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# Effect Of Microwave Rays On Biological Aspects Of Khapra Beetle *Trogoderma granirium* In Lab.

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**ABSTRACT**

In experiment Lab. Doing in AL sweera technical insect waist in year 2018 to know the effect of microwave ray on biological aspects of Khapra beetle *Trogoderma granirium* in three level of energy , the high test mortality of eggs was 100% in time 90 second in 720 watt. The mortality of larvae was 82.2% in 90 second of energy level 420 watt and 100% at 720 watt of 90 second of treatment. The pupa mortality was 55.0 , 87.8 , 100% at energy level 220,420,720 watt respectively of time 90 seconds. Adults mortality was 48.4, 90.0, 100% at 90 seconds of treatment in level energy 220,420.720 watt respectively

**Keywords:** microwave, khapra beetle, Trogoderma granirium.

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## INTRODUCTION

The Khapra beetle *Trogoderma granirium* one of the most dangerous and important pest ,it consider one of primary pests of wheat in storage , it damage the seeds and other material storage (AL-Iraqi et. At .1993) .the khapera beetle on of the more dangerous insect storage ,because its more damage of any insects in the world (Low,et.at .2000). the damage causes from larvae espicaley largest age the infection to cereal seed caused damage to it and eat all content of seed and larvae the shell of seeds only (Mahammaed et.at 2010) .the human used many methods to control the pests chemical methods used pesticides and fumigants for many years ago but the insect , consist resistance for these chemical ,so we suggest to use physical methods like microwave ray to control these insect in Iraq and microwave means small wave and it have magnetic field and it was mon ionizeal , this methods don't leave residue on food material and it was effect on seeds. So we suggest these wave to control khapra beetle in Lab .

## MATERIALS AND METHODS

The khpra beetle reared on wheat seed variety Abu-chriab , and constants temperature in incubator under 35±2C and 70±5% R.H. in glasses jars capacity 800 gm covered his opening moselin cloth to ventriaion . and the microwave system was Panasonic electric in frequency 2450 (MHZ) and energy 1500 watt . we used three level of energy 280,420,720 watt and three period of treatment 30,60,90nseconds for each level of energy and for egg, larva 3$^{rd}$ instar pupa and adults .used glass petri dish 9 cm diameter three replicate each petri dish has 10 induvial (egg, Larvae ,pupa ,adults) treated with three Level af energy for three time. After treatment each one put in incubators at 28± 2C and R.H. 70±5% and record mortality percentage from 12 hours after treatment to complete life spine for each instar. The experimental analysis CRD using SAS program 2012 and L.S.D>0.05.

## RESULTS AND DISCUSSION

Table (1) shows that .mortality of eggs treated with microwave rag was 62.0, 75.3 and 100% in energy Level 220,420,720.watt respectively in time 90 seconds .And the adults emergence from treated eggs was 39.0, 25.6,100% and 98.7%.in energy Level 220,240,720 and control re respectively also in exposure period 90 seconds.

Kirkpatrik (1974) found the microwave rag effect in hatching percentage of eggs of *callsobruchus maculatus* and increase energy level and exposure time increase mortality of eggs. The eggs of insects is more sensitive to microwave ray ,and increasing energy level and exposure time mean increasing mortality of eggs because conations dividing egg cells and evaporate humidity of eggs (Heler 1970). Zaid (2002) refers that energy level 491 watt and 40 second exposure time enough to prevent hatching eggs of *sitophilus granaries* and egg mortality was 100% .

**Table 1: Effect of microwave rays on eggs of *T.granarium* .**

| Larvae emergence % | Mortality % | Exposure period (second) | Energy level (watt) |
|---|---|---|---|
| 67.5 | 35.3 | 30 | 220 |
| 58.1 | 44.4 | 60 | |
| 39.0 | 62.0 | 90 | |
| | | 5.8 | L.S.D>0.05 |
| 50.0 | 52.0 | 30 | 420 |
| 38.1 | 63.0 | 60 | |
| 25.6 | 75.3 | 90 | |
| | | 4.5 | L.S.D>0.05 |
| 19.1 | 81.1 | 30 | 720 |
| 8.0 | 92.1 | 60 | |
| 100 | 100 | 90 | |
| | | 4.3 | L.S.D>0.05 |
| 98.7 | 1.3 | 0 | Control |

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The effect of microwave ray on 3rd larval instar in table (2) the mortality was 52.2,82.2 ,100% in exposure time 90 seconds .and energy level 220,420,720 watt .and the adults emergence from treated larvae was 40.3 ,15.0,0.0 adult in exposure time 90 seconds and level energy 220,420,and 720 watt. While in control was 100%

Nahar et.at(2015) says that microwave ray can killed different stage of *Ephestia cautella* and effected increase with energy level the mortality was 100%in 600,800 watt and exposure time was 60 seconds .Zaho (2007) treated *sitophilus orizae* with microwave ray in energy level 0.017 k watt and temperature 55 C the mortality was 100% to larvae and adults .also major and bedi (1992)was found that mortality increased with exposure time of microwave ray when treated larvae of *R.dominica* .

**Table 2: Mortality of microwave rays on 3rd stage of larva *T.granarium* .**

| Adult emergence % | Pupa emergence % | Larva Mortality % | Exposure period (second) | Energy level (watt) |
|---|---|---|---|---|
| 67.0 | 74.3 | 25.5 | 30 | 220 |
| 50.6 | 61.1 | 37.6 | 60 | |
| 40.3 | 50.0 | 52.2 | 90 | |
| | | | 5.7 | L.S.D>0.05 |
| 50.0 | 61.0 | 39.0 | 30 | 420 |
| 32.1 | 52.0 | 48.1 | 60 | |
| 15.0 | 18.1 | 82.2 | 90 | |
| | | | 5.0 | L.S.D>0.05 |
| 20.3 | 31.1 | 69.0 | 30 | 720 |
| 0.0 | 9.2 | 91.2 | 60 | |
| 0.0 | 0.0 | 100 | 90 | |
| | | | 4.3 | L.S.D>0.05 |
| 100 | 100 | 0.00 | 0 | Control |

Table (3) show that in level 220 watt not effective on pupa mortality if was zero and adult emergence was100% in 30 second. While in creasing of energy level and exposure time increase pupa mortality 55.0 ,87.8 and 100% in 90 second and 220, 420 ,720 watt . in 720 watt the emergence of adult from treated pupa was 21.0 , 6.6 and zero % in 30 , 60 and 90 second. Heller (1970) refer to microwave ray effect on dividing sexual cells in stage of formation then the pupa more sensitive to microwave ray because its inhibition Somatic cell dividing then the pupa die before when reach adult stage .Salin (2015) say when treated pupa of *R.dominca* in microwave ray at 700 watt and 90 second exposure time .mortality was 100%for pupa stage of time pests .

**Table 3: Mortality of pupa *T.granarium* treated with microwave ray .**

| Adult emergence % | Pupa emergence % | Exposure period (second) | Energy level (watt) |
|---|---|---|---|
| 100.0 | 0.0 | 30 | 220 |
| 67.0 | 33.0 | 60 | |
| 45.0 | 55.0 | 90 | |
| | | 8.0 | L.S.D>0.05 |
| 65.0 | 35.0 | 30 | 420 |
| 40.0 | 60.0 | 60 | |
| 13.0 | 878 | 90 | |
| | | 5.3 | L.S.D>0.05 |
| 21.0 | 79.0 | 30 | 720 |
| 6.6 | 93.3 | 60 | |
| 0.0 | 100 | 90 | |
| | | 4.0 | L.S.D>0.05 |
| 100 | 0 | 0 | Control |

Table (4) show the effect of microwave ray on adult at *T.granarium* the mortality was 48.4 , 90.0 and 100% in three level energy 220 , 420 and 720 watt in 90 second of exposure while the normal mortality was 4.2% in control treatment . Ismail (2008) used three level energy of microwave ray 260 ,560, 760 watt for 1 , 1.5 and 2 mint on khpra beetle *T.granerium* the mortality was 100 % in height level of energy 760 watt while 99.6% for 560 watt and 10.9 % for 260 watt . Casagrande (2001) say that increase of level energy and exposure time or both of them increase mortality of *Tribolium confusum* we used microwave ray .

**Table 4: Effect of microwave ray on adults of *T.granarium* .**

| Adult emergence % | Exposure period (second) | Energy level (watt) |
|---|---|---|
| 37.1 | 30 | 220 |
| 45.0 | 60 | |
| 48.8 | 90 | |
| | 5.0 | L.S.D>0.05 |
| 40.0 | 30 | 420 |
| 60.0 | 60 | |
| 90.0 | 90 | |
| | 5.0 | L.S.D>0.05 |
| 70.0 | 30 | 720 |
| 85.0 | 60 | |
| 100 | 90 | |
| | 4.1 | L.S.D>0.05 |
| 4.3 | 0 | Control |

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