PERFORMANCE OF SELF PROPELLER LIQUID AND ORGANIC FERTILIZERS MACHINE FOR SMALL HOLDING

By

MAHMOUD AHMED IBRAHIM EL-ATTAR

A thesis submitted in partial fulfillment

of

the requirement for the degree of

DOCTOR OF PHILOSOPHY

In

Agricultural Science

(Agricultural Mechanization)

Department of Agricultural Mechanization

Faculty of Agriculture

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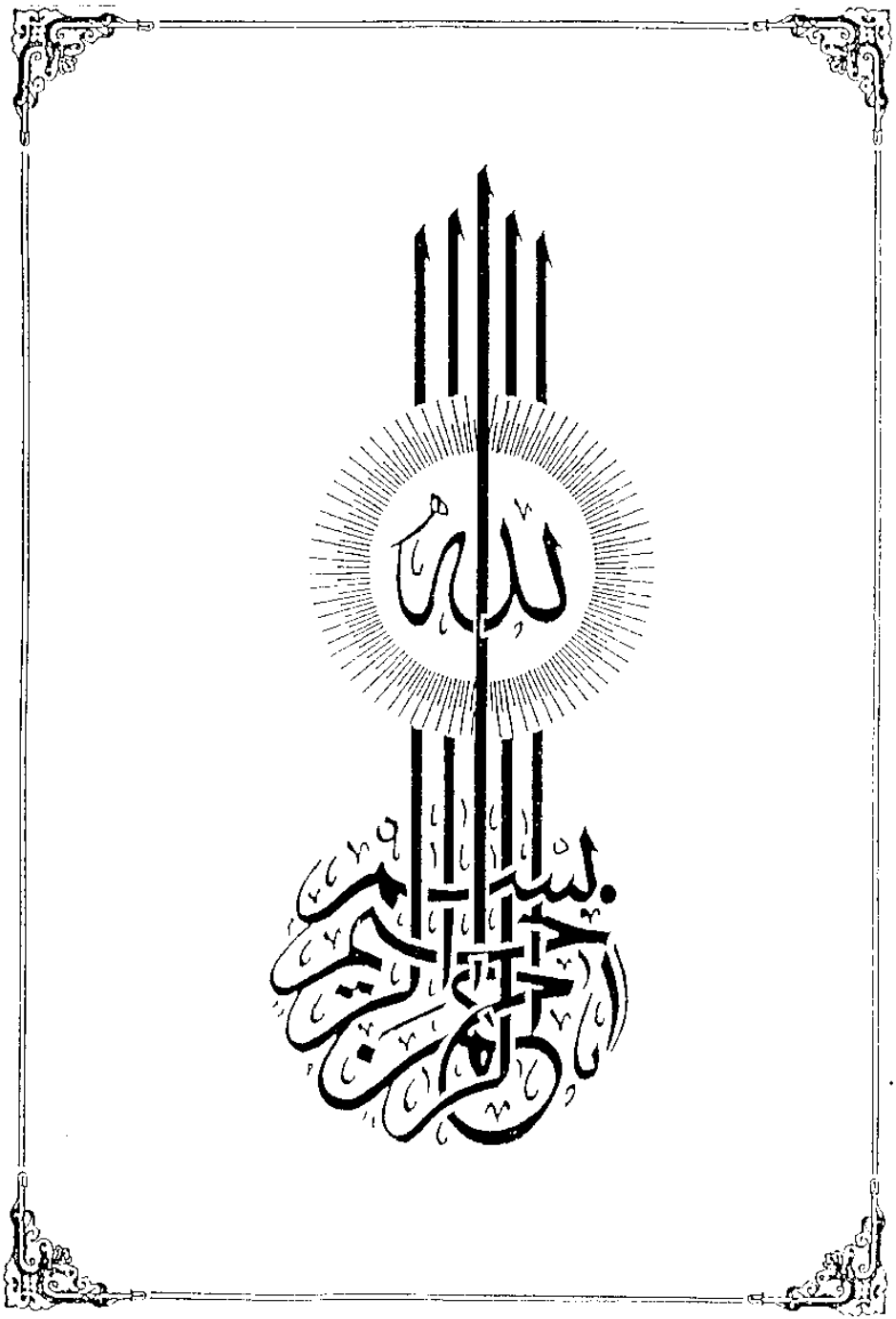

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ABSTRACT

The study was run on designed and built self propeller liquid and organic fertilizers machine for small holding. It included measurements on; weight and its distribution, field capacity, fuel consumption, nitrogen distribution in soil, energy, rolling resistance and traction. The primary components of this machine were :1) power tiller (14 Hp-diesel fuel). 2) a one-axial compost spreader. 3) device mix the compost with the soil. 4) injection unit. The performance of this machine was evaluated in the field by carrying out a comparative study of the under-surface application (10 cm below soil surface) versus on-surface application method. Nitrogen

sources used were liquid urea, liquid ammonium nitrate, solid urea, solid ammonium nitrate and compost. Nitrogen rates used 50, 100, 150 kg N/ feddan.

The results of field experiments showed that the injecting liquid urea and liquid ammonium nitrate using the machine increased the grain and stover yields of maize by about 14% and 10% over the surface application of solid urea and solid ammonium nitrate. The results also revealed that there was an increase in maize grains and stover with increasing nitrogen level. The maximum grain and stover yields of maize was obtained with nitrogen rate 100 kg N/feddan.

KEY WORDS

Mechanical application : Infection pressure N/Cm^2.
Machine speed Km/h.
Discharge liquid fertilizer Lit/min.
Discharge Compost m^3/min.

Fertilizer application : Liquid Urea.
Liquid ammonium nitrate.
Solid urea.
Solid ammonium nitrate.
Compost.

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