EVALUATION OF SOME SLOW-RELEASE FERTILIZERS UNDER EGYPTIAN CONDITIONS

By

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Approval Sheet

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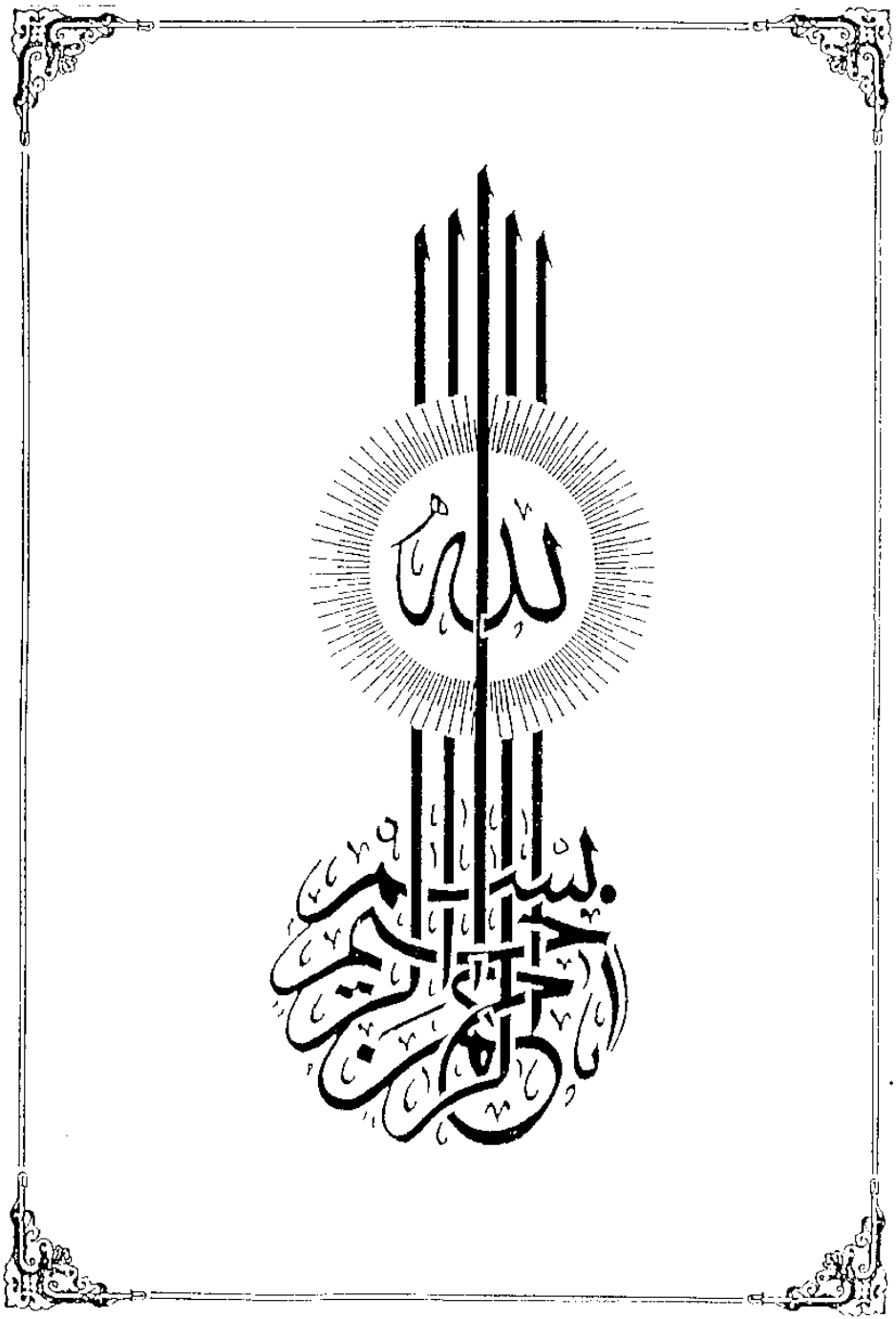

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Abstract

Trials were achieved to produce some local slow-release fertilizers which have been later evaluated as compared with imported ones. This has been performed through different practices including those involving leaching of soil columns, evaluation for activity index, incubation and biological experiments.

From the column studies, data showed that coating with polyethylene (PE), melamine (MF) or ureaform (UF) decreased total leachability of ammonium nitrate (AN) fertilizers as well as nitrogen release from urea ones, the highest effect being found with both imported and prepared sulphur-coated urea (SCU).

With respect to incubation experiment, the release of NO_3^- increased as time goes on, NH_4^+ being more present at the beginning of incubation. Nitrogen release efficiency was higher using imported AN coated fertilizers plantozan and plantocote (PZ and PC) compared to local urea ones capsulated urea and bentonite (CCU* and BCU*); coating urea with sulphur (SCU*) appeared to be more efficient in slowing N-release compared with correspondent imported coating one (SCU).

Finally, biological experiment indicated that UF fertilizer produced the highest values of dry matter content for both shoots and roots of corn plants. Status of N, P, K in

shoots were improved with addition of coated fertilizers compared with uncoated AN ones, such status being better in shoots compared with roots which reflects the known rapid translocation of such elements to over-ground plant parts.

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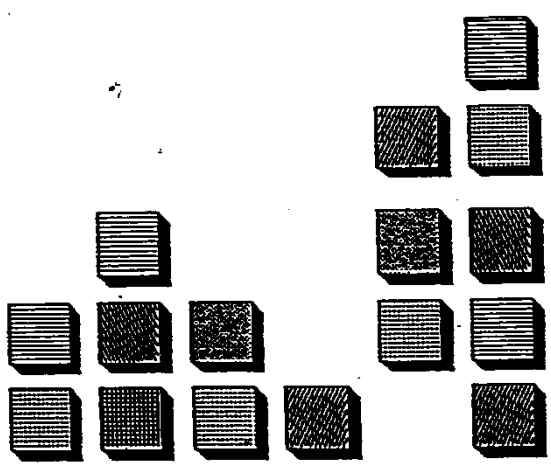

1. INTRODUCTION

In Egypt, the population explosion has been particularly dramatic; it is expected that by the year 2000, the population will be more than seventy million persons. However, agriculture still occupies a unique situation in the Egyptian economy but unfortunately with relatively low productivity. Accordingly, the Egyptian government is continuously trying to increase such productivity for old cultivable areas as well as reclaiming about 2.8 million feddan by the start of the new century. This has been thought to be performed through several means one of which is the efficient use of relatively high rates of fertilizers. Consumption use in Egypt is expected to rise from 6.9 million tons in 1990 to more than 8.2 million tons at the end of this century.

The agronomic use efficiency of water-soluble nitrogenous fertilizer materials such as urea and ammonium nitrate may be low because of their loss through leaching, volatilization, decomposition and luxury consumption particularly under conditions of heavy application; such losses may vary from 10% under good field conditions to 75% under the adverse conditions.

To overcome the disadvantages mentioned above, attempts to achieve control dissolution of soluble fertilizers have been made using delayed release materials. Fertilizers that release plant nutrients relatively slowly throughout the growing season or even several successive seasons continue to attract the attention of both scientists and technologists.

The aim of this research work is to evaluate certain slow-release fertilizers applied to increase the fertility status of certain Egyptian soils and consequently increasing their agricultural productivity. In addition, trials to produce local slow-release fertilizers using both synthetic and natural materials are performed.