COMPATIBILITY BETWEEN SOME AGRICULTURAL FERTILIZERS AND HERBICIDES IN WHEAT PLANTATIONS, WITH SPECIAL REFERENCE TO THEIR ENVIRONMENTAL EFFECTS.

Presented by

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B. Sc (Botany and Chemistery)

Ain Shams University

M. Sc. In Biological Science.

A Thesis Submitted in Partial Fulfillment

Of

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In

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ABSTRACT

The extensive use of pesticides is coincided with an increase of its residue effect on environmental elements such as water, soil, crops, food products, animal and humans. So, this study aimed to investigate the persistence of Clodinafop-propargyl, Isoproturon and Diclofop-methyl when mixed with nitrogen fertilizer in soil planted with wheat plants. Also, the effects of different storage temperature on the stability of chemical and physical properties of the tested herbicides under field conditions and according to FAO specifications were studied.

The results of the present work can be summarized as follows:

1- Degradation of clodinafop-propargyl when mixed with N-fertilizer was occurred faster in field. After 120 days of treatment the residues of this herbicide when used at the recommended rate and mixed with nitrogen fertilizer at 75, 40 and 40 kg/Fed were not detected in wheat plants.

2- The residues of isoproturon and diclofop-methyl when mixed with-N fertilizers were not detected in soil and in wheat plants after 150 days from application.

3- The active ingredient % of each of the studied herbicides was affected by storage temperature degree and long storage periods for 360 days in sunny and in dark places.

4- Diclofop-methyl was more stable when exposed to direct sunlight and in dark place at room temperature when stored for 360 days.

5- pH of clodinafop-propargyl and diclofop-methyl were also affected by storage temperature and duration of exposure period when were stored in sunny and in dark places for 360 days.

6-The suspensibility % tests emulsion stability and re-emulsification test for the two tested pesticides formulations were passed successfully in sunny and dark places after 360 days from storage.

7-The wet sieve test and the wetting of clodinafop-propargyl formulation without stirring during storage were passed successfully through 360 days storage in direct sunlight and in dark places.

8-Clodinafop-propargyl, isoproturon and diclofop-methyl formulation were failed through steady foam test at the experimental conditions for 360 days storage.

9-The active ingredient % of clodinafop-propargyl and Isoproturon were influenced by temperature and period of exposure when stored at 54ºC for 14 days. While, diclofop- methyl herbicide was more stable under the same storage conditions.

10-pH values were gradually decreased by storage when clodinafop propargyl and isoproturon formulations stored for 14 days at 54 ºC. Also, pH range for diclofop-methyl herbicide was more stable through the same storage conditions.

11-The suspensibility test of the two studied herbicides was passed successfully through when stored for 14 days at 54 ºC

12-The emulsion stability and re-emulsification of diclofop-methyl formation and when mixed with N-fertilizer were not affected with storage at elevated temperature or at low heat degrees at zero ºC and 54 ºC for 7 and 14 days.

13-The formulated clodinafop-propargyl herbicide was completely wetted within one minute without swirling before one day of storage for 14 days storage at54 ºC.

14-The spontaneity of dispersion % of isoproturon herbicide was not affected by period of storage and passed successfully through storage for 14 days at 54 ºC.

15-Physical properties of the three tested herbicide formulations were passed successfully when mixed with nitrogen fertilizer at the recommended rates under storage for 14 days at 54 ºC.

I - INTRODUCTION

The extensive use of crop-protection chemicals to reduce crop losses by weeds, insects and diseases is an integral part of modern sustainable agriculture. Exposure to pesticides causing serious environmental problems. These chemicals could be a source of hazards to humans and animals for their presence every where in soil, drinking water, natural products, air, vegetables, fruits and foodstuffs. The use of pesticides provides unquestionable benefits in increasing agricultural production. Therefore, the importance of providing data about the side-effects of these chemicals on the environmental elements is of great concern and demands. Pesticides after application on crops should be followed by waiting period from last treatment and harvest to insure that their residues are below the tolerance levels before marketing. It has drawback of pesticide residues which remain on fruits and vegetables constituting a potential risk to consumers.

The fate and behaviour of herbicides in the soil are influenced by many factors, including soil properties, & management, application methods, herbicide properties, landscapes, cultivated crops and climatic conditions. Also, accumulation of herbicides in ground water is affected by physical, chemical and biological mechanisms **(Ramesh and Balasubramanian, 1999).** Thus, in order to minimize the risk of herbicides contamination in the environment, laboratory studies on sorption and leaching of herbicides in soils have provided much useful information. But, laboratory experiments cannot simulate field conditions. The results obtained from laboratory studies can differ greatly from the results found in field studies due to many variables **(Ying and Williams, 2000).**