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DEGRADATION OF PHENYL UREA IN SOIL

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ABSTRACT

Chemicals decompose with different rates at different temperatures and moisture contents. With increasing moisture content and temperature the chemicals decompose more easily and quickly. Degradation of ^{14}C - Phenyl Urea was investigated at 3 different moisture contents (5 %, 10 %, 15 %) and 3 temperatures. (5°C, 10°C, 25°C). Decomposition is the highest at 25°C and 15 % moisture content.

ÖZET

Kimyasaal maddeler farklı sıcaklık ve nem miktarında, farklı hızlarda bozunmaya uğrarlar. Nem miktarı ve sıcaklık artışıyla orantılı olarak ilaçlar daha kolay ve çabuk bozunurlar. ^{14}C - Fenil Üre'nin 3 farklı nem miktarı (% 5, % 10, % 15) ve 3 farklı sıcaklıktaki (5°C, 15°C, 25°C), bozunma hızları araştırılmış ve bozunmanın 25°C sıcaklık ve % 15 nem miktarında en fazla olduğu bulunmuştur.

INTRODUCTION

Many pesticides are used to increase the food production in recent years. After application of the pesticides to soil they begin to degrade related to their chemical structure, formula, environmental effects, moisture content and temperature.

Some pesticides like organochlorine insecticides are very persistent and toxic and they stay in the soil for a long time without degradation and causing environmental problems. Others like urea herbicides degrade more rapidiy in the soil and do not cause much environmental problems.

Two main types of degradation occur in soil are chemical and microbiological. Chemical transformations in soil are widespread phenomena. There is always the possibility that any given reaction in soil is chemical rather than biological. The probable chemical recations in soil are hydrolyses and oxidations.

Chemicals decompose with different rates at different moisture contents and temperatures. With increasing moisture concent and temperature the chemicals decompose more easily and quickly.

Degradation of ^{14}C - Phenyl Urea was investigated at 3 different moisture contents (5 %, 10 %, 15 %) and 3 temperatures (5°C, 15°C, 25°C).

EXPERIMENT

20 g of soil was weighed into a vial, ^{14}C - Phenyl Urea solution (1 ml = 0.2 μ ci) was added to dry soil, mixed and required water for different mointure contents (5 %, 10 %, 15 %) was added and left at the temperatures (5°C, 15°C, 25°C) that was needed for the experiment. Two samples from each moisture content and temperature were taken to be analysed at intervals.

The samples that were taken from each temperature and moisture content were extracted with 40 ml of Acetone, shaken for two hours at the orbitary shaker. 20 ml. supertanants were taken, evaporated to dryness, 10 ml. coctail B was added and counted at Liquid Scintillation Counter (Beckman LS 250)

RESULTS AND CONCLUSION

Degradation results of ^{14}C - Phenly Urea at (5 %, 10 %, 15 %) moisture contents and at (5°C, 15°C, 25°C) are given at the tables — 1, 2, 3.

TABLE — 1. Degradation at 5 % moisture content.
(Total 14 C activity = 100)

Reaction Time (weeks)	5°C	15°C	25°C
2	21	35	35
3	30	51	61
4	34	58	63
6	36	63	70
8	37	62	68

TABLE — 2. Degradation at % 10 moisture content.
(Total 14 C activity = 100)

Reaction Time (weeks)	5°C	15°C	25°C
2	22	25	47
3	23	38	68
4	28	50	77
6	38	55	87
8	40	56	90

TABLE — 3. Degradation at % 15 moisture content
(Total 14 C activity = 100)

Reaction Time (weeks)	5°C	15°C	25°C
2	21	25	59
3	30	32	81
4	30	33	91
6	38	58	96
8	40	59	97

$^{14}CO_2$ evolution of Phenyl Urea was also studied. In a closed system the soil was incubated with ^{14}C - Phenyl Urea at 25°C and released $^{14}CO_2$ was collected at 0.25 ml. 25 % TEAH + 1.5 ml H_2O. Total ^{14}C activity was measured at the Liquid Scintillation Counter. (Beckman LS 250)

Results are given in Fi. 1.

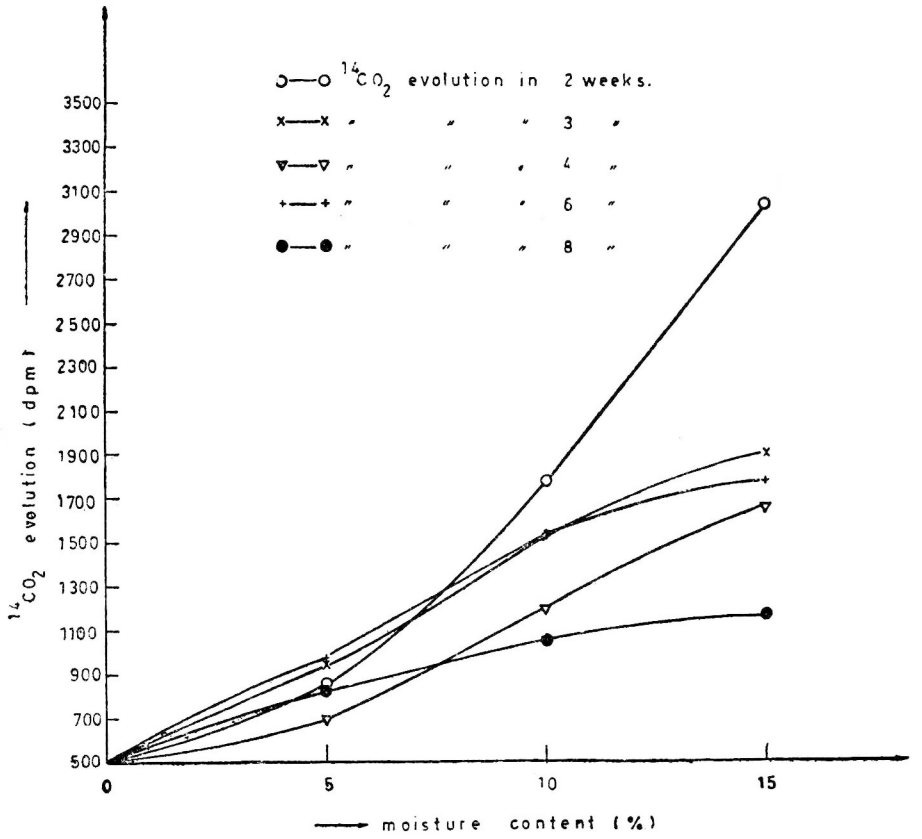

Fig. 1. $^{14}CO_2$ evolution of ^{14}C - Phenyl Urea at 25°C.

With increasing moisture content and temperature Phenly Urea decomposed more quickly and easily. It can be seen from the results that decomposition is the highest at 25°C and 15 % moisture content.

$^{14}CO_2$ is also released most at 15 % moisture content and 25°C.

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