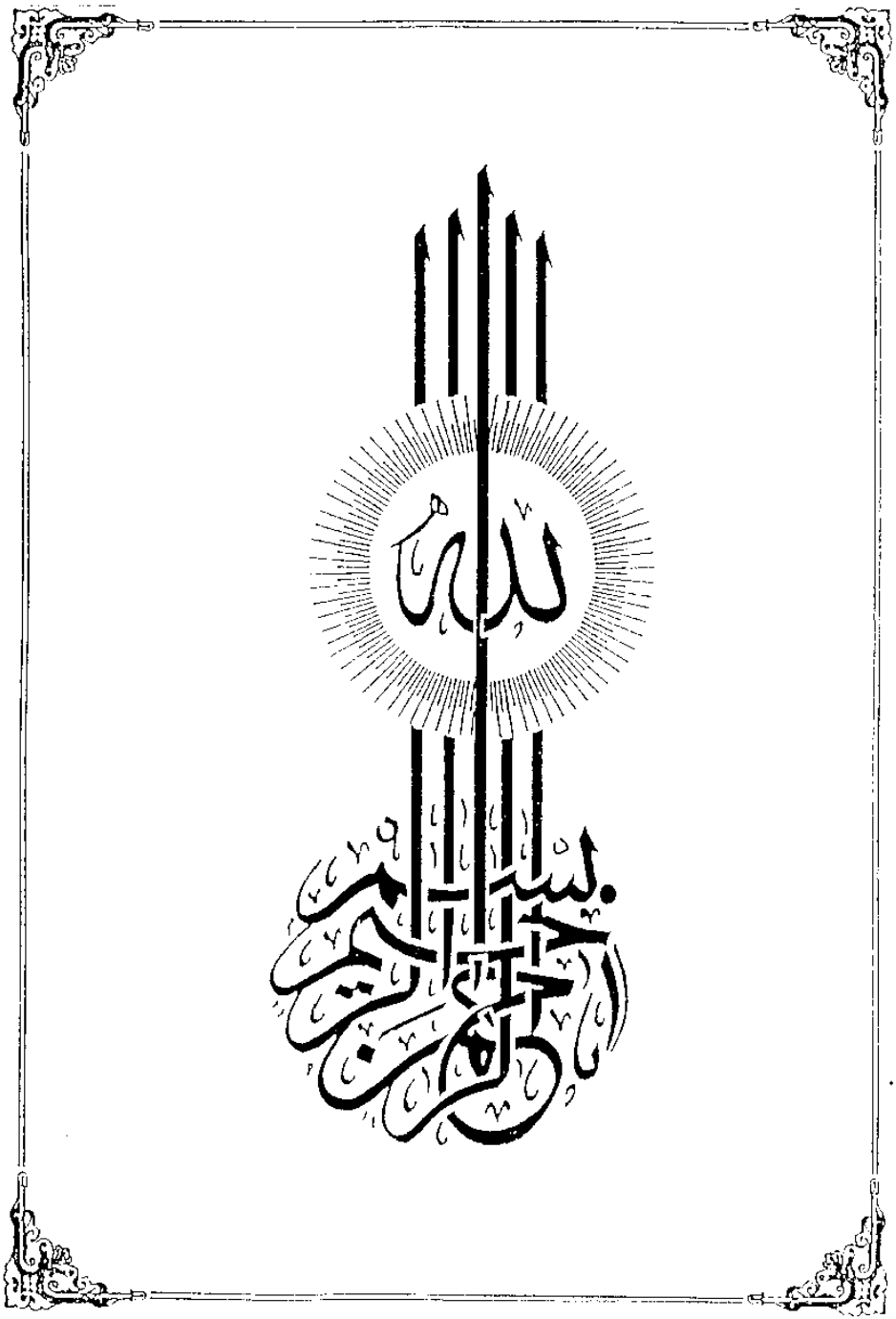

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ABSTRACT

Excised barley roots for two genotypes (Giza 121 and Sahrawy) were selected to study the absorption kinetics of some nutritional elements. The study involved evaluation for absorption of both macroelements, represented by P, and microelements represented by Fe.

The study included evaluation for the maximum velocity (Vmax) and Michaelis constant (Km) along with their responses to environmental factors including period of investigation, pH, accompanied cations or anions and concentration of concerned ions.

The relationship between uptake kinetics and certain anatomical and genetic features was also evaluated. Results showed the following:

1) Positive uptake responses of both phosphate and iron as absorption time progressed.

2) Negative uptake responses of phosphate absorption

at presence of $FeSO_4$ in the absorption media, presence of KH_2PO_4 being favorable for absorption of Fe from Fe-EDDHA.

3) Either positive or negative responses to different pH values of the absorption media, OH^- being generally depressive for phosphate uptake and H^+ being promotive for iron uptake.

4) Concentration of concerned ions was effective on the absorption of both phosphate and iron, relationship being characterized by two phases each having different maximum velocity (Vmax) and Michaelis constant (Km). Such parameters were generally dependent on the ion under consideration as well as the accompanied ions in the absorption media.

5) The rate of concerned ion uptake increased with increasing the cortex area for both elongation zone and root hair one, such area being responded to concentrations of concerned ion in the absorption media.

6) There are differences in polypeptide bands between studied barley genotypes, some of these bands being responded for concentration of concerned ions in the absorption media.

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CONTENTS

LIST OF TABLES

LIST OF FIGURES