The Possibility of using *Haplophyllum tuberculatum* (Forssk.)A.Juss, Extracts as a Herbicide

By

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((The Possibility of using Haplophyllum tuberculatum (Forssk.) A. Juss, Extracts as Herbicide))

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Dedication

TO MYFAMILY

AND MYFRINDS

Acknowledgment

I am grateful to my teacher

Dr. Mohamed Al drawi

Who teach ; Supervise and guide me during training period .

I am sincerely thankful and grateful to Mr. Othman Abu Aisha for their help and continuous encouragement.

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Abstract

Natural products of plants offer a vast array of secondary compounds with biological activity, including phytotoxicity. Many of these compounds have the potential to be used directly as herbicides or as structural leads for new synthetic herbicides.

Many studies have focused on production from plant products or syntheses chemicals that impasse allelopathic influences are called allelochemical.

From the results which obtained throughout this investigation which carried out to investigate the possibility of using *Haplophyllum tuberculatam* extracts as a herbreids.

Aqueous extract of *H. tuberculatum* parts were tested for allelopathy activity using some species of plants. The 12.5, 25, 50, 100, and 200gram/liter of Dist. water treatments of extract killed the some seedling, at 50, 100, 200gram/liter.

The effect of water extracts of different plant parts (flower, leaf and root) at different concentration (12.5, 25, 50, 100 and 200 mg/ml) on germination percentage from some species in these results showed that, the leaf extract and flower extract were superior to root extract.

The effect of *H.tuberculatum* extracts fractionated by different solvents (hexane, chlorophorm and ethylacetet) from ethanol extract has strong inhibitory effect against seed germination, and its aggregates in ethylacetet fraction and chlorophorm fraction, respectively, was at concentration of 0.05mg/ml.

The other fractions namely hexane fraction and aqueous fraction proved to be unsuitable sources for allelochemicals that inhibit growth of tested species.

Chapter (1)
Introduction

INTRODUCTION

Due to increase in the number of herbicide-resistant weeds and environmental concerns in the use of synthetic herbicides, there have been considerable efforts in designing alternative weed management strategies. The conventional synthetic herbicides are becoming less and less effective against the resistant weed biotypes (Bhowmik and Inderjit, 2003).

During the last decades scientists have experienced a growing interest in organic farming partly about environmental degradation and contamination of soil and water especially by chemical products as herbicides.

The problem today is that crop production has based on the use of herbicides and fertilizers (Fogelberg, 2001). Theses chemicals cause several human diseases and many organisms especially weeds develop genetic resistance to herbicides. An earlier reports concerning reduction or elimination of agrochemicals in farming was published in 1997 (Anonymous, 1997) The aim of this project was to produce a system to

control weeds in small grain cereal crops in northern Europe using significantly reduced of herbicides by precise targeted application and, a system to control weeds in salad and vegetable row crops using a precise non – chemical method.

Based on the findings in recent literature and the current research trends, we listed many point aims necessary to demonstrate allelopathy effects of *Haplophyllum tuberculatum* to other weeds. The objective of this bioassay research is to examine the role of allelopathic effects of Haplophyllum tuberculatum extracts on other plants particularly some weed species which may used in natural weed management.

Although we cannot eliminate the use of herbicides, their use can be reduced by exploiting allelopathy as an alternate weed management tool for crop production against weeds.

The objectives in detailed are to:

1- Study the effect of *Haplophyllum tuberculatum* extracts on germination of some weeds by using of different extraction method and different solvents.

2- Study the effect of different concentration of *H. tuberculatum* extracts on germination of some weeds.

3- Study the effect of *H. tuberculatum* Leaf, flower and root extracts at different concentrations on germination of some weeds.

4- Study the effect of fractionated extracts from Hull ethanol extract of *H. tuberculatum* at different concentrations on germination of some weeds.(germination percentage, dry & wet weight, and length of radical & shoot) .

Chapter (2)
Literature Review

LITERATURE REVIEW

Allelopathy is a chemical interaction between plants (Microbes and higher plant) direct or indirect (harmful or beneficial) that includes stimulatory as well as inhibitory influences (Molisch, 1937). It was later defined as effect of plants, including microbes, on other plants through the release and escape of chemicals into the environment (Rice, 1984). It is essentially a chemical process used by plants to keep other plants out of their space. Contemporary researchers have tended to broaden the context of allelopathy to include interactions between plants, and higher animals, suggesting that allelopathy may be part of chemical communication between plants, and between plants and other organisms, and that such communication may contribute to plant defense . In contrast, phytotoxicity is defined as a chemical that is toxic to plant growth whether it is derived from plant products or synthetics (herbicide or other pesticide residues) Chemicals that impose allelopathic influences are called allelochemicals or allelochemics.

They may be largely classified as secondary plant metabolites, which are generally considered to be those compounds (such as alkaloids, phenolics, flavonoids, terpenoids and glycosides) which do not play a role in primary metabolic processes essential for a plants survival, and are produced as offshoots of primary metabolic pathways. Allelochemics are present in

virtually all plant tissues, including leaves, flowers, fruits, stems, roots, rhizomes, seeds and pollen.

Natural products of plants offer a vast array of secondary compounds with biological activity, including phytotoxicity .Many of these compounds have the potential to be used directly as herbicides or as structural leads for new synthetic herbicides. Although natural compounds have made a large impact in the insecticide area, relatively few successes have been obtained with these compounds as herbicides. The most notable success is that of glycosides.

Use of natural products in a herbicide discovery strategy has been hindered by several problems. The number of options that must be considered in discovery and development of a natural product as a herbicide is larger than for a synthetic herbicide (Duke and Lydn, 1993).

Allelopathic materials have been proved to be effective, targeted, and rapidly dissipated or destroyed in the environment. They influence nematodes, fungi, bacteria, insects, and mites, as well as weeds (Hartmann and Nezadal,1990)

Allelochemicals might be used to induce ecological changes that would positively influence beneficial organisms and interfere with pests.

Commonly, cited effects of allelopathy include reduced seed germination and seedling growth. Like synthetic herbicides, there is no common mode of action or physiological target site for all allelochemicals. However, known sites of action for some allelochemicals include cell division, pollen germination, nutrient uptake, photosynthesis, and specific enzyme function. Allelopathic chemicals can also persist in soil, affecting both neighboring plants as well as those planted in succession. Although derived from plants, allelochemicals may be more biodegradable than traditional herbicides but may also have undesirable affects on non-target species, necessitating ecological studies before widespread use. Selective activity of tree allelochemicals on crops and other plants has also been reported. For example, *Leucaena leucocephala,* the miracle tree promoted for re-vegetation, soil and water conservation and animal improvements in India, also contains a toxic, non-protein amino acid in leaves and foliage that inhibits the growth of other trees but not its own seedlings. *Leucaena* species have also been shown to reduce the yield of wheat but increase the yield of rice. Leachates of the chaste tree or box elder can retard the growth of pangola grass but stimulate growth of bluestem, another pasture grass (Ferguson and Rathinsabapathi, 2003)

Allelochemical concentrations in the producer plant may also vary over time and in the plant tissue produced. Foliar and leaf litter leachates of

Eucalyptus species, for example, are more toxic than bark leachates to some food crops (Ferguson and Rathinsabapathi, 2003).

Aqueous extracts of (*Miscanthus transmorrisonensis)* plant parts with two ecotypes were bioassayed. The extracts showed significant phytotoxic effects on seed germination and radical growth of four tested plants (Chou and Lee, 1991) Poor emergence of commercially grown lettuce has been observably when planted immediately after the Celery crop, Celery residues possess allelopathic potential to developing lettuce seedlings Celery tissue type and concentration, soil type, incubation of celery root residue in soil, and addition of activated the magnitude of the observed phytotoxicity (Shilling et *al.*, 1992).

Field and laboratory studies were conducted to examine the differential phytotoxicity of residues of *Artemisia princes var.orientalis* Wormwoodusing various plants as test species. In seedling growth tests with abandoned field soils (control) and soil underneath Wormwood plants (test), the elongation dry weight, and caloric content of seedlings grown in the soy from under Wormwood plats were severely inhibited, thereby suggesting that certain inhibitor remained in the soil (Yun and Kil, 1992, Inderjit, 2001) Find to exert phytotoxic on other plant species, chemicals may have to move to the roots of the target plant through the soil. However during movement, biotic (physical and chemical) barriers can limit the phytotoxicity of chemicals in

terms of quality and quantity required to cause injury. Organic matter reactive mineral surfaces, ion exchange capacity, inorganic ions, and biotic and biotic factors of soil environment significantly influence allechemical activity.

The phytotoxic nature of Wheat (*Triticum aestivum* L.) Straw leachate Possible involvement of organic molecules in the growth inhibition of perennial ryegrass (*Lolium perenmel*) (Al-Hamdi *et al.*, 2001). Phtotoxicity decreased when subjected to temperature above 70 °C. (Chou and Leu, 1992).

Early studies in which the authors dug into the soil where plants in the proximity of walnuts were dead or stunted found plant root contact with walnut roots. Potatoes, alfalfa, tomatoes and apple trees were sensitive to contact with Walnut root (Massey, 1925; Schneiderhan 1926).

Subsequent experiments showed that aqueous extract decaying residues, and root exudates of *Euphorbia prostrata* L. were inhibitory to most of the test species including *Cynodon dactylon* (L.) Pers (Alsaadawi et al., 1990).

Aqueous lixiviates and organic extracts of Ipomoea tricolor inhibited the radical growth of *Amaranthus leucocarpus* and *Echinochloa crusgalli* (Dikic, 1999).

Bioactivity-guided fractionation of the isolation of the allelopathic principles, the most inhibitory effects were induced by ethyl acetate and chloroform extract (Anaya et al.,1990).

The Alfalfa root (*Medicago sativa* L.) residue is toxic to Cucumber (*Cucumi sativus* L.) seed germination and seedling growth (Ells and Mcsay 1991), the extracts of both the leaves and roots plus rhizomes of *Nupharlutea* L. were strongly inhibitory to lettuce (*Lemna minor* L.) seedling growth (Elakovich and Wooten, 1991).

Dry weight of some plants was slightly increased at lower concentrations of the aqueous exiracts of mature leaf, stem and root of Wormwood plants (*Artemisia princeps var. orientalis*) whereas it was proportionally inhibited at higher concentrations. Kil and yun, 1992 find the ability of *Delonix regia* to controlled for adjacent grassland. The aqueous extract of *D. regia* on two local understudy species (*Isachne nippone* and *Centella asiatica*) inhibited growth of both species more than 70 % (Chou and Leu 1992).

The potential allelopathic activity of Devils claw (Proboscidea *louisianica* (Mill) Thellung) essential oil and a few of the compounds it contains on the elongation of Cotton (*Gossypium hirsutum L.*) and Wheat (*triticum aestivum*

L.) Ether extracts of the steam distillates from fresh Devils claw were inhibitory to Cotton and Wheat radical elongation (Riffe *et al*, 1990).

Grace, and Tillman, (1990) pointed out that there are some fallacies in the analogy, such as the inability of a chemical to reproduce once it has entered the organism.

From study the effect of seven different plant residues on different weed plants under field conditions. Same plant residues reduced plant growth similar to glyophosate and in the long run, they were significantly better than glyophosate (Al-Juboory and Ahmed, 1994).

Allelochemicals are often secondary metabolites and not necessarily produced for competition (Berenbaum, 1995).

Hull extract from 91cultivated rice cultivars (*Oryza sativa* L.) may be a source of natural herbicide, and warm water may extract more allelochemicals than hot water there may be genetic differences among rice cultivars for allelopathic potential on barnyard grass (*Echinochloa Crusgallip*. Beauv .Var .oryzicala ohwi) (Ahn and Chung, 2000).

Showed that white (*Cardaria draa* L. Desr.) and syrian saye (*Salvia syriaaca* L.) are of great allelopathic potential against different vegtable crops; onion, and tomato being the most sensitive crops when added or

released foliage leachates or root exudates of both weed species into soil mixture allehemical activity (Qasem, 2001).

The allelopathic effect of rice (*Oryza sativa* L.) on lettuce (*Lactuca sativa* L.) and ducksalad (*Heteranthera limosa*(Sw.)willd.) was investigated with water soluble extracts (Ebana et al., 2001).

Used the legumes as biological tools in agriculture to control weed that by producing the largest weed biomass reduction (68%) (Caamal – Maldonado *et al.*, 2001).

Inderjit and Weiner, 2001 thought that the strict criteria laid out for establishing a case of allelopathy were more onerous than for other ecological phenomena.

Despite the reluctance of ecologists to work with suspected allelopathic plants, investigators in agronomy, horticulture and forestry were undeterred (Horsley, 1977; Fisher, 1980; Menges, 1988; Inderjit *et al.*, 1996; and Qasem and Foy, 2001). At a minimum, the procedure used to determine potential allelopathy consisted of a bioassay of seed germination rate and radical from the suspected allelopathic plant. Often there were additional studies involving greenhouse applications of leachates to growing plants and bioassays of other species in the system in which the suspected allopath grew. However, field studies were rare and some studies never involved soil in any portion of the

experiment. These studies were designed as a preliminary selection for plants that could be producing allelochemicals.The bioassays were quick and relatively inexpensive and therefore useful in searching for potential allelochemicals or potentially allelopathic plants, but not effective in demonstrating that allelopathy was occurring in the field. Meanwhile, studies expanded to include the role of the soil community interactions with allelochemicals. These studies recognized that allelopathic plants can act both directly and indirectly on their neighbors. The most direct effect occurs through root contact where the chemical exuded into the rhizosphere of one plant can affect the other before it is degraded into other chemicals. Another, slightly more indirect way occurs when a modified chemical exudates affects another plant. Finally, the most indirect way in which an allelochemical can have its impact on a plant is by modification of the soil ecosystem. This occurs when the allelochemical affects microbial populations or nutrient availability that then has a cascading effect that interferes with the higher plant.

Mixture of *Lactuca sativa, Xanthium occidentale* and *Cirsium japonicum* extracts had more inhibitory effects on test plants (*Medicago sativa*) than each single extract treatment (Chon *et al.*, 2003).

The body parts of rice(*Oryza sativa* .L) (leaves , straw ,and hull) had the highest inhibitory on seed germination and growth of barnyard

grass (*Echinochloa crus* - gallip. Beauv.var. orycicala Ohwi) and there was a higher average inhibitory effect for straw ealnats (21 .6%) than for hulls (8.2%) and leaves (12.4%) these results suggest that rice body parts may be a source of natural herbicides and that it is necessary to develop acceptable selection standards (Chung *et al.*, 2003).

Stem number and fresh weight of Bermuda grass or Johnson grass increased with increasing interference duration, and they were greater where both weeds were grown with cotton than with corn. These results suggest that there is growth inhibition of both crops due to potential allelopathic substances released from the two perennial weeds bat cotton growth was inhibited more than corn. Further more, cotton and corn yield were reduced more by the Johnson grass interference compared with that caused by Bermuda grass (Vasilkoglon *et al.*, 2005).

In general, the grasses from its home range had an allelopathic effect on knapweed and knapweed had an allelopathic effect on native North American grasses, though there were some species variations. There were also competitive effects occurring among the species. Some studies showed that allelopathy effect on root Growth more than shoot growth (Gabor and Veatch, 1981; Chon 2003; AL- Hamdi *et al.*, 2001; Ebana et al., 2001; Chon *et al.*, 2003; Vasilakoglon *et al.*, 2005).

Studied the inhibition of seed germination by quinoline alkaloids synthesized by plants of the tropical genus (*Cinchona ledgeriana*) on (*O.americunum* L.), (*S.tenuior* L.), (*C.roseus* L.) and (*C.ledgeriana)* itself (Aerts *et al.*, 1991).

The structure alkaloids were isolated from (*Haplophyllum tubeculutm*) (Sheriha *et al.*, 1985; Sheriha *et al.*,1987; Mcphail *et al.*,1990 and Al-Rehaily *et al.*,2001). Previous allelopathic studies showed that the inhibitory activity is related to the presence in those plants of alkaloid (Anaya *et al.*, 1990; Aerts *et al.*, 1991).

The effect of sequential hexane, ethyl acetate, and aqueous methanol extracts of Regal. Sweet potato on seed germination of sweet potato (*Proso-millet*) and seven weed species was studied the aqueous methanol extract was much more inhibitory than the hexane or ethyl acetate extracts (Peterson and Harrison, 1991).

Microorganisms may detoxify the allelochemicals under some environmental conditions (Zackrisson and Nilsson 1992, Inderjit., 2001).

Chapter (3)
Materials and Methods

3. MATERIALS AND METHODS

3.1. Plant Material:

Haplophyllum tuberculatum (Forssk.)A. Juss.Figure (1). Was collected in 2004, near the Al-Sdada highway 160 km western of Sirte the plant material was identified in the herbarium of Biology Department faculty of Science, Al-Tahadi University, Sirte. Libya. Flora of Libya. The plant material was kept at the Al-Tahadi Herbarium.

3.2. Plant Description:

Haplophyllum tuberculatum. (Forssk)A. Juss: Rutaceae, Dicoat. It is a perennial herb sub woody at base 15 – 40 cm tall. Furnished with prominent glands. Crisped-hairy at least below. Leaves highly variable from sub orbicular to ovate, obviate, lanceolate to linear, sometimes 3 -sect, 2 – 4.5, 2 – 12 mm. Inflorescence lax, bracteates many flowered, in scorpoid cymes with central flower often 5 - merous; bracts usually ovate 1 – 1.2 mm sepals lanceolate to deltoid-ovate, 1:1.25×mm. glabrous to ciliate or whit lanate. Petals oblong-ovate, bright yellow, 4– 4.5 mm long. Stamens filaments free to very slightly fused below slightly fused below, abruptly dilated in the lower half. Usually villous below. Ovary segments 2-ovulate without a terminal appendage or tubercle, glabrous to pilose; style glabrous to pilose,

1.5: 2 mm long. Capsules 3-4 mm in diameter, glandular, segments usually 5, rounded above, each 1-2 seeded usually.

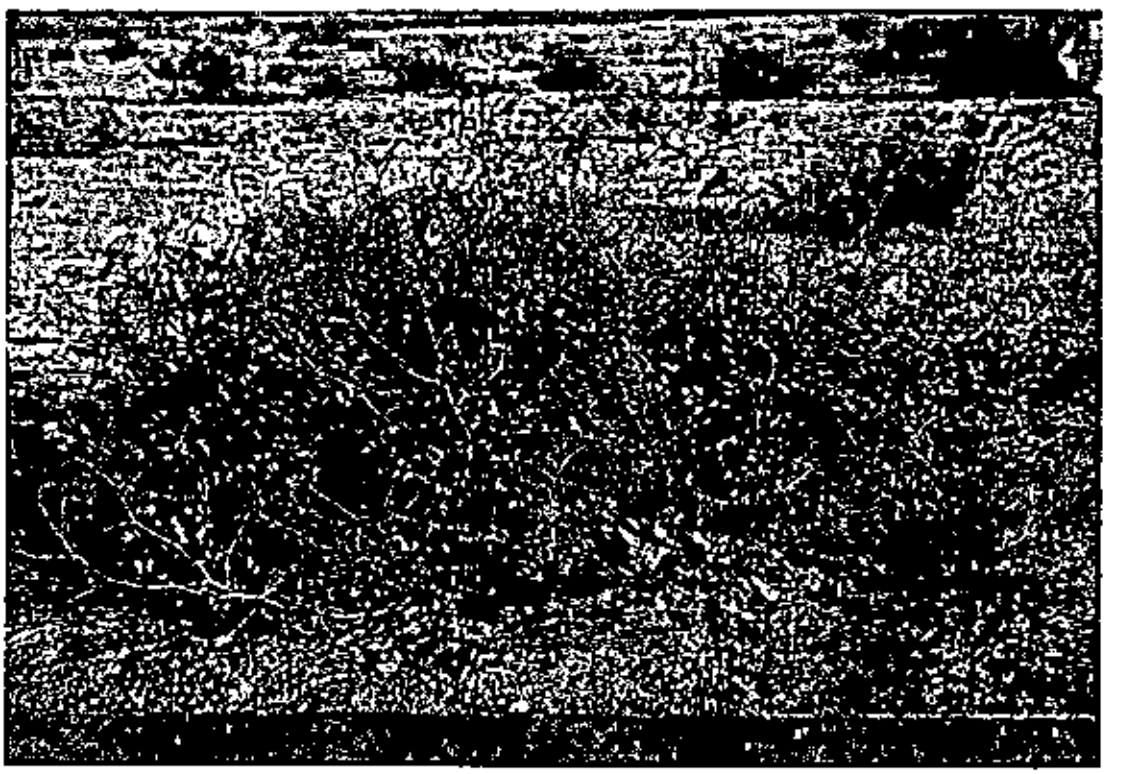


Figure (1) ***Haplophyllum tuberculatum.*** **(Forssk)A. Juss.**

3.3. Selected tested weeds:

In primary investigation were tested 8 selected weeds (Dicotyledons & Monocotyledons) were:

1 – ***Hordeum vulgare*** **L.** (Poaceae).

2 – ***Emax spinosus*** **L.** (Polygonaceae).

3 - ***Cyndon dactylon*** **(L.) Pers.** (Poaceae).

4 – ***Anagalis arvensis var.*** **caerulea (L.) Gouan.**(Primulaceae).

5 – ***Ocimum basilium*** **L.** (Lamiaceae).

6 – ***Beta valgaris ssp.*** **Macrocarpa (Guss.) Thell.** (Chenopodiaceae).

7 - ***Daucus carota ssp.*** **gummifer (Lam.) Hook.**(Apiaceae).

8 - ***Cucumis sativus*** **L.** (Cucurbitaceae).

In the last experiments (Fractionation experiments) we tested only three weeds were:

1- ***Cyndon dactylon*** **(L.) Pers.** (Poaceae).

2-***Hordeum vulgare*** **L.**(Poaceae).

3-***Cucumis sativus*** **L.**(Cucurbitaceae).

3.4. Extraction methods:

The air-dried plant parts (roots, leaves and flower) were ground by pistil and were treated by different solvents (Water, Ethanol and Methanol). Three

different types of extraction methods the extracts filtered through one layer of whattman filter paper to remove the insoluble plant parts. To prevent microorganism's growth on the extracts were filtered again through a 0.2mm Millipore sterile filtration system (Nalgene Filter).

The types of extraction methods are:

Ground Parts (roots, leaves and flower) at different weights (10 grams and 20 grams) and mixed with 1000 ml of selected solvents water or ethanol or methanol and treated by the following methods of extraction.

1.The soaked plant parts in the selected solvent at room temperature (25±2°C) for 24 h. by using of shaking then separate the extract from plant material by using filter paper whattman No.1.

2. Fractionation Procedure:

Fractionation procedure as described by Al-Gabory and Al-Rawi (1994). Fresh plant material 2000 g. were ground and soaked overnight on 10 liter of Petroleum ether (40–60) then separation the Pet. ether solvent from plant material by using filter paper Whattman No.1. and these steps was repeated two times, then soaked plant material was treated by Petroleum ether solvent

in Ethanol solvent 70% at room temp (25±2°C) after five days separation the ethanol extract From plant material by using a filter paper wahttman No.1. This step was repeated several times. The Ethanol extract were drieness by removal the Ethanol solvent by using Rotary evaporator at 30°C, the dried extract were mixed with 250ml water, and this extract were exposure to different solvents with different polarity degree to extraction of all possible compounds (fig.2).

The fractionation method described in figure (2) and the steps of Fractionation are:

Step 1. Hexane fraction:

Add hexane solvent to the water extract (v/v) in separation faunal extraction (2000 ml) and mix to separate all possible dissolved compounds in hexane solvent. Were repeated this step several times. Finely the hexane extract were evaporates in rote vapor at 15 °C to obtain the first fraction, is a (hexane).

Step 2. Chloroform fraction:

Add Chloroform solvent to water extract (v/v) obtained from last step 1. And mix in separation faunal to separate all possible dissolved compounds in

Chloroform solvent. We repeated this step several times finally the Chloroform extract were evaporated by rote-vapor at 20 °C to obtain second fraction, is (Chloroform fraction).

Step 3. Ethyl acetate fraction:

Add Ethyl acetate solvent (v/v) to water extract obtained from last step (step 2) and mix in separation faunal to separate all possible dissolved compounds in Ethyl acetate solvent by using repeated extraction by Ethyl acetate solvent, finally Ethyl acetate extract were evaporated by Rota-vapor at 30 °C to obtained the third fraction is (Ethyl acetate fraction).

Step 4. Equoes fraction (Water fraction).

The extract resulted from last step (step. 3) were dried by Rota-vapor at 50 °C to obtained Forth fraction is (Water fraction).

All fractions resulted from these Fractionation method were weighted and stored in refrigerated at - 4 °C to time of use.

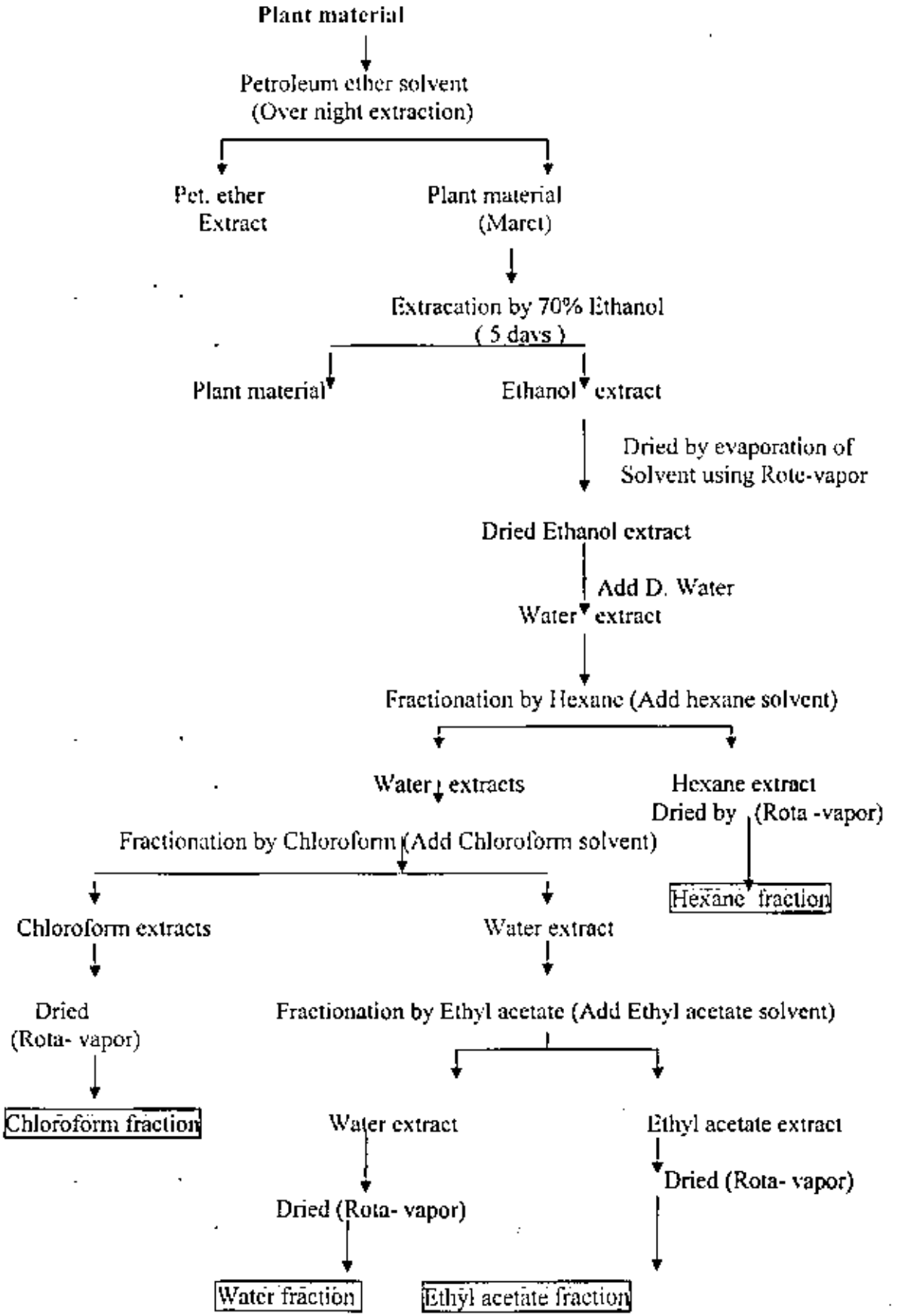


Figure (2) Steps of fractionation procedure.

3.5. Phytogrowth Inhibitory:

Phytogrowth Inhibitory activities of *Haplophyllum tuberculatum* extracts were determined by some parameters as well as seed germination, radical growth shoot growth, dry weight and fresh weight of treated seeds. Firstly seeds surface were sterilized by 0.3% calcium hypochlorite for 5 min then placed on sterile distilled water were repeated this step several times. And then 20 seeds of selected (treated) weeds were placed on 9.00 cm diameter sterile Petri-dishes with filter paper whattman No.1.in three replicates. Each plates which received 5 m L of the tested extract at different concentration uses. Distilled water and glyophosate (1ml / 75 ml. Water) was used for positive and negative control (Shahid *et al.*, 2003) Petri dishes were incubated in incubator in darkness at 27 c° for 5 days data were analyzed with the T-test and ANOVA and duncan's test. Pre-treatment of plant extracts to test were dissolved all extracts in sterile Dist. water at different concentration by using the followig equation.

$$\text{Conc. (mg / ml)} = \frac{\text{Extract weight (mg)}}{\text{Solvent volume (ml)}}$$

Chapter (4)

Results

4. RESULTS

4.1. The effect of *Haplophyllum tuberculatum* Methanol and Dist. water extracts on germination percentage (%) of some weed seeds.

The effect of methanol and water solvents have been studied to determine of the best (superior) extraction solvent. The effect of extracts was calculated after 5days in five replicates, the results showed there was no difference between the two solvents as shown in figure (3). The extracts were inhibiting the growth of all tested weed. Therefore, it is possible to use the water as extraction solvent in afterward experiments.

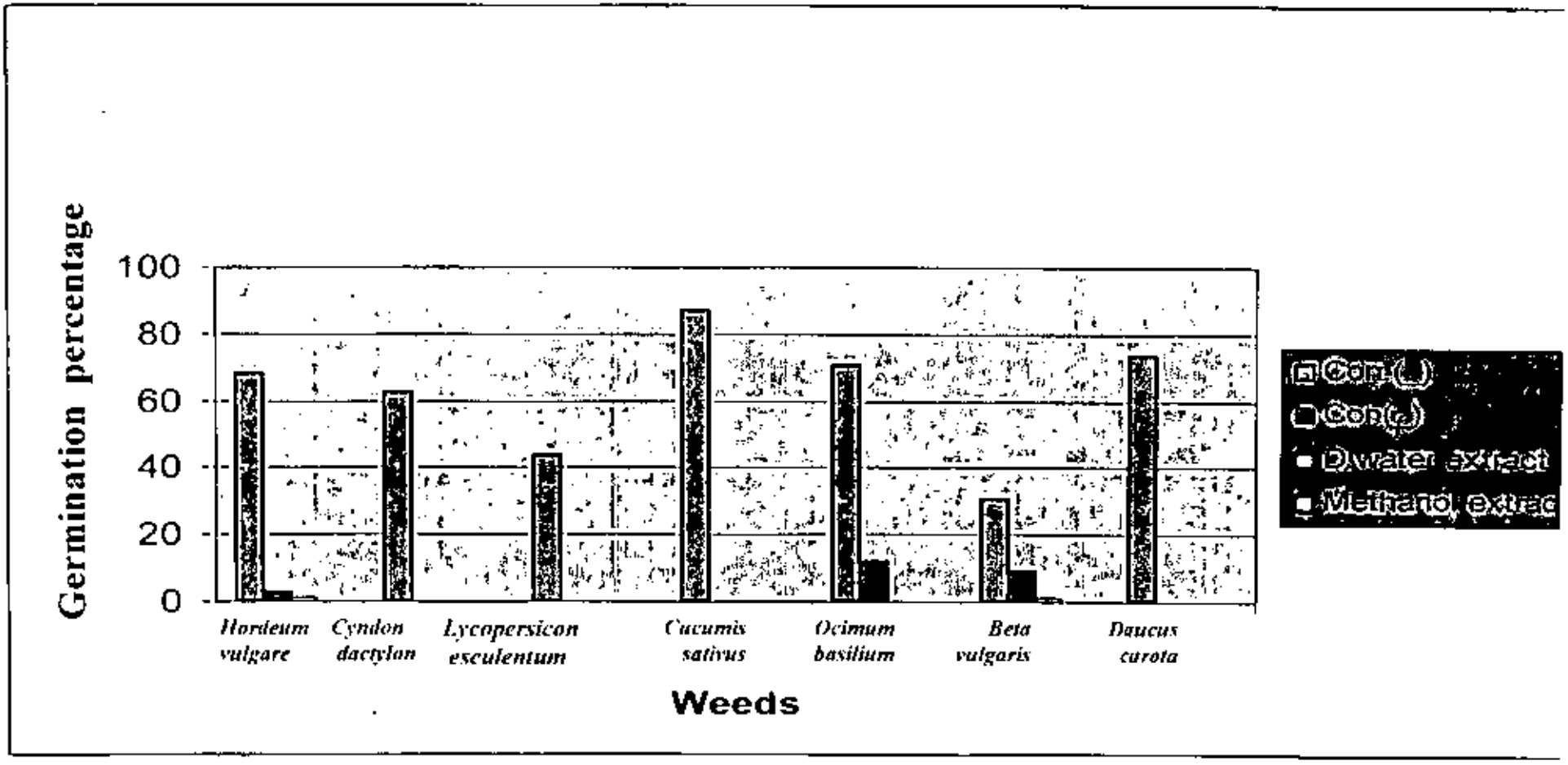


Figure (3) Effect of *Haploltyllum tuderculatum* extracts by Methanol and D.Water on growth percentage (%) of some Weeds

4.2. The effect of flower, leaf and root of *Haplophyllum tuberculatum* Dist. water extracts at different concentration on germination percentage (%) of some selected seeds of crops and weeds.

Factorial Analysis of Variance (ANOVA) test at significance level (α 0.05) showed that :

For *Hordeum vulgare*

There were no significant differences in germination percentage between flower leaf and root water extract (P = 0.322) however, there were significance differences within extract concentrations (P = 0.00) , LSD test revealed that there were significances differences between all extracts concentrations, LSD test at α (0.01) revealed that, in case of extract concentration there were no significance differences between all concentrations used except 12.5 mg/ml and the highest effect was at concentrations 12.5 and 25 mg/ml, respectively.

For *Cucumis sativus*:

There were significant differences between flower, leaf and root water extracts and there were significant differences within extract concentrations, LSD test (α 0.01) revealed that:

(I) in case of extract type there was no significant differences between flower extract and leaf extract, and the best extract that showed good inhibitory effect was the leaf extract .

(ii) In case of extract concentrations, there were no significant differences between concentrations of 12.5 and 25 mg/ml, and between 12.5 and 50 mg/ml, and between 50 and 100 mg/ml, and among the tested concentrations the best inhibitory effect were obtained at 100 and 200 mg/ml respectively.

For *Cyndon dactylon*:

There is a significant difference between flower, leaf and root extracts, and there were significant differences within extracts concentrations, LSD test revealed that:

(I) In case of extract type (α 0.05) there were no significant differences between root extract and leaf extract , and the best extract that showed good inhibitory effect against Cyndon was flower extract .

(II) In case of extract concentration (α 0.01) there were no significant differences between all tested extract except at concentration of 12.5 mg/ml , and the best concentration that showed good effect against Cyndon were 12.5 and 25 mg/ml , respectively .

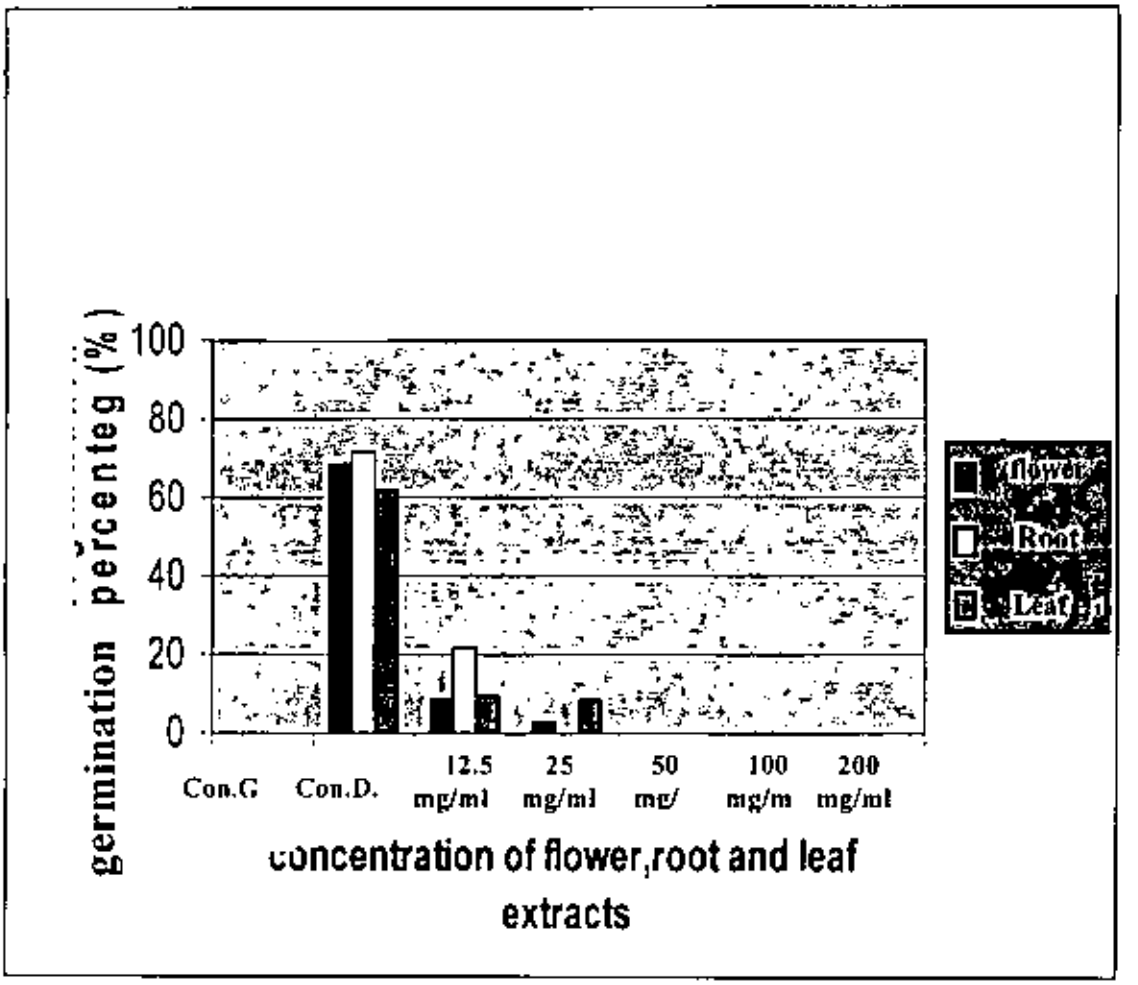


Figure (4).effect of flower, root and leaf extracts (mg / ml) on germination percentage (%) of *Hordeum vulgare.*

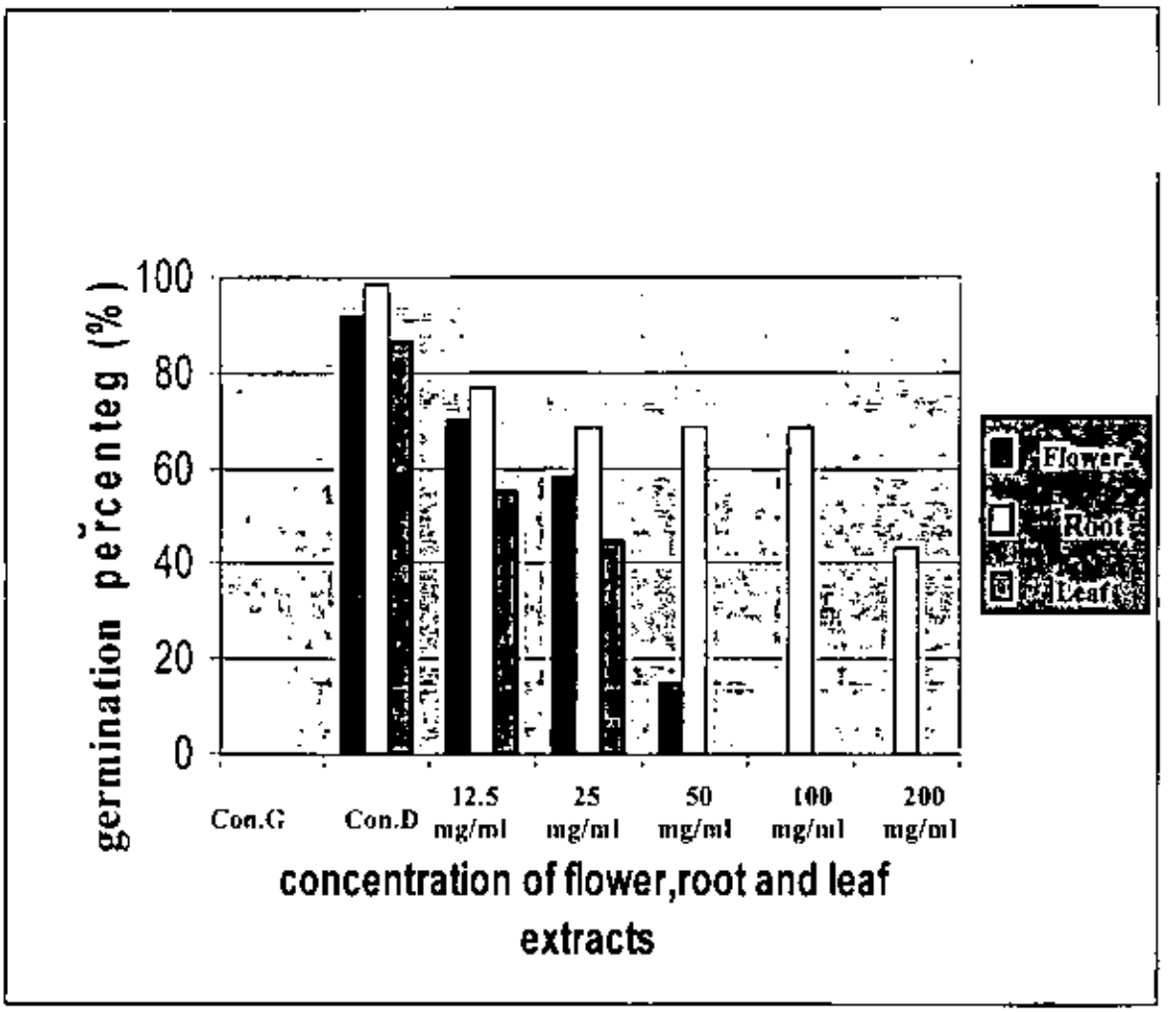


Figure (5).effect of flower, root and leaf extracts (mg / ml) on germination percentage (%) of *Cucumis sativus*.

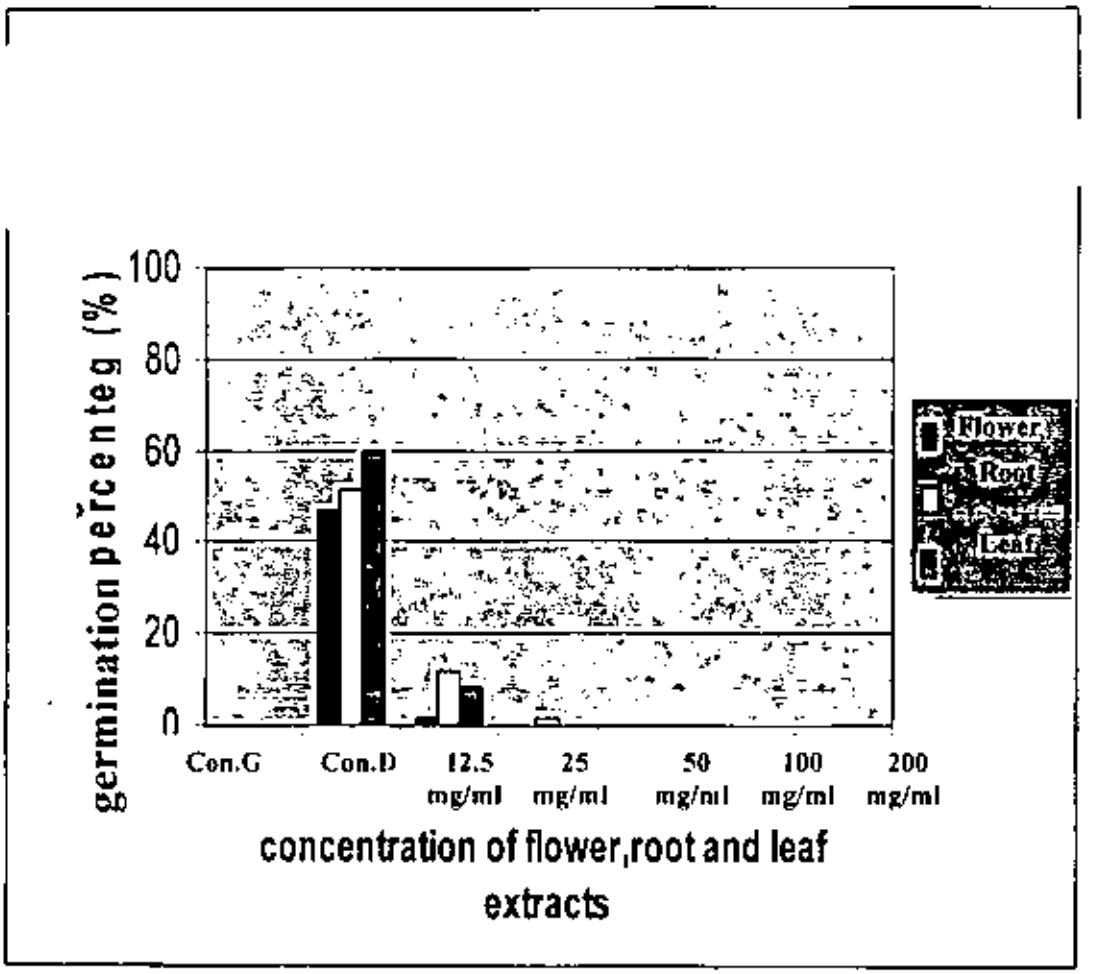


Figure (6).effect of flower, root and leaf extracts (mg / ml) on germination percentage (%) of *Cyndon dactylon*.

4.3. Effect of *Haplophyllum tuberculatum* extracts fractionated by different solvents from Ethanol extract at different concentration on Cyndon *dactylon*:

1- germination percentage:

There are significant differences on effect of different fractionated extracts and different fractions concentration on germination percentage of *Cyndon dactylon*

LSD test at level ($\alpha = 0.01$) showed that in case of fraction type; there is no significant differences between hexane, chloroform and ethyl acetate fractions in their effects on germination and the best one were ethyl acetate fraction.

In case of effect of fractions concentration on germination percentage, there are no significant differences between all concentrations used and the highest effect was at concentration of 0.2mg/ml for all the fractions including the aqueous fraction.

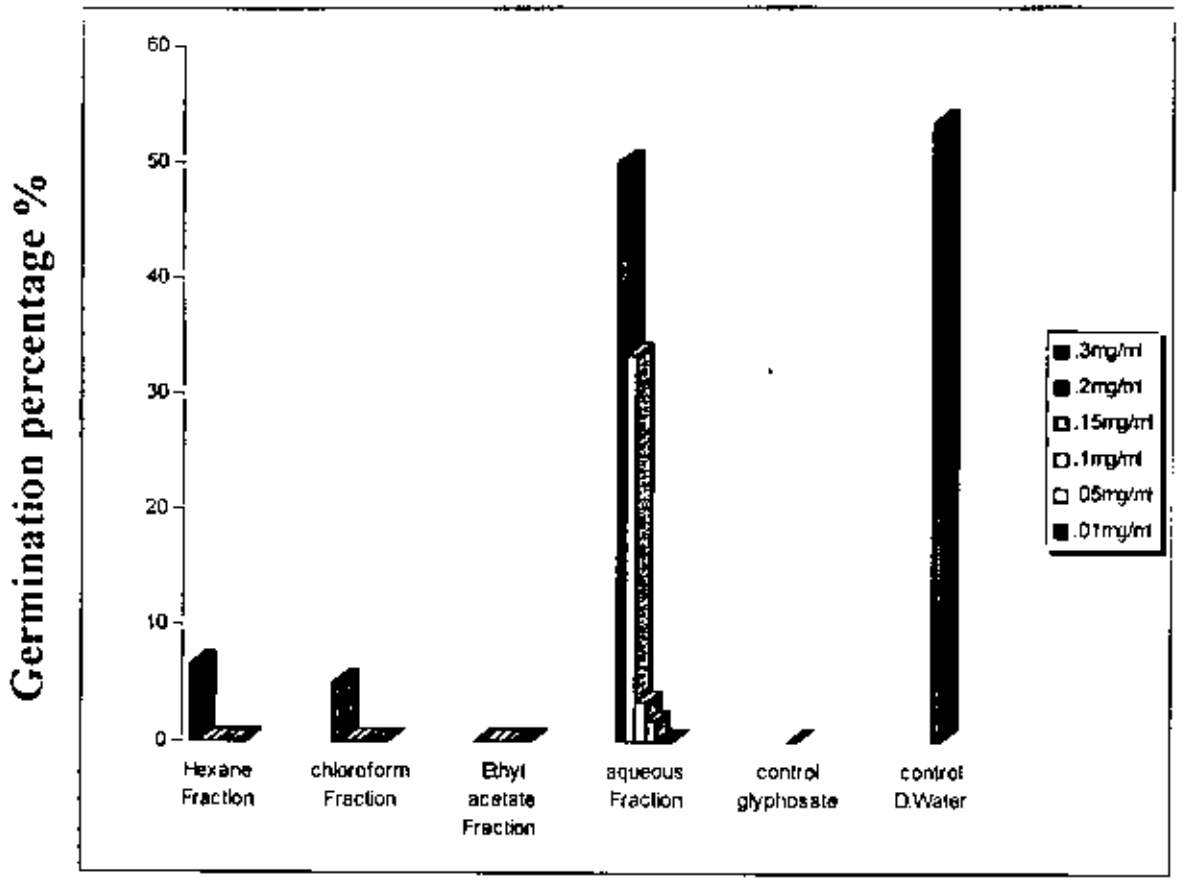


Figure (7). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from ethanol extracts on germination percentage (%) of *Cyndon dactylon.*

2- on root length:

There is significance difference between fractions that reduced root length of Cyndon and there is significance differences between all concentrations used.(fig.8).

LSD test at (α '0.05) showed that in case of fractions type there is no significance difference between fractions of ethyl acetate and all other fractions used.

In case of effect of fractions concentration on germination percentage, there are no significant differences between all concentrations used and the highest effect was at concentration of 0.2mg/ml for all the fractions including the aqueous fraction.

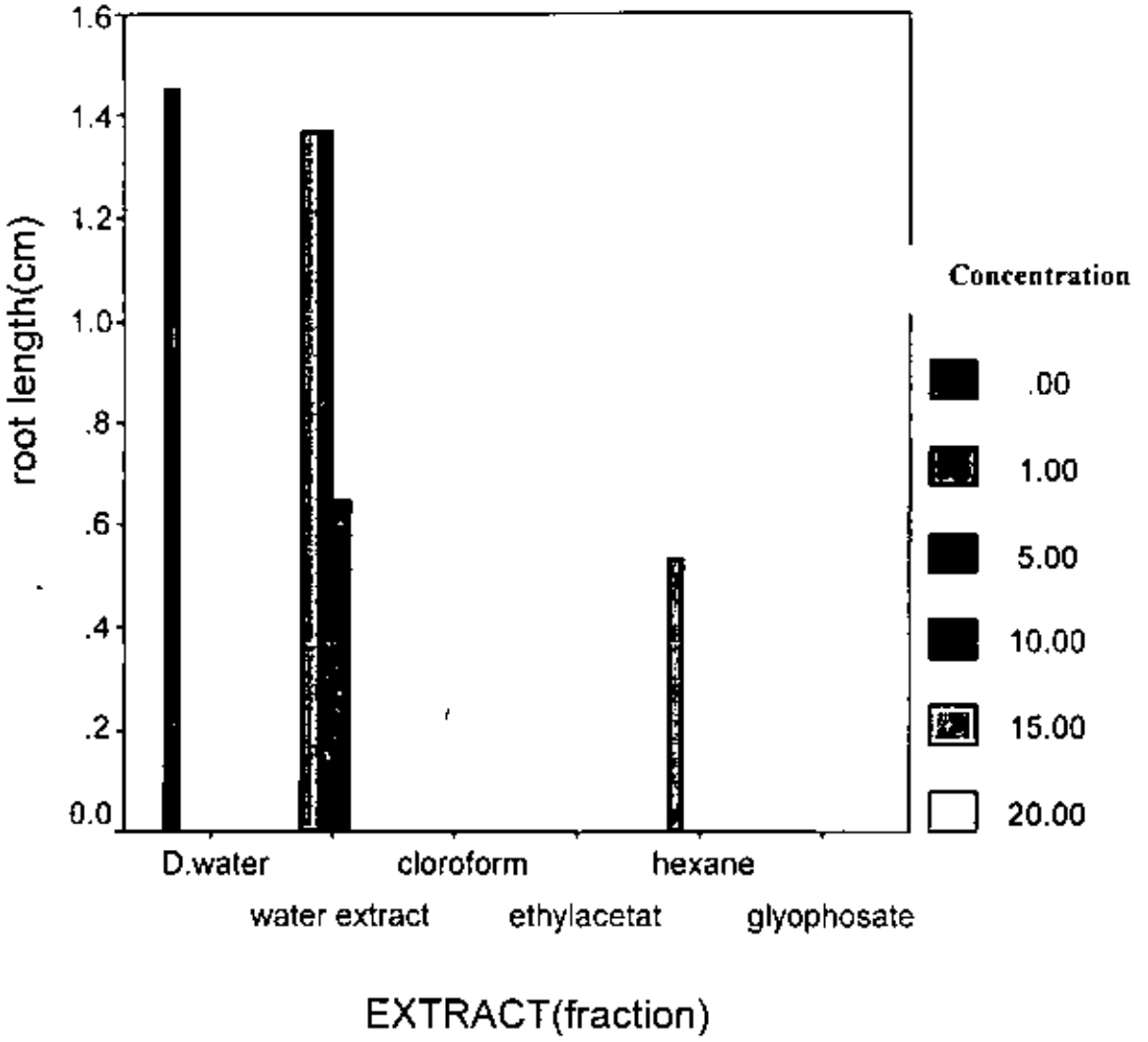


Figure (8). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from ethanol extracts on Root length of *Cyndon dactylon*.

3- on shoot length:

There were significant differences between fraction and concentrations that reduced of shoot length of *Cyndon dactylon* (fig.9).

LSD test at (α `0.05) showed that in case of fractions type there were no significant differences between fractions chloral form and ethyl acetate.

In case of fractions concentration there were no significant differences between concentration 0.20, 0.30 mg/ml and all concentrations used.

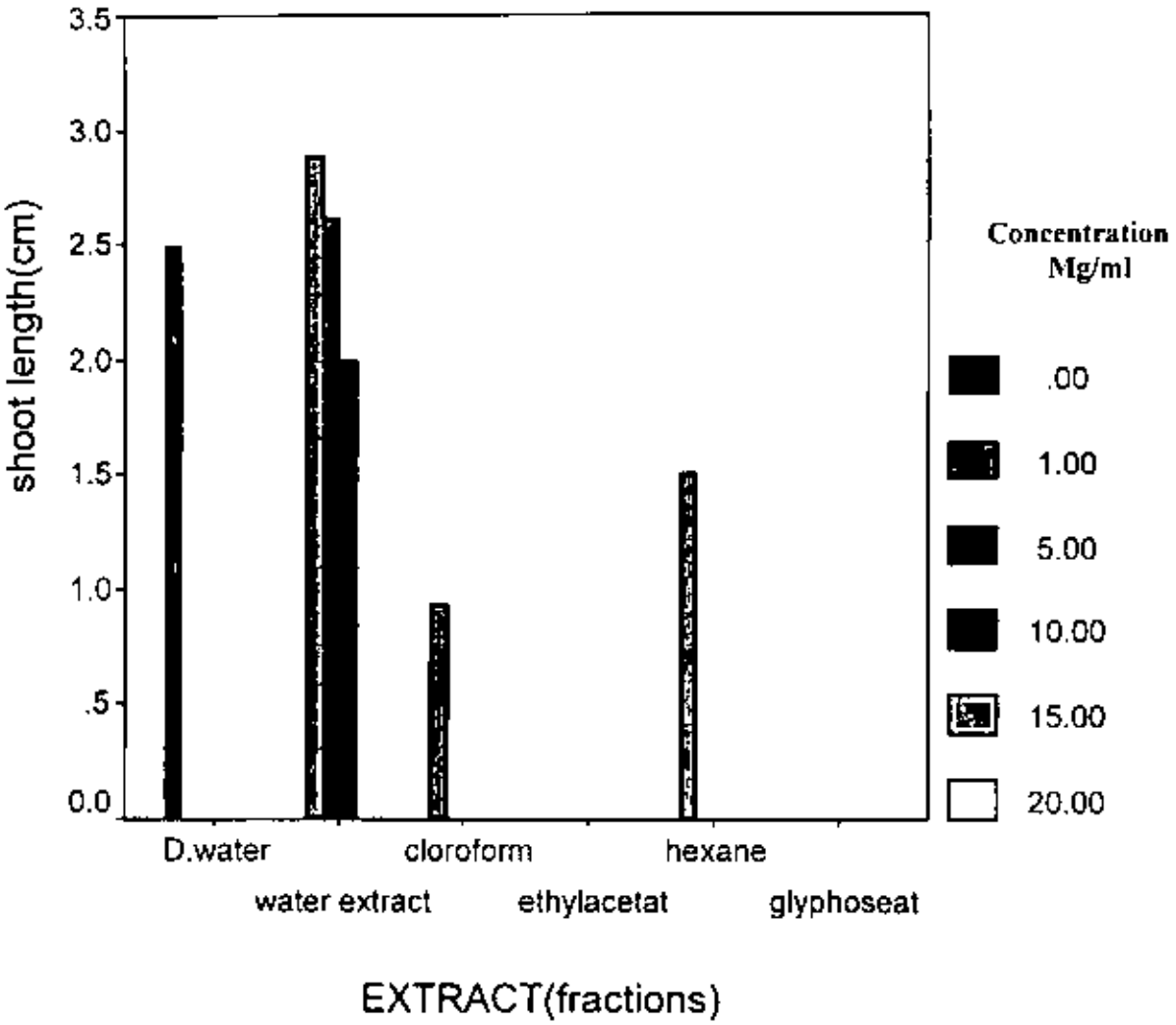


Figure (9). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from Ethanol extracts on Shoot length of *Cyndon dactylon*.

4-effect on fresh weight and dry weight:

Factorial analysis test at (α 0.05) showed that there were significant differences between all fractions that able to reduced the fresh weight of Cyndon and there were significant differences between all fractions concentrations, LSD test at (α 0.05) showed that, in case of fractions type there were no significant differences between all fractions used and the best fractions showed good results were the aqueous and hexane fraction respectively. In case of fractions concentration there were no significant differences between all concentrations used, and the highest effects were at 0.01 and 0.05 mg/ml respectively (fig.10).

There were significant differences between fractions that reduced dry weight, and there were significant differences between fractions concentration, LSD test at (α 0.05) showed that in case of fractions type there were no significant differences between all extract fractions, and the highest reduction was for aqueous and hexane fractions, respectively (fig.11).

For fraction concentration there were no significant differences between all tested concentrations.

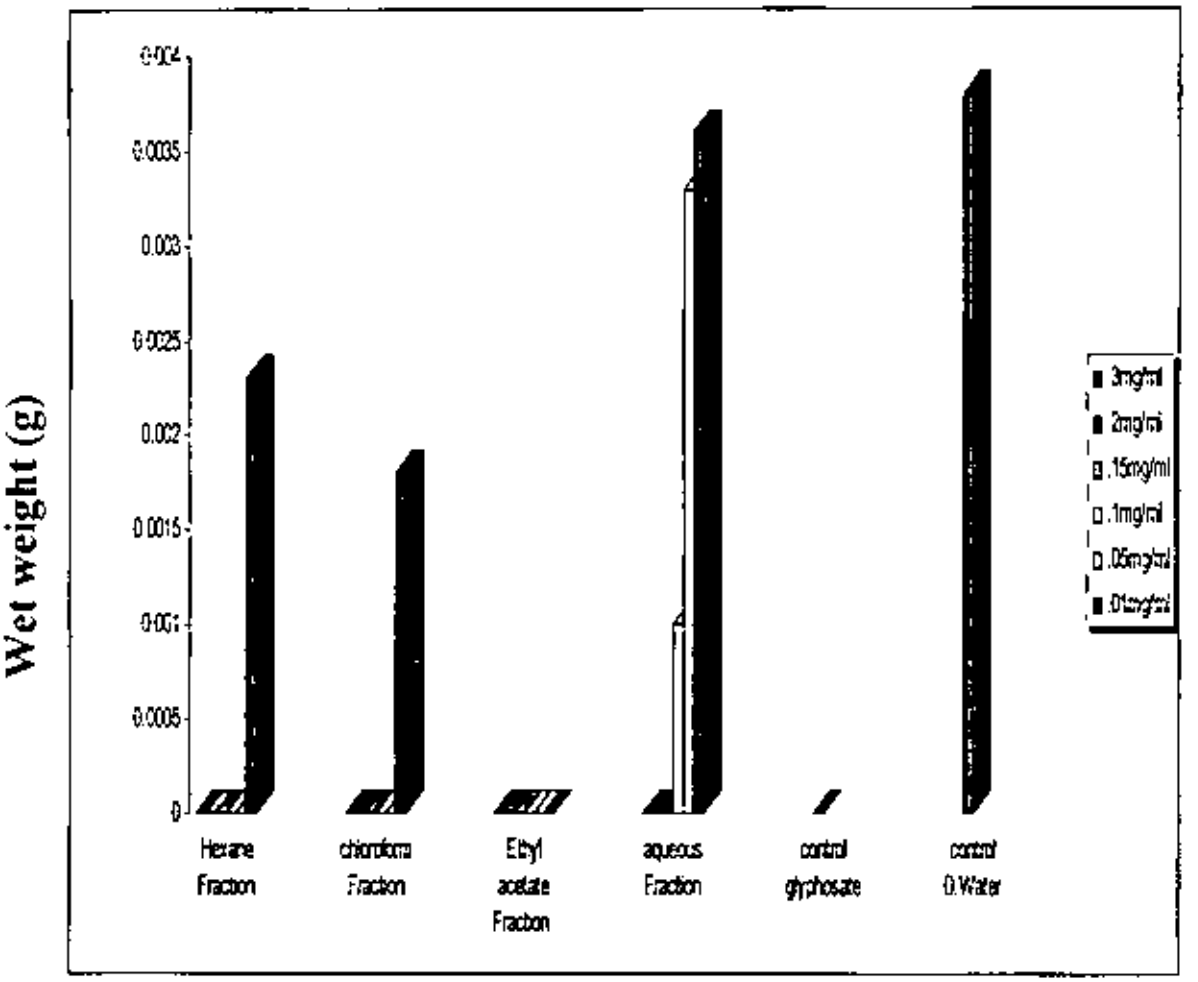


Figure (10). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from ethanol extracts on wet weight of *Cyndon dactylon*

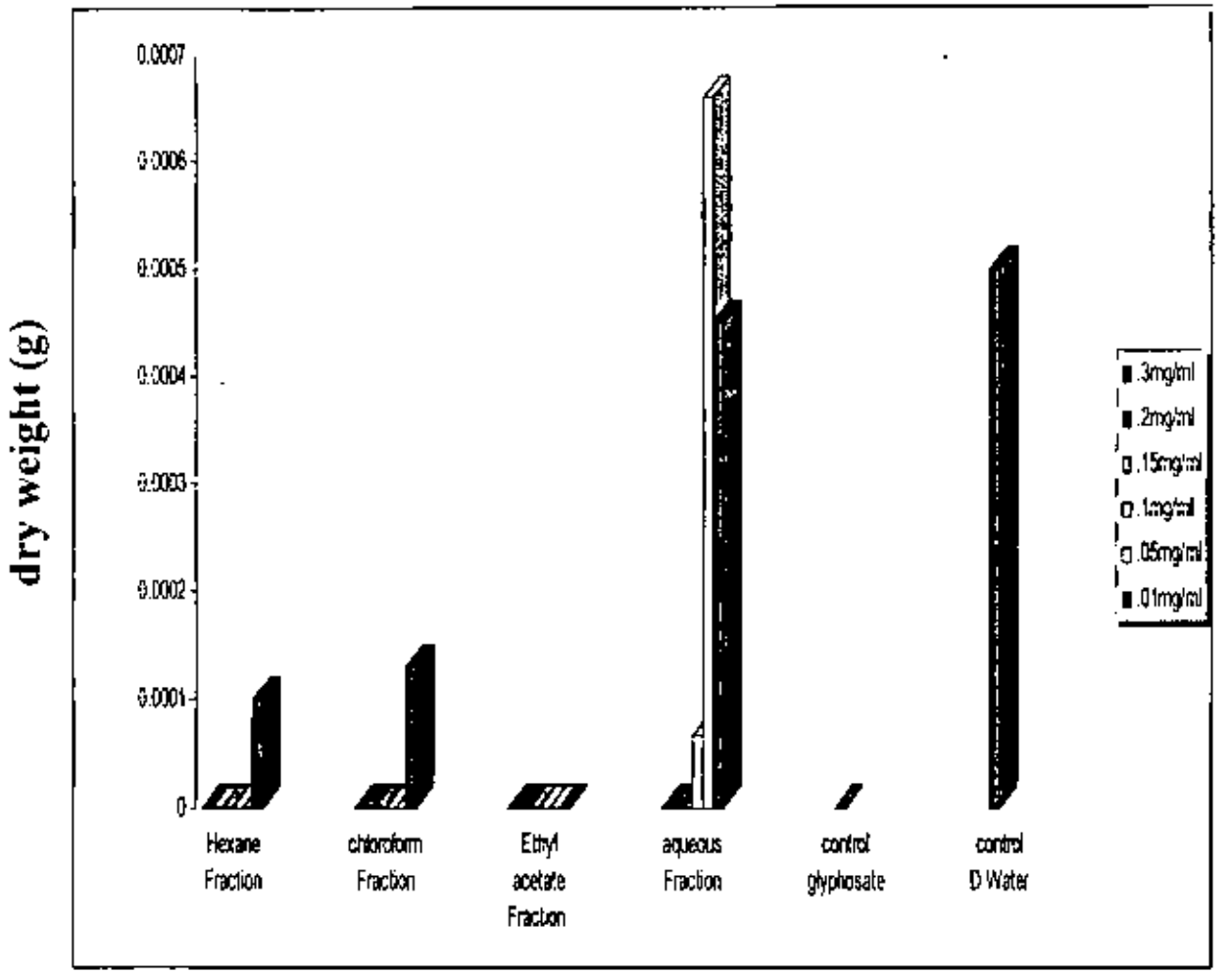


Figure (11). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from ethanol extracts on dry weight of *Cyndon dactylon*.

4.4. Effect of *Haplophyllum tuberculatum* extracts fractionated by different solvents from Ethanol extract at different concentration on. *Cucumis sativus*:

1- germination percentage:

There are significant differences in effect of different fractionated extracts on growth % of *Cucumis sativus*, and there was a significant difference in effect of different fractions concentrations on growth % of C. *sativus*

LSD test at level ($\alpha = 0.01$) Showed that:

(i) In case of fraction type I there were significant differences between Hexane, aqueous, Chloroform and ethyl acetate fractions and the best fraction that was able to inhibit growth of C. *sativus* is ethyl acetate fraction.

(ii) In case of effect of fractions concentration on growth % of C. *sativus*, there were no significant differences between concentration.(0.3 and 0.2) and between (0.15 and 0.10) (fig.12).

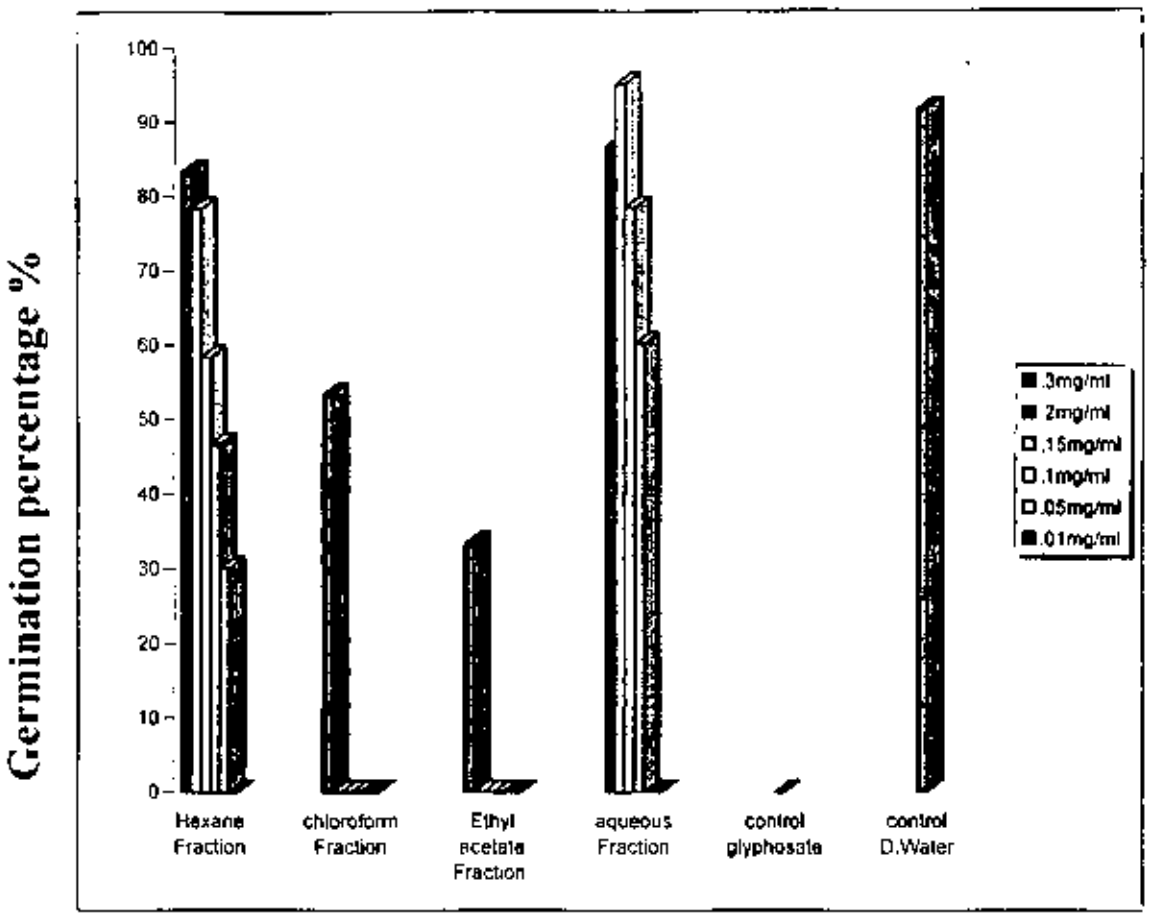


Figure (12). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from Ethanol extracts on growth percentage (%) of *Cucumis sativus*.

2- on root length:

There were no significant differences between all fractions that reduced root length of cucams and there were no significant differences between all fractions concentration used LSD test at (α =0.05) showed that.

In case of fractions type there were no significant differences between fractions chloral form and ethyl acetate. (fig.13).

In case of fractions concentration there were no significant differences between concentration 0.20 and 0.30 mg/ml and all concentrations used.

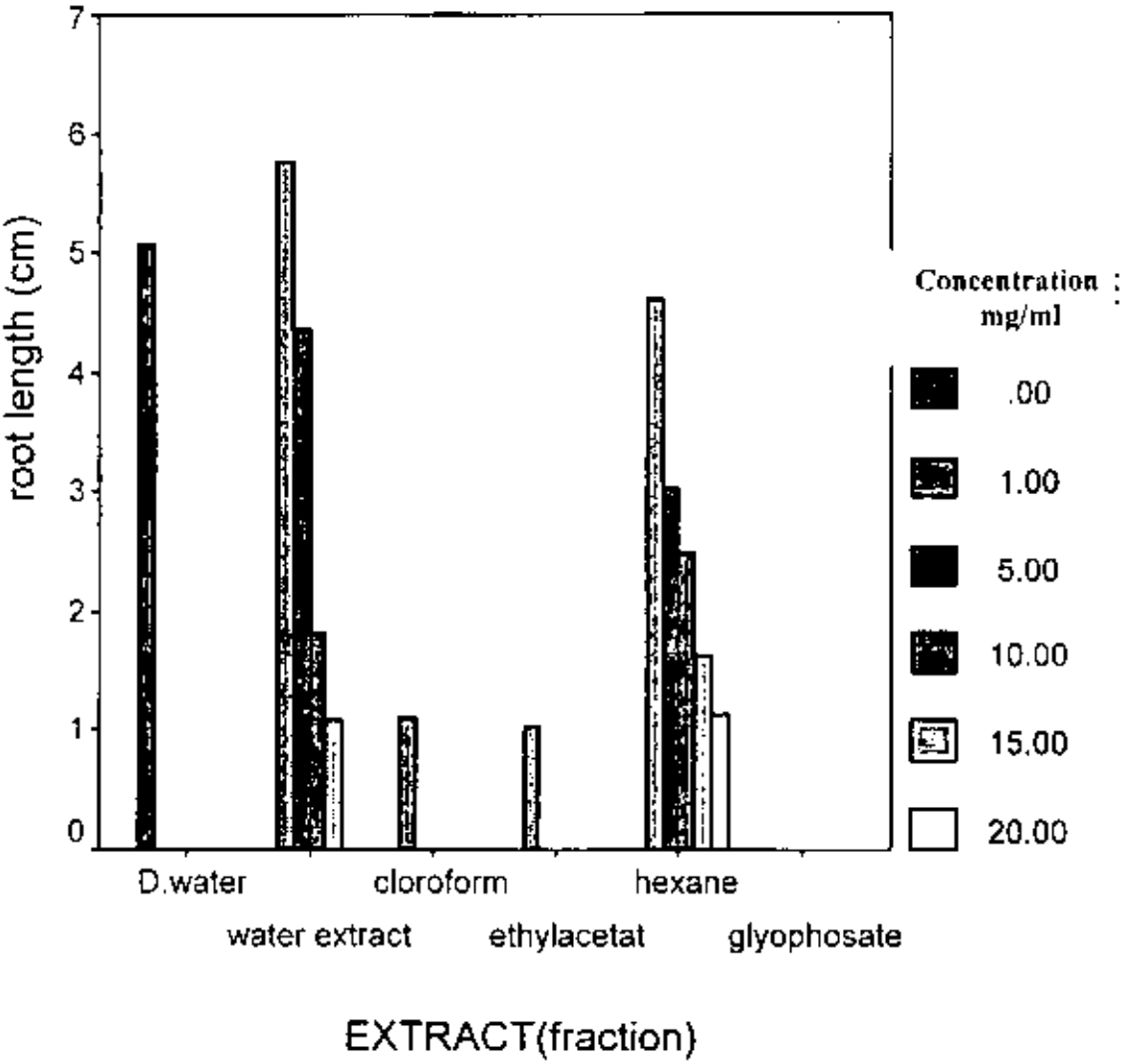


Figure (13). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from ethanol extracts on Root length of *Cucumis sativus*.

3-Effect on shoot length:

There were no significant differences between all fractions that shoot length of cucams and there were no significant differences between all fractions concentrations used LSD test at (α =0.05) showed that.

In case of fractions type there were no significant differences between fractions chloroform and ethyl acetate (fig.14).

In case of fractions concentration there were no significant differences between concentration 0.20 and 0.30 mg/ml and all concentrations used.

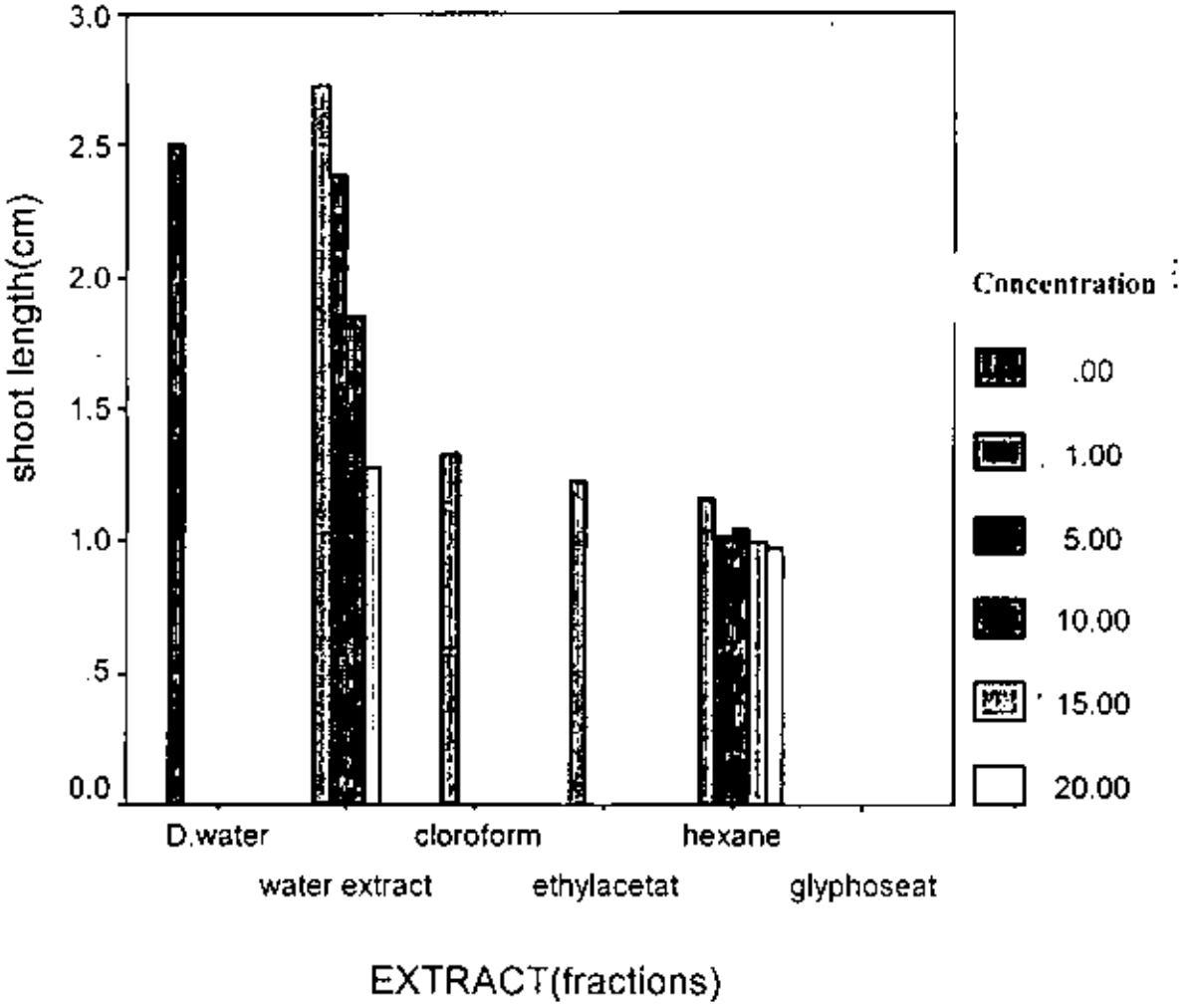


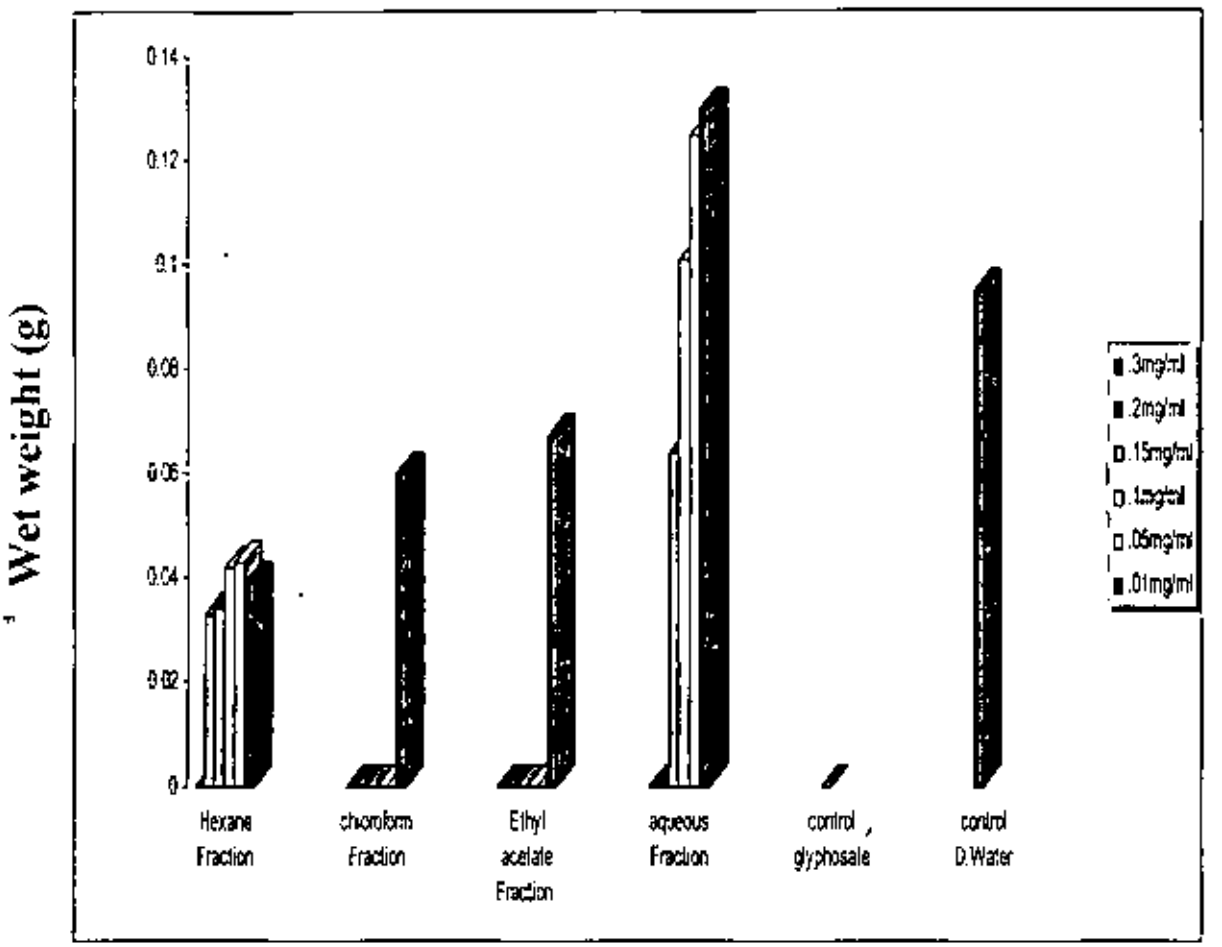
Figure (14). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from ethanol extracts on shoot length of *Cucumis sativus*

4- on fresh weight and dry weight:

Factorial analysis test at (α 0.05) showed that there were significant differences between different fractions that able to reduce the fresh weight of cucumis and there were significant differences between all fractions concentration, LSD test at (α 0.05) showed that:

(i) In case of fractions type, there were no significant differences between chloroform fraction and ethyl acetate fraction, and those are the best fraction, respectively.

(ii) In case of fraction concentration , there were no significant differences between concentration 0.3 and 0.2 mg/ml , and between 0.1 and 0.05 mg/ml , and the best concentration used that show good inhibitory effect were 0.3 , 0.2 and 0.15 mg/ml, respectively (fig.15 and 16).



figure(15). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from ethanol extracts on wet weight of *Cucumis sativus*.

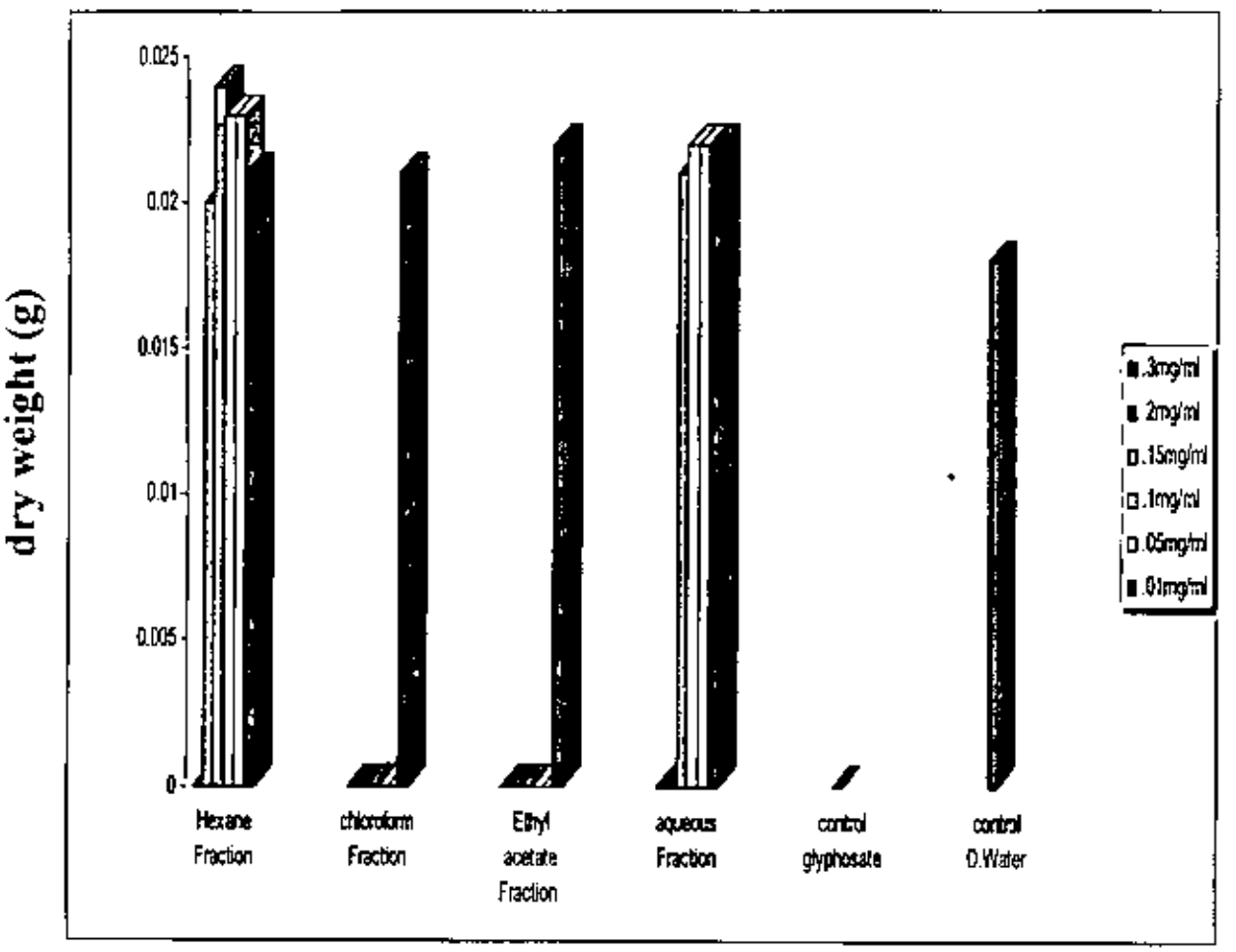


Figure (16). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from ethanol extracts on dry weight of *Cucumis sativus*.

4.5. Effect of *Haplophyllum tuberculatum* extracts fractionated by different solvents from Ethanol extract at different concentration on *Hordeum vulgare*:

1-Effect on germination percentage:

There were significant differences in effect of different fractionation extracts on germination percentage (%) of Hordeum vulgare, and there were significant differences in the effect of different fractions concentration on germination percentage's test at level ($\alpha = 0.01$) Showed that:

(I)In case of fraction type.

There were no significant differences between fraction hexane, chloroform and ethyl acetate, and no difference between hexane and aqueous, and the best fractions show good inhibitory effect on germination percentage of H. vulgare, were ethyl acetate and chloroform, respectively.

(ii) In case of fractions concentrations:

There were no significant differences between fractions concentration 0.30 , 0.20 , 0.15 and 0.10 mg/ml.

The best concentration that gave good inhibitory effect on growth of *H. vulgare* were 0.30, 0.20, 0.10 mg/ml, respectively as shown in (fig.17).

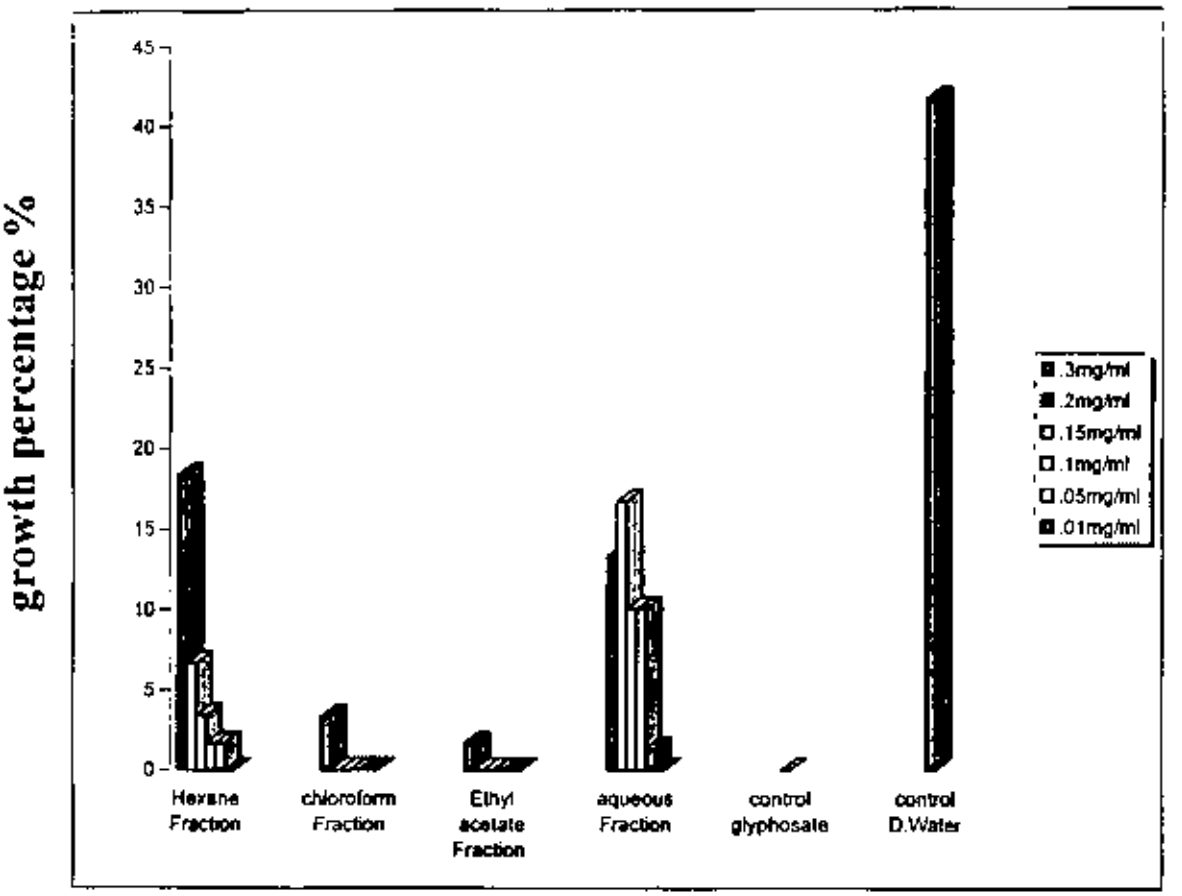


Figure (17). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from Ethanol extracts on growth percentage (%) of *Hordeum vulgare*

2- on root length:

There were no significant differences between fractions that reduced of root length of Hordum and there is no significant differences between fractions concentrations, led test at (α=0.05) showed that.

In case of fractions type there were no significant differences between aqueous and chloroform fractions and between ethyl acetate and all fractions tested.

In case of fractions con cent ration there were no significant differences between con castration 30 mg/ml and all concentration tested and between 0.10 and 0.05mg/ml and between 0.05 and 0.10 mg/ml and between 0.10 and 0.15 mg/ml (fig.18).

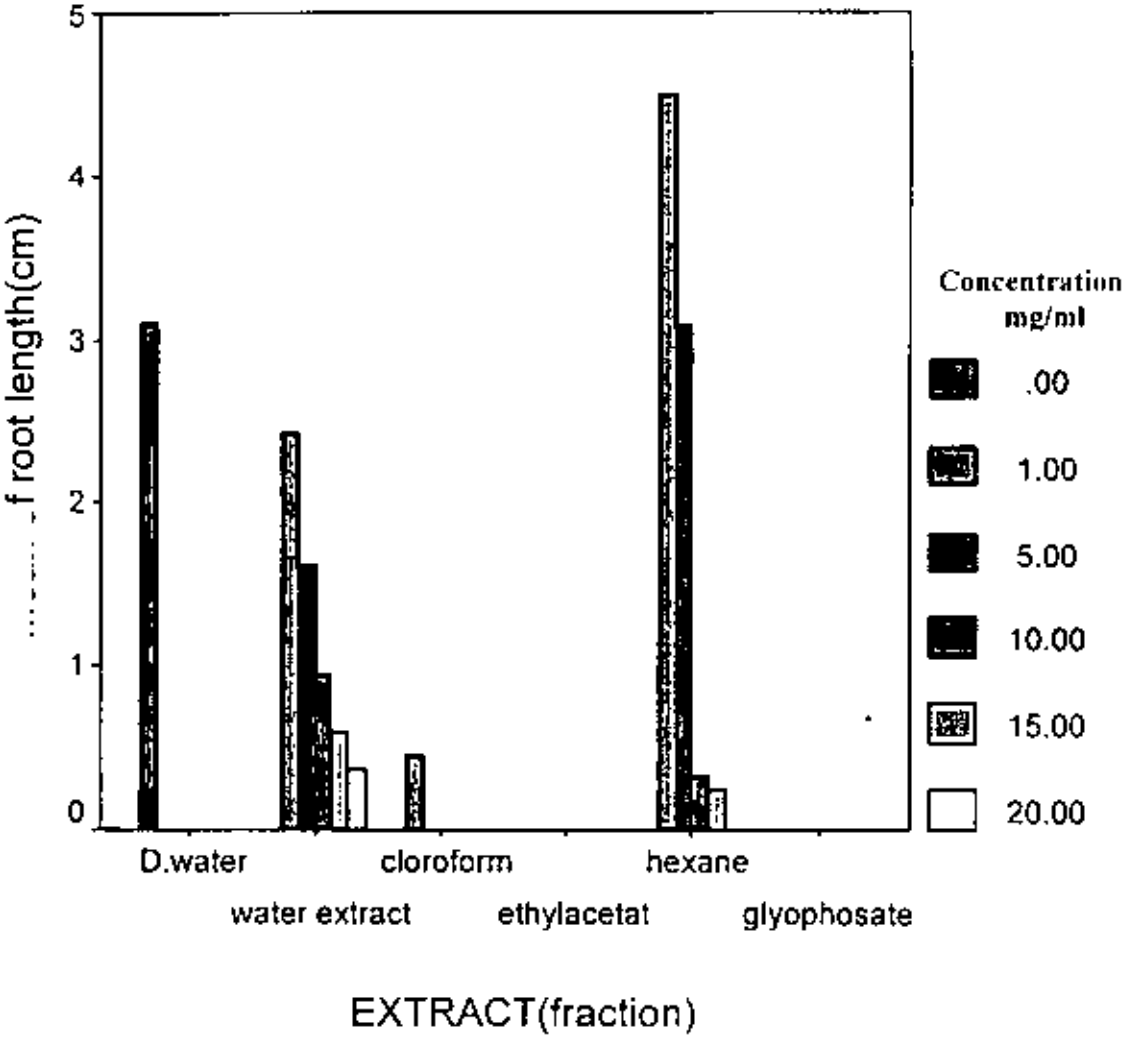


Figure (18). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from ethanol extracts on Root length of *Hordeum vulgare*

3- on shoot length:

There were no significant differences between fractions that reduced of Shoot length of Hordum and there is no significant differences Between LSD test at (α=0.05) shoved that:

1- In case of fractions type there were no significant differences between aqueous and chloroform fractions and between ethyl acetate and all In fractions tested.

2-In case of fractions concentration there were no significant differences between extras 0.01 and 0.05 mg/ml and between 0.1 and 0.20 and 0.30 and fractions concentration.

3-In case fraction conceptions of ethyl acetate with Hordum there were significant differences between all concentrations used (p=0.122).

4-In case of chloroform there were significant differences between all concentrations used.

5-In case of hexane fruition there were no significant differences between friction concentration LSD tests revealed that (fig.19).

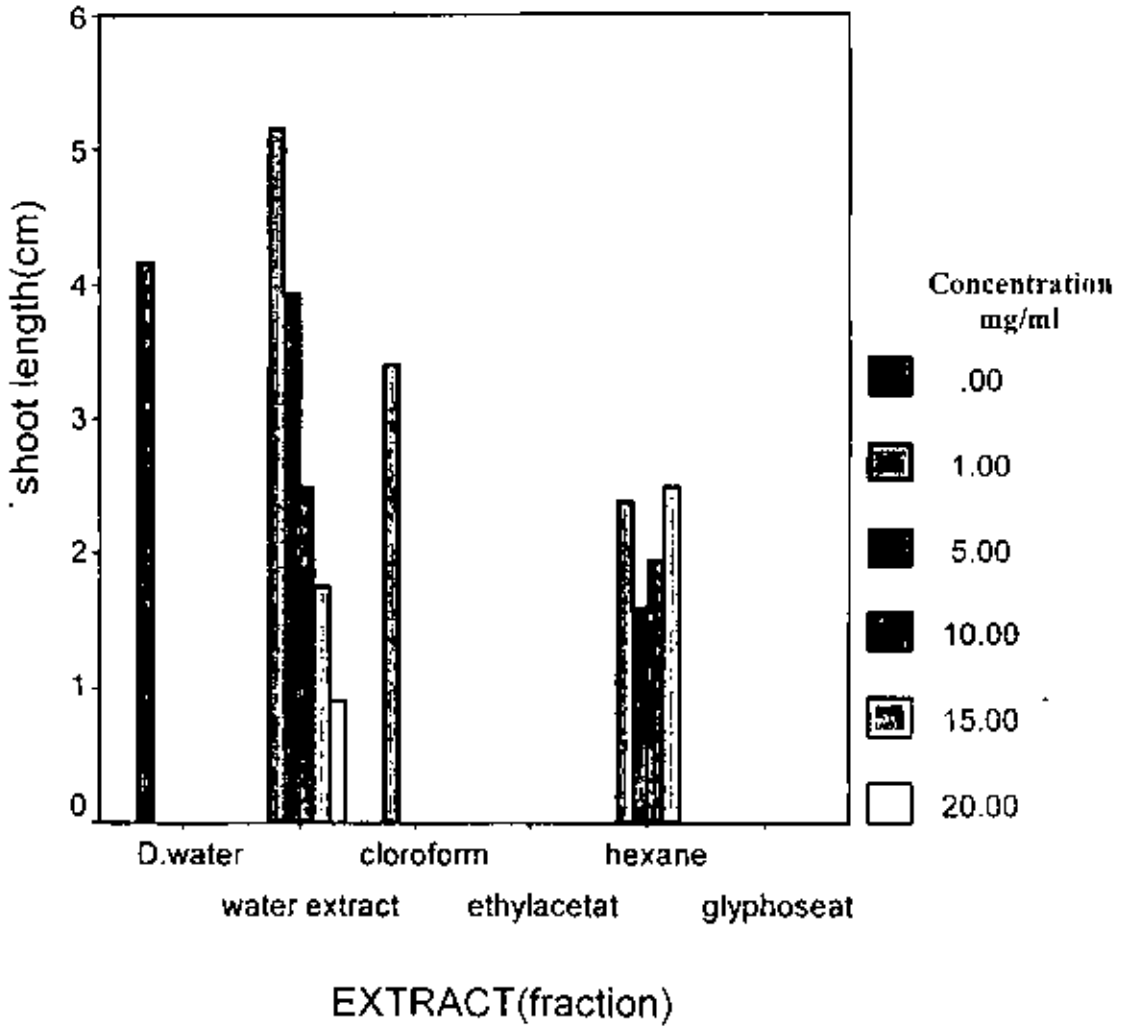


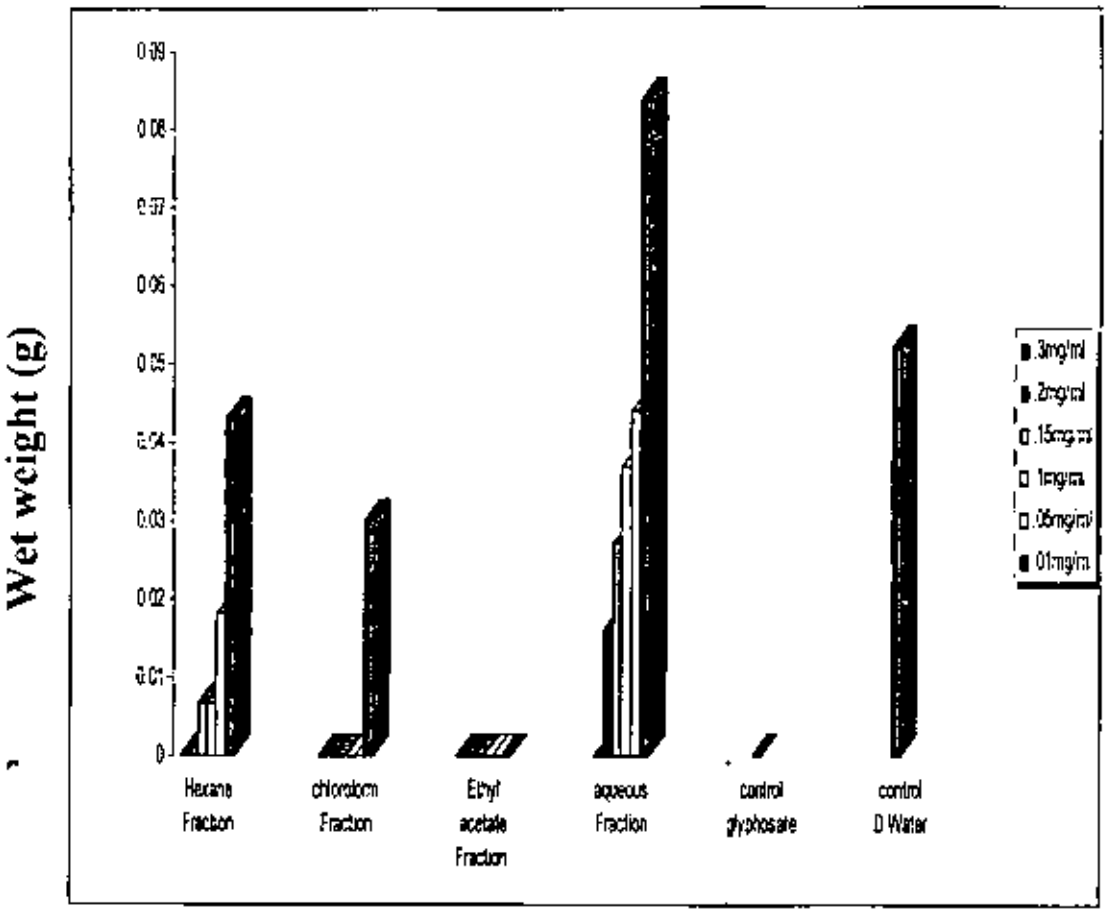
Figure (19). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from ethanol extracts on Shoot length of *Hordeum vulgare.*

4- on fresh weight and dry weight:

There were significant differences between different fractions that were able to reduce the fresh weight of Hordeum and there were significant differences between all fractions concentration, LSD test at (α 0.05) showed that:

(i) In case of fraction type, there were no significant differences between hexan fraction and chloroform fraction and between chloroform fraction and ethyl acetate fraction, the best result in term of reduced wet weight of hordum was ethyl acetate fraction.

(ii) In case of fractions concentration there were no significant differences between concentrations 0.30 , 0.20 and 0.15 mg/ml and between 0.2 , 0.15 and 0.10mg/ml,and between 0.15 , 0.10 and 0.05mg/ml , and the best concentrations that showed good reduction of fresh weight of hordum were 0.3, 0.2 and 0.15 mg/ml respectively (fig.20 and 21) .



figure(20). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from ethanol extracts on wet weight of *Hordeum vulgare*

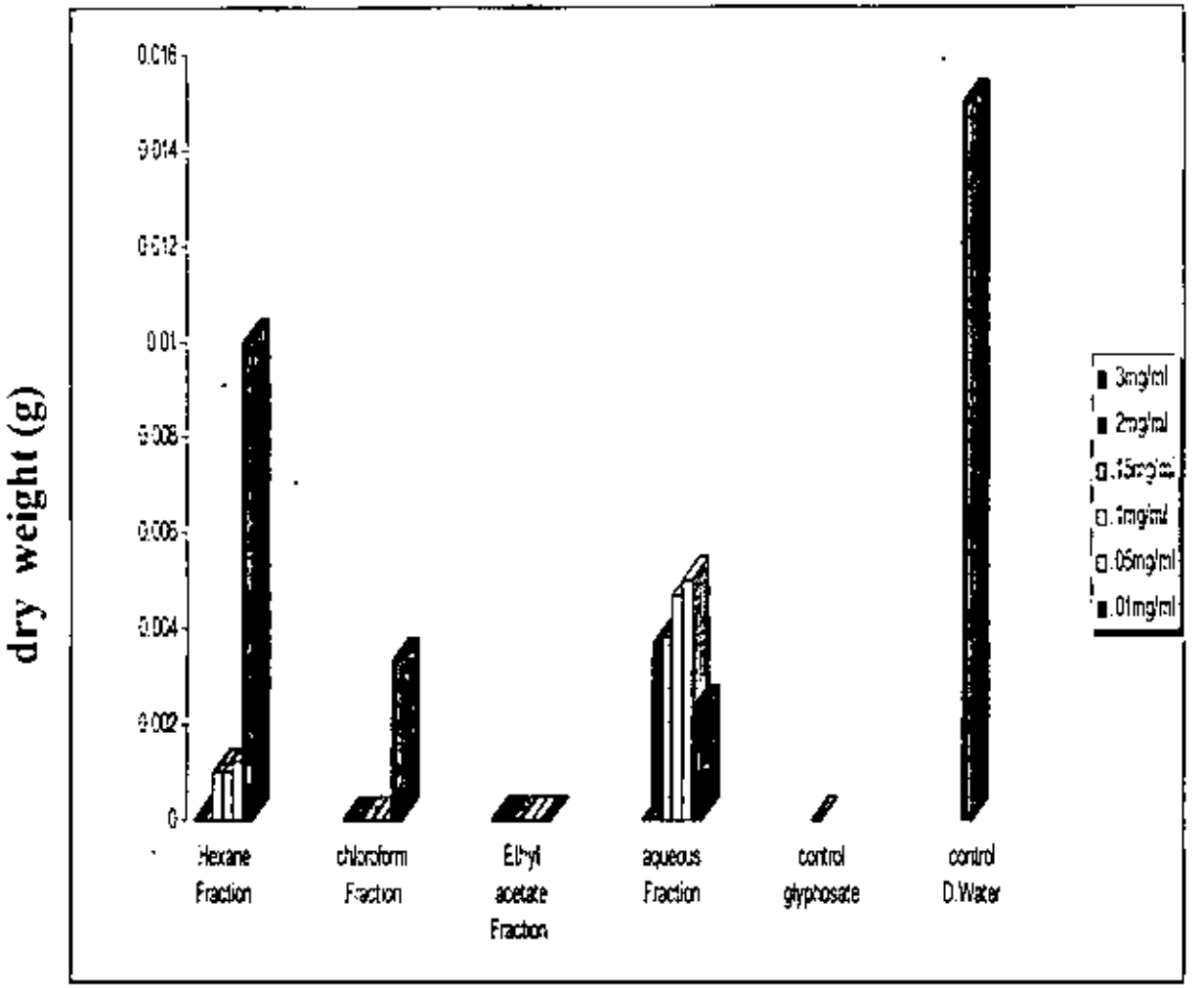


Figure (21). The effect of *Haplophyllum tuberculatum* Extracts fractionated by different solvents from ethanol extracts on dry weight of *Hordeum vulgare*

Chapter (5) Discussion

Discussion

5.1. The effect of *Haplophyllum tuberculatum* Methanol and Dist. water extracts on germination percentage (%) of some weed seeds.

The effect of Methanol & Dist. water solvents have been studies to determination of the best (superior) extraction solvent. The effect of extracts was calculated after (124 hours) in five replicates, the results showed there were no differences between the two solvents. As shown in figure (3). The extracts were inhibiting the growth of all tested weed. Therefore, it is possible to use Dist. water solvent as extraction solvent in afterward experiments (Alsadawi et al.1990, Abna et al.2001).

5.2. The effect of flower, leaf and root of *Haplophyllum tuberculatum* water extracts at different concentration on germination percentage (%) of some selected seeds of crops and weeds.

The effect of water extracts different plant parts (flower, leaf and root) at different concentration (12.50, 25.00, 50.00, 100.00 and 200.00 mg/ml) on germination percentage of *Hordeum vulgare* L, *Cucumis sativus*, and *Cyndon dactylon*, have been studied to determine which part of the plant have the potential produce allelochemical that inhibit seed germination and the effective concentration that show superior effects.

As shown in figures (4, 5, 6). The results showed that, the leaf extract and flower extract were superior to root extract. Leaf extract show good inhibitory effect on germination of all tested species at concentrations of 25 mg/ml on *Cyndon dactylon* and 50 mg/ml on *Cucumis sativus* and *Hordeum vulgare*. It is clear that there is a direct relationship between extract inhibitory effects and its concentrations.

Flower extract showed good inhibitory effect on growth of all tested species at concentrations 25 mg/ml on *Cyndon dactylon*, 50 mg/ml on *Hordeum vulgare* and 100 mg/ml on *Cucumis sativus*.

5.3. Effect of *Haplophyllum tuberculatum* extracts fractionated by different solvents from Ethanol extract at different concentration on germination percentage of some selected species.

This experiment has been carried out to identify: the natures of allelochemicals that inhibit the growth of tested species (*Cucumis sativus*, *Hordeum vulgare* and *Cyndon dactylon*) depend on type of solvent that can dissolve allelochemicals and to determine the effective extract concentration, and what is the relationship between allelochemicals it is antagonism in term of effectiveness (Ferguson and Rathinsabapathi 2003).

The results in Figures (7, 8, 9) showed that , the allelochemical that has strong inhibitory effect against seed germination its aggregates in ethyl acetate fraction and chloroform fraction respectively at concentration 0.05 mg /ml.

The other fractions namely hexane fraction and aqueous (water) fraction proved to be unsuitable sources for allelochemicals that inhibit growth of tested species seeds at different concentration comparing with another

fractions and control glyophosate. On the other hand hexane fraction and aqueous (water) fraction was less inhibitory.

The highest inhibitory effect of allelochemical in ethyl acetate fraction and chloroform fraction effective at concentration (0.05 mg/ml) with different seed species, accept *Cyndon dactylon* which was inhibited by 0.01mg/ml of ethyl acetate fraction (Anaya et al. 1990).

The inhibitory concentration in aqueous fraction and hexane fraction on *Cucumis sativus* at concentration (0.15 mg/ml, 0.20 mg/ml) respectively, on *Cyndon dactylon* were (0.15 mg/ml and 0.50mg/ml) respectively and on *Hordeum vulgare* was (0.30mg/ml)

The results showed that the effective allelochemicals that inhibit the growth of tested species distributed in different fractions which may indicate that there were many compounds that responsible of inhibitory action.

5.4. The effect of *Haplophyllum tuberculatum* extracts, fractionated by different solvents from Ethanol extract, at different concentrations, on shoot length of some selected weeds.

This experiment has been carried out to find the effect of different fractions, from ethanol extracts by using different solvents (Polar and Non polar solvents), on shoot length of some weeds were *Cucumis sativus*, *Cyndon dactylon* and *Hordeum vulgare* and determine the effective concentration that inhibit or reduce the shoot length growth.

The results presented in Figures (10, 11, 12) indicated that the best fractions that strongly reduced the shoot length of tested weeds were Ethyl acetate and Chloroform fractions at all concentrations used.

The effective concentrations of Ethyl acetate fraction that reduced shoot length of tested weeds *Cyndon dactylon* , *Hordeum vulgare* and *Cucumis sativus* was (0.0 1 , 0.01 , and 0.05 mg /ml), respectively.
And the effective concentrations of Chloroform fraction was (0.05 mg/ml) against all tested weeds.

Other fractions, from hexane and aqueous fraction, proved to be unsuitable sources for allelochemicals that inhibit or reduced of shoot growth at different concentrations. On the other hand these fractions proved to be growth activators.

5.5. The effect of *Haplophyllum tuberculatum* extracts, fractionated by different solvents from Ethanol extract, at different concentrations, on root length of some selected weeds.

This experiment has been carried out to find the effect of different fractions was fractionated from ethanol extracts by using different solvents (Polar and Non – polar solvents) on root length of some weeds were *Cucumis sativus*, *Cyndon dactylon* and *Hordeum vulgare*. And to determine of the effective concentration that inhibit or reduce of root length growth.

The results presented in Figures (12, 13, 14) indicated that, In general, all fractions show inhibitory effect against all tested weed in different concentrations used (Gabor and Veatch, 1981; Chon 2003; AL- Hamdi *et al.* 2001; Ebana et al.2001; Chon *et al.*2003; Vasilakoglou *et al.* 2005).

The best fractions that strongly reduced the root length of tested weeds were Ethyl-acetate and Chloroform fractions at different concentrations used.

The effective concentration of Ethyl – acetate that reduced root length of tested weed *Cyndon dactylon*, *Hordeum vulgare* and *Cucumis sativus* were (0.01,0.01 and 0.05 mg/ml), respectively, and the effective concentration of

Chloroform fraction can reduced the growth of root of tested weeds by (0.01,0.05 and 0.05 mg/ml), respectively. The Hexane fraction proved to be has good inhibitory effect against *Cyndon dactylon* at concentrations of (0.05 mg/ml), other weeds proved to be resistance to this chemical compound involved in this fraction.

In general, the aqueous fraction show good inhibitory effect at higher concentrations against tested weeds and the fully reduced concentrations were (0.15, 0.25 and 0.20 mg/ml), respectively.

5.6.The effect of *Haplophylum tuberculatum* extracts fractionated by different solvents from Ethanol extracts on wet and dry weight of tested weeds.

This experiment has been carried out to find the effect of different extracts that fractionated by different solvents from ethanol extracts on wet and dry weight of some weeds *Cyndon dactylon* , *Hurdeum vulgare* and *Cucumis sativus*. The results are shown in figures (dry weight, 15, 16, 17) (wet weight,18, 19, 20) evident that, In general there is a clear direct relationship between wet and dry weight of all tested weeds and extracts concentrations in which the wet and dry weight reduced gradually (Kil and yun, 1992) .

In case of *Cyndon dactylon*, the wet weight and dry weight clearly fully reduced when used of ethyl acetate, chloroform and hexane fractions at most concentrations used.

With *Hordeum vulgare* the wet and dry weight were fully reduced when used of ethyl acetate and chloroform fractions, at the most concentration used.

In case of *Cucumis sativus* the wet and dry weight were fully reduced when used of Ethyl acetate and Chloroform fraction at concentration (0.01mg/ml). The aqueous fraction was used as a growth activator of all tested weeds.

References

REFERENCES

Aerts, R.J., W.Snoeijer, E.Meijden and R.Verpoorte (1991).Allelopathic inhibition of seed germination by Cinchona alkaloids. Phytochemistry. 30(9):2947-2951.

Ahn, J .K, I. M. Chung (2000). Allelopathic potential of Rice Hulls on Germination and seedling Growth of Barnyardgrass. Agronomy Journal 2: 1162-1167,

Al-Hamdi, B. Inderjit, M. Olofsdotter and J. C. Streibig (2001). Loboratory Bioassay for phytotoxicity. Agronomy Journal. 93: 43- 48.

Al-Juboory, B.A. and M.M.Ahmad (1994). The allelopathic effects of plant residues on some weeds plants. Arab Journal Plant Protection.12 (1):3-11.

Al-Rehaily, A.J., T.A.Al-Howieiny, M.S.Ahmad, M.A.Al-Yahya, F.S.El Feraly, C.D.Hufford and A.T.Mcphail (2001).Alkaloids from *Haplophyllum tuberculatum*.Phytochemistry.**57:597-602.**

Alsaadawi, I.S., F.A.K.Sakeri and S.M.Al-Dulaimy (1990).Allelopathic inhibition of *Cynodon dactylon* (L.) pers. And other plant species by *Euphorbia prostrate* L. Journal of Chemical Ecology. **16(9):2747-2754**

Anaya, A.L., M. R. Calera, R. Mata and R. Pereda- Miranda (1990). Allelopathic potential of compounds isolated from *Iponoea tricolor* Cav. (Convolvulaceae). Journal of Chemical Ecology. **16, 7: 2145-2152.**

Berenbaum,M.R.(1995). Turnabout is fair play: secondary roles for primary compounds.Journal of Chemical Ecology.**21:925-941.**

Bhowmik, P.C.and Inderjit (2003).Challenges and opportunities in implementing allelopathy for natural weed management. Crop Protection.**22 (4):160-168**

Caamal – Maldonado, J .A. J. J. Jimene 3 – Gsornio, A. Torres – Barragan and A.L. Anaya (2001). The Use of Allelopathic legume Cover and Mulch speces for weed control in croppiny Systems . Agronomy Journal, **93: 27-36.**

Chon, S. U., Y.M. Kim and J.C. Lee (2003). Herbicidal Potential and quantification of causative allelochemicals from several compositae weeds. Weed Research. **43:444- 450.**

Chou, C.H. and Y.F.Lee (1991).Allelopathic dominance of Miscanthus transmorrisonensis in alpine grass land community in Taiwan.Journal of Chemical Ecology.**17 (11):2267-2281**

Chou, C.H. and L.L.Leu (1992).Allelopathic substance and interactions of *Delonix regia* (Boj) Raf. Journal of Chemical Ecology.**18 (12):2285-2303.**

Chung I. M., K. H. Kim, J. K. Ahn, S. B. Lee, S. H. Kim and S. J. Hahn (2003) Comparison of Allelopathic Potential of Rice Leaves, Straw, And HullExtracts on Barnyardgrass. Agronomy Journal **95:1063-1070**

Dikic, M. 1999 . Allelopathic effects of the extract of aromatic and medical plants on the germination of weed seed . In Proceedings of the 11th European Weed Research Society Symposium , Basel 1999, 75.

Duke, S.O.; J. Lydon (1993). Natural phytotoxins as herbicides.American Chemical Society. 524: 110-124

Ebana, K., W. Yan, R.H. Dilday, H. Namai and k. okuno (2001) Variation in the Allelopathic Effect of Rice with water Soluble Extracts Agronomy Journal, **93:12-16.**

Elakovich, S.D. and J.W.Wooten (1991).Allelopathic potential of *Nuphar lufea* (L.) SIBTH. And SM.(Nymphaeaceae). Journal of Chemical Ecology.**17 (4):707-714**

Ells, J.E and A.E.Mc Say (1991) . Allelopathic Effects of Alfalfa plant Residues on Emergence and Growtn of Cucumber seedlings Hortscience. **24 (4) : 368-370 .**

Ferguson,J.J.and B.Rathinsapathi (2003).Allelopathy How plants suppress other plants.Document HS944,of Horticulturl Sciences Department

,Florida Cooperative Extension Service,Institute of Food and Agricultural Sciences,University of Florida.

Fisher,R.(1980).Allelopathy: a potential cause of regeneration failure. Journal of Forestry: 346-350.

Fogelberg,F.(2001).Reseach on pest control and pesticide reduction in Sweden,Denmark and the Netherlands-ongoing work and new ideas for the futur . Dissertation . Dept. Agricultural Engineering Swedish University of Agricultural Sciences.

Frank, E. D. and S.O. Duke (2001). Searching for Rice allelochemicals. Agronomy Journal. 93: 16- 20.

Gabor,W.E. and C.Veatch(1981).Isolation of a phytotoxin form quackgrass (*Agropyron repens*) rhizomes.Weed science.29(2):155-159

Grace, J.B. And D. Tilman.(1990). Perspective on Plant Competition Academic Press, San Diego.

Hartmann, K.M.& Nezadal,W.1990.Photocontrol of weeds without herbicides. Naturwissenschaften 77,158-163

Horsley,S.B.(1977).Allelopathic inhibition of Black Cherry by Fern, grass, goldenrod and aster. Canadian Journal of Forestry Research **7:205-216**

Inderjit. (2001). Soils: environmental effect on allechemical activity. Ag Agronomy Journal **93:79-84.**

Inderjit and J.Weiner.(2001) Plant allelochemical interference or soil Chemical Ecology Perspectives in plant Ecology. Evolution and Systematics. **4:3-12.**

Inderjit; S. Kaur and K. M. M. Dakshini(1996).Determination of allelopathic potential of a weed Pluchea lanceolate through a multifaceted approach.Canadian Journal of Botany. **74:1445-1450**

Kil,B.S. and K.W.Yun(1992).Allelopathic effects of water extracts of *Artemisia princ* var.orientalis on selected plant species. Journal of Chemical Ecology.**18 (1):39-51.**

Mallik , A. U . and C.E. Prescott (2001) , Growth inhibitory of Salal on Western Hemlack and Westrn Red cedar , Agronomy Journal.93:85-92 .

Massey, A. B. (1925).Antagonism of the Walnuts (*Juglans nigra* L.and *J.cinerea* L.) in certain plant associations. Phytopathology. **15:773-784.**

Mcphail, A. T. ,D. R. Mcphail, M. S. Al-Said, M. M. El-Domiaty and F. S. El-Feraly(1990). Revision of the stereochemistry of (+)- tuberine, an alkaloid from *Haplophyllum tuberculatum* **29(9):3055-3057.**

Menges,R.M.(1988).Allelopathic effect of Palmer amaranth (*Amaranthus palmeri*) on seedling growth .Weed Science **36:325-328.**

Molisch, H.(1937). Der Einfluss einer Pflanze auf die andere-Allelopathie.Fischer, Jena ,Germany

Peterson, J.K.; H.F. Harrison (1991). Differential inhibition of seed germination by sweetpotato (*Ipomoea batatas*) root periderm extracts. Weed Science **39 (1): p. 119-123**

Qasem , J.R.(2001) . Allelopathic potential of white Tap and Syrian Sage on Vegetable Craps . Agronomy Journal .93 : 64-71.

Qasem, J. R. and C. L. Foy. (2001).Weed allelopathy, its ecological impacts and future prospects : a review. Journal of Crop Production **4:43-119.**

Rice, E.L. (1984).allelopathy, 2nd edition. Academic Press, Orlando, Florida.

Riffie,M.S.;G.R.Waller;D.S.Murray and R.P.Sgaramello(1990).Devil's-claw (*Proboscidea louisianica*), essential oil and its components: potential allelochemical agents on Cotton and Wheat. Journal of Chemical Ecology. **16(6)1927-1940.**

Roth, C. M., J. P. Shroyer and G. M. Paulsen (2000). Allelopathy of Sorghum on wheat under several Tillage systems. Agronomy Journal **92: 855-60.**

Schneiderhan, F.J.(1926).The Black Walnut(*Juglans nigra* L.) as a cause of the death of apple trees. Phytopathology. **17:529-540.**

Sheriha, G.M;K. Aboua and B.Z. Elshtaiwi (1985). An alkaloid from *Haplophyllum tuberculatum*. Phytochemistry 24(40):**884-886.**

Sheriha,G.M,K.Aboua,B.Z.Elshtaiwi,A.S.Ashour;F.A.Abeda and H.H.Alhallag (1987). Quinoline alkaloids and Cytolxie Lignams From *Haplophyllum tuberculatum*. Phytochemistry 26(12):3339-3341.

Shilling,D.G.;J.A.Dusky;M.A.Mossler and T.A.Bewick (1992). Allelopathic potential of Celery residues on Lettuce. Journal of the American society for Horticultural Science.117 (2):308-312.

Vasilakoglon, I., K. Dhima and I. Elefitherohorinos (2005). Allelopathic potential of Bermudagrass and and Johnsongrass. Agronomy Journal. 97: 303- 313.

Warnock , D.F,W.D. Hutchison , C. B. S. Tong and D,W, Davis (2001) Evaluating Maize for Alleloche micals That Affect Europeam Corn Borer (Lepidoptera : Crambidae) larval development , Crop Science 41:1761-1771.

Yun,K.W.;B.S.Kil(1992)Assessment of allelopathic potential in *Artemisia princes* var.orientalis residues. Journal of Chemical Ecology. 18(11)1933-1940.

Zackrisson,O. and M.C.Nilsson (1992).Allelopathic effects by *Empetum hermaphrodidum* on seed germination of two boreal tree species. Canadian Journal of forest research.22 (9):1319-1319.

المراجع العربية

الجبوري، عواد علي ومحمد الراوي(1994) علم الأدوية الطبيعية.الطبعة الأولى_دار الكتب والوثائق بغداد.ص38_71

Appendix

Table (1). Effect of *Haplophyllum tuberculatum* Methanol and Dist. water extracts on germination percentage (%) of some Weeds seeds.

Tested Weeds	Control D. water (%).	Glyophosate (%).	Methanol extract (%).	D.Water extract (%).
Hordeum vulgare	68.0(± 2.73)	3.0(± 2.74)	0.0(±0.0)	1(±2.24)
Cyndon dactylon	63.0(± 8.37)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)
Lycopersicon esculentum	44.0(± 11.94)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)
Cucumis sativus	87.0(± 6.71)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)
Ocimum basilium	71.0(± 10.84)	12.0(± 5.7)	0.0(±0.0)	0.0(±0.0)
Beta vulgaris	31.0(± 5.48)	9.0(±2.24)	0.0(±0.0)	1.0(±2.24)
Daucus carota	74.0(± 5.48)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)

Table (2) Effect of flower, root and leaf extracts of *Haplophyllum tuberculatum* Water extracts on germination percentage(%) of some crops and weeds

extracts	Leaf extract			Root extract			Flower extract		
Weed treatments	*Cyndon dactylon*	*Cucumis sativus*	*Hordeum vulgare*	*Cyndon dactylon*	*Cucumis sativus*	*Hordeum vulgare*	*Cyndon dactylon*	*Cucumis sativus*	*Hordeum vulgare*
Control glyophosate	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)
Control D.Water	60(±2.0)	86.67(±0.58)	61.67(±0.58)	51.67(±0.0)	98.33(±0.58)	71.67(±2.08)	46.67(±4.26)	91.67(±0.58)	68.66(±1.52)
Extracts conc (12.5mg/ml)	8.33(±0.58)	55.0(±1.0)	10.0(±2.65)	11.67(±0.58)	76.67(±2.3)	21.67(±1.53)	1.67(±0.58)	70.0(±1.53)	8.33(±1.15)
Extracts conc (25mg/ml)	0.0(±0.0)	45.0(±2.0)	8.33(±2.03)	1.67(±0.58)	68.33(±1.53)	0.0(±0.0)	0.0(±0.0)	58.0(±2.5)	3.33(±1.15)
Extracts conc (50mg/ml)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	68.33(±1.53)	0.0(±0.0)	0.0(±0.0)	15.0(±3.6)	0.0(±0.0)
Extracts conc (100mg/ml)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	68.33(±0.58)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)
Extracts conc (200mg/ml)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	43.33(±1.58)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)	0.0(±0.0)

Table (3).

Data file: _FLT_
Title: effect of flower, root and leaf extracts on growth percentage

Function: FACTOR

Experiment Model Number 2:
Completely Randomized Design for Factor A, Factor B
is a Split Plot
Data case no. 1 to 63.

Factorial ANOVA for the factors:
Replication (Var 1: rep) with values from 1 to 3
Factor A (Var 2: extract) with values from 1 to 3
Factor B (Var 3: treatment) with values from 1 to 7

Variable 5: Cucumis

Grand Mean = 40.238 Grand Sum = 2535.000 Total Count = 63

A N A L Y S I S O F V A R I A N C E T A B L E

K Value	Source	Degrees of Freedom	Sum of Squares	Mean Square	F Value	Prob
2	Factor A	2	13402.381	6701.191	145.5776	0.0000
-3	Error	6	276.190	46.032		
4	Factor B	6	58171.429	9695.238	97.6629	0.0000
6	AB	12	9197.619	766.468	7.7209	0.0000
-7	Error	36	3573.809	99.272		
	Total	62	84621.429			

Coefficient of Variation: 24.76%

s_ for means group 2: 1.4805 Number of Observations: 21
y

s_ for means group 4: 3.3212 Number of Observations: 9
y

s_ for means group 6: 5.7525 Number of Observations: 3
y

Variable 4: Hordeum

Grand Mean = 12.302 Grand Sum = 775.000 Total Count = 63

ANALYSIS OF VARIANCE TABLE

K	Source	Degrees of Freedom	Sum of Squares	Mean Square	F Value	Prob Value
2	Factor A	2	96.032	48.016	1.3750	0.3224
-3	Error	6	209.524	34.921		
4	Factor B	6	33013.494	5502.249	171.1811	0.0000
6	AB	12	415.079	34.590	1.0761	0.4075
-7	Error	36	1157.143	32.143		
	Total	62	34891.271			

Coefficient of Variation: 46.09%

s_ for means group 2: 1.2895 Number of Observations: 21
Y

s_ for means group 4: 1.8898 Number of Observations: 9
Y

s_ for means group 6: 3.2733 Number of Observations: 3
Y

==========

Variable 6: Cyndon

Grand Mean = 8.651 Grand Sum = 545.000 Total Count = 63

A N A L Y S I S O F V A R I A N C E T A B L E

K Value	Source	Degrees of Freedom	Sum of Squares	Mean Square	F Value	Prob
2	Factor A	2	98.413	49.206	5.3913	0.0457
-3	Error	6	54.762	9.127		
4	Factor B	6	20826.985	3471.164	280.6631	0.0000
6	AB	12	334.921	27.910	2.2567	0.0296
-7	Error	36	445.238	12.368		
	Total	62	21760.318			

Coefficient of Variation: 40.65%

s_ for means group 2: 0.6593 Number of Observations: 21
y

s_ for means group 4: 1.1723 Number of Observations: 9
y

s_ for means group 6: 2.0304 Number of Observations: 3
y

Table (4). The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on germination percentage (%) of *Cyndon dactylon* .

Treatment	Extracts concentration mg/ml	germination percentage %
Hexane Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	6.67(±0.58))
Chloroform Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	5.0(±0.0)
Ethylacetate Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.0(±0.0)
aqueous Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	1.67(±.0.58)
	0.1	3.33(±0.58)
	0.05	33.33(±1.53)
	0.01	50.0(±1.7)
Control glyphesate	1 ml/75 ml D. water	0.0(±0.0)
Control D.Water	Sterile D. water	53.33(±2.08)

Table (5). The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on germination percentage (%) of *Hordeum vulgare*.

Treatment	Extract concentration	germination percentage %
Hexane Fraction	0.3	0.0(±0.0)
	0.2	1.68(±0.58)
	0.15	1.68(±0.58)
	0.1	3.38(±0.58)
	0.05	6.68(±1.53)
	0.01	18.33(±3.0)
Chloroform Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	3.33(±0.58)
Ethyl acetate Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	1.68(±0.58)
aqueous Fraction	0.3	0.0(±0.0)
	0.2	1.33(±0.58)
	0.15	10.0(±.0.58)
	0.1	10.0(±0.0)
	0.05	16.68(±2.5)
	0.01	13.33(±1.53)
Control glyphosate	1 ml/75 ml D. water	0.0(±0.0)
Control D.Water	Sterile D. water	41.68(±1.15)

Table (6). The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on germination percentage (%) of *Cucumis Sativus*.

Treatment	Extract concentration	germination percentage %
Hexane Fraction	0.3	0.0(±0.0)
	0.2	30.0(±2.0)
	0.15	46.68(±3.79)
	0.1	58.33(±1.53)
	0.05	78.33(±3.79)
	0.01	83.33(±1.15)
Chloroform Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	53.33(±4.7)
Ethylacetate Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	33.33(±2.5)
aqueous Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	60.0(±.2.6)
	0.1	78.33(±1.5)
	0.05	95.0(±1.0)
	0.01	86.68(±1.53)
Control glyephosate	1 ml/75 ml D. water	0.0(±0.0)
Control D.Water	Sterile D. water	91.67(±0.58)

Table (7).

Variabe4: *Hordeum vulgare*

ANALYSIS OF VARIANCE TABLE

K Value	Source	Deqrees of freedom	Sum of Squares	Mean Square	F Value	Prod
2	Factor A	5	23540.972	4708.194	92.4518	0.0000
-3	Error	12	611.111	50.926		
4	Factor A	5	399.306	79.861	5.0145	0.0007
6	AB	25	799.306	31.972	2.0076	0.0144
-7	Error	60	955.556	15.926		
	Total	107	26306.250			

Coefficient of Variation:41.64%

Table (8).

Variabe5: *Cucumis Sativus*

ANALYSIS OF VARIANCE TABLE

K Value	Source	Deqrees of freedom	Sum of Squares	Mean Square	F Value	Prod
2	Factor A	5	117529.630	23505.926	236.7030	0.0000
-3	Error	12	1191.667	99.306		0.0000
4	Factor A	5	4443.148	4443.148	95.4945	0.0000
6	AB	25	1198.704	1198.704	25.7632	
-7	Error	60	46.528	64		
	Total	107				

Coefficient of Variation:19.59%

Table (9).

Variabe6: *Cyndon dactylon*

ANALYSIS OF VARIANCE TABLE

K Value	Source	Degrees of freedom	Sum of Squares	Mean Square	F Value	Prod
2	Factor A	5	40436.111	8087.222	74.3336	0.0000
-3	Error	12	1305.556	108.796		
4	Factor A	5	1630.556	326.111	62.8929	0.0000
6	AB	25	5516.667	220.667	42.5571	0.0000
-7	Error	60	311.111	5.185		
	Total	107				

Coefficient of Variation:19.52%

Table (10). The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on root length of *Hordeum vulgare*

Treatment	Extract concentration mg/ml	Root length (cm)
Hexane Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0 (±0.0)
	0.1	0.5(±0.0)
	0.05	3.1 (±2.0)
	0.01	4.48(±1.93)
Chloroform Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.45(±0.07)
Ethyl acetate Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.0(±0.0)
aqueous Fraction	0.3	0.0(±0.0)
	0.2	0.50 (±0.25)
	0.15	0.6.0 (±0.17)
	0.1	0.95(±0.20)
	0.05	1.6(±0.28)
	0.01	2.43(±1.07)
Control glyphosate	1 ml/75 ml D. water	0.0(±0.0)
Control D Water	Sterile D. water	3.1(±1.3)

Table (11).

The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on root length of *Hordeum vulgare*.(extracts)

Between-Subjects Factors
Tests of Between-Subjects Effects
Dependent Variable: HORDEUM

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Model	630.190	29	21.731	13.353	.000
EXTRACT	530.070	4	132.518	81.426	.000
REP	100.120	25	4.005	2.461	.003
Error	89.510	55	1.627		
Total	719.700	84			

a R Squared = .876 (Adjusted R Squared = .810)

Multiple Comparisons
Dependent Variable: HORDEUM
LSD

(I) EXTRACT	(J) EXTRACT	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
D.water	water extract	1.7656 *	.3324	.000	1.0996	2.4317
	cloroform	2.6538 *	.9361	.006	.7778	4.5299
	hexane	-4.6154E-02	.3696	.901	-.7868	.6944
water extract	D.water	-1.7656 *	.3324	.000	-2.4317	-1.0996
	cloroform	.8882	.9282	.343	-.9720	2.7484
	hexane	-1.8118 *	.3491	.000	-2.5113	-1.1122
cloroform	D.water	-2.6538 *	.9361	.006	-4.5299	-.7778
	water extract	-.8882	.9282	.343	-2.7484	.9720
	hexane	-2.7000 *	.9422	.006	-4.5882	-.8118
hexane	D.water	4.615E-02	.3696	.901	-.6944	.7868
	water extract	1.8118 *	.3491	.000	1.1122	2.5113
	cloroform	2.7000 *	.9422	.006	.8118	4.5882

Based on observed means.
* The mean difference is significant at the .05 level.

Table (12).
The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on root length of *Hordeum vulgare*.(Conc. Equoes fraction)

Tests of Between-Subjects Effects
Dependent Variable: HORDEUM

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Model	362.828	31	11.704	18.159	.000
REP	330.222	26	12.701	19.705	.000
FERQENCE	32.606	5	6.521	10.118	.000
Error	18.692	29	.645		
Total	381.520	60			

a R Squared = .951 (Adjusted R Squared = .899)

Multiple Comparisons
Dependent Variable: HORDEUM
LSD

		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
(I) FERQENCE	(J) FERQENCE				Lower Bound	Upper Bound
.00	1.00	.6788 *	.3246	.045	1.499E-02	1.3427
	5.00	1.4816 *	.3105	.000	.8466	2.1167
	10.00	2.1538 *	.3636	.000	1.4102	2.8975
	15.00	2.5038 *	.3636	.000	1.7602	3.2475
	20.00	2.6638 *	.3920	.000	1.8620	3.4657
1.00	.00	-.6788 *	.3246	.045	-1.3427	-1.4989E-02
	5.00	.8028 *	.3901	.049	4.921E-03	1.6006
	10.00	1.4750 *	.4336	.002	.5882	2.3618
	15.00	1.8250 *	.4336	.000	.9382	2.7118
	20.00	1.9850 *	.4577	.000	1.0489	2.9211
5.00	.00	-1.4816 *	.3105	.000	-2.1167	-.8466
	1.00	-.8028 *	.3901	.049	-1.6006	-4.9206E-03
	10.00	.6722	.4231	.123	-.1932	1.5376
	15.00	1.0222 *	.4231	.022	.1568	1.8876
	20.00	1.1822 *	.4478	.013	.2664	2.0981
10.00	.00	-2.1538 *	.3636	.000	-2.8975	-1.4102
	1.00	-1.4750 *	.4336	.002	-2.3618	-.5882
	5.00	-.6722	.4231	.123	-1.5376	.1932
	15.00	.3500	.4635	.456	-.5980	1.2980
	20.00	.5100	.4861	.303	-.4843	1.5043
15.00	.00	-2.5038 *	.3636	.000	-3.2475	-1.7602
	1.00	-1.8250 *	.4336	.000	-2.7118	-.9382
	5.00	-1.0222 *	.4231	.022	-1.8876	-.1568
	10.00	-.3500	.4635	.456	-1.2980	.5980
	20.00	.1600	.4861	.744	-.8343	1.1543
20.00	.00	-2.6638 *	.3920	.000	-3.4657	-1.8620
	1.00	-1.9850 *	.4577	.000	-2.9211	-1.0489
	5.00	-1.1822 *	.4478	.013	-2.0981	-.2664
	10.00	-.5100	.4861	.303	-1.5043	.4843
	15.00	-.1600	.4861	.744	-1.1543	.8343

Based on observed means.
* The mean difference is significant at the .05 level.

Table (13).

The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on root length of *Hordeum vulgare*(Conc. Chloroform fraction)

Tests of Between-Subjects Effects
Dependent Variable: HORDEUM

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	55.472	26	2.134	10.536	.240
Intercept	237.806	1	237.806	1174.349	.019
FERQENCE	13.080	1	13.080	64.591	.079
REP	42.392	25	1.696	8.374	.267
Error	.203	1	.203		
Total	293.480	28			
Corrected Total	55.674	27			

a R Squared = .996 (Adjusted R Squared = .902)

Table (14).
The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on root length of *Hordeum vulgare*(Conc. Hexane fraction)

Tests of Between-Subjects Effects
Dependent Variable: HORDEUM

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Model	613.469	31	19.789	10.246	.000
REP	571.411	26	21.977	11.379	.000
FEROENCE	42.058	5	8.412	4.355	.002
Error	106.231	55	1.931		
Total	719.700	86			

a R Squared = .852 (Adjusted R Squared = .769)
Dependent Variable: HORDEUM
LSD

		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
(I) FEROENCE	(J) FEROENCE				Lower Bound	Upper Bound
.00	1.00	-5.9790E-02 *	.4026	.882	-.8666	.7470
	5.00	.8972 *	.4506	.051	-5.8704E-03	1.8002
	10.00	2.3594 *	.5375	.000	1.2822	3.4366
	15.00	2.5913	.5619	.000	1.4653	3.7174
	20.00	2.7372	.6294	.000	1.4757	3.9986
1.00	.00	5.979E-02	.4026	.882	-.7470	.8666
	5.00	.9570 *	.4654	.044	2.437E-02	1.8896
	10.00	2.4192 *	.5499	.000	1.3171	3.5212
	15.00	2.6511 *	.5738	.000	1.5012	3.8010
	20.00	2.7970 *	.6401	.000	1.5142	4.0797
5.00	.00	-.8972	.4506	.051	-1.8002	5.870E-03
	1.00	-.9570 *	.4654	.044	-1.8896	-2.4368E-02
	10.00	1.4622 *	.5860	.016	.2879	2.6366
	15.00	1.6942 *	.6084	.007	.4748	2.9135
	20.00	1.8400 *	.6713	.008	.4946	3.1854
10.00	.00	-2.3594 *	.5375	.000	-3.4366	-1.2822
	1.00	-2.4192 *	.5499	.000	-3.5212	-1.3171
	5.00	-1.4622 *	.5860	.016	-2.6366	-.2879
	15.00	.2319	.6753	.733	-1.1214	1.5853
	20.00	.3778	.7325	.608	-1.0901	1.8457
15.00	.00	-2.5913 *	.5619	.000	-3.7174	-1.4653
	1.00	-2.6511 *	.5738	.000	-3.8010	-1.5012
	5.00	-1.6942 *	.6084	.007	-2.9135	-.4748
	10.00	-.2319	.6753	.733	-1.5853	1.1214
	20.00	.1458	.7506	.847	-1.3583	1.6500
20.00	.00	-2.7372 *	.6294	.000	-3.9986	-1.4757
	1.00	-2.7970 *	.6401	.000	-4.0797	-1.5142
	5.00	-1.8400 *	.6713	.008	-3.1854	-.4946
	10.00	-.3778	.7325	.608	-1.8457	1.0901
	15.00	-.1458	.7506	.847	-1.6500	1.3583

Based on observed means.
* The mean difference is significant at the .05 level.

Table (15). The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on root length of *Cucumis sativus*

Treatment	Extract concentration mg/ml	Root length(cm)
Hexane Fraction	0.3	0.0(±0.0)
	0.2	1.13(±.48)
	0.15	1.6(±0.66)
	0.1	2.5(±1.6)
	0.05	3.03(±1.4)
	0.01	4.6(±1.96)
Chloroform Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	1.1(±0.46)
Ethyl acetate Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	1.04(±0.31)
aqueous Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	1.07(±0.27)
	0.1	1.8(±0.65)
	0.05	4.35(±1.64)
	0.01	5.77(±1.6)
Control glyephosate	1 ml/75 ml D. water	0.0(±0.0)
Control D.Water	Sterile D. water	5.06(±2.0)

Table (16).
The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on Root length of *Cucumis sativus*.(extracts)

Tests of Between-Subjects Effects
Dependent Variable: CUCUMIS

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Model	5577.669	61	91.437	23.834	.000
EXTRACT	5359.908	5	1071.982	279.418	.000
REP	217.761	56	3.889	1.014	.453
Error	1588.301	414	3.836		
Total	7165.970	475			

a R Squared = .778 (Adjusted R Squared = .746)

Multiple Comparisons

Dependent Variable: CUCUMIS
LSD

(I) EXTRACT	(J) EXTRACT	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
D water	water extract	1.5479 *	.3001	.000	.9580	2.1378
	cloroform	3.9660 *	.4355	.000	3.1099	4.8220
	ethylacetat	4.0291 *	.5114	.000	3.0237	5.0344
	hexane	2.1333 *	.3020	.000	1.5397	2.7269
water extract	D.water	-1.5479 *	.3001	.000	-2.1378	-.9580
	cloroform	2.4180 *	.3744	.000	1.6820	3.1540
	ethylacetat	2.4812 *	.4606	.000	1.5758	3.3865
	hexane	.5854 *	.2043	.004	.1838	.9870
cloroform	D.water	-3.9660 *	.4355	.000	-4.8220	-3.1099
	water extract	-2.4180 *	.3744	.000	-3.1540	-1.6820
	ethylacetat	6.312E-02	.5583	.910	-1.0344	1.1606
	hexane	-1.8326 *	.3759	.000	-2.5716	-1.0937
ethylacetat	D.water	-4.0291 *	.5114	.000	-5.0344	-3.0237
	water extract	-2.4812 *	.4606	.000	-3.3865	-1.5758
	cloroform	-6.3125E-02	.5583	.910	-1.1606	1.0344
	hexane	-1.8958 *	.4618	.000	-2.8035	-.9880
hexane	D.water	-2.1333 *	.3020	.000	-2.7269	-1.5397
	water extract	-.5854 *	.2043	.004	-.9870	-.1838
	cloroform	1.8326	.3759	.000	1.0937	2.5716
	ethylacetat	1.8958 *	.4618	.000	.9880	2.8035

Based on observed means.
* The mean difference is significant at the .05 level.

Table (17).
The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on Root length of *Cucumis sativus*. (Conc. Equoes fraction)

Tests of Between-Subjects Effects
Dependent Variable: CUCUMIS

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Model	4521.307	60	75.355	34.964	.000
FERQENCE	4398.273	5	879.655	408.148	.000
REP	123.034	55	2.237	1.038	.417
Error	396.563	184	2.155		
Total	4917.870	244			

a R Squared = .919 (Adjusted R Squared = .893)

Multiple Comparisons
Dependent Variable: CUCUMIS
LSD

(I) FERQENCE	(J) FERQENCE	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
.00	1.00	-.6982 *	.2840	.015	-1.2585	-.1380
	5.00	.7155 *	.2787	.011	.1657	1.2654
	10.00	3.2542 *	.2916	.000	2.6788	3.8295
	15.00	3.9956 *	.3203	.000	3.3637	4.6274
1.00	.00	.6982 *	.2840	.015	.1380	1.2585
	5.00	1.4137 *	.2827	.000	.8559	1.9715
	10.00	3.9524 *	.2955	.000	3.3695	4.5354
	15.00	4.6938 *	.3238	.000	4.0550	5.3326
5.00	.00	-.7155 *	.2787	.011	-1.2654	-.1657
	1.00	-1.4137 *	.2827	.000	-1.9715	-.8559
	10.00	2.5387 *	.2904	.000	1.9657	3.1117
	15.00	3.2800 *	.3192	.000	2.6503	3.9098
10.00	.00	-3.2542 *	.2916	.000	-3.8295	-2.6788
	1.00	-3.9524 *	.2955	.000	-4.5354	-3.3695
	5.00	-2.5387 *	.2904	.000	-3.1117	-1.9657
	15.00	.7414 *	.3305	.026	8.926E-02	1.3935
15.00	.00	-3.9956 *	.3203	.000	-4.6274	-3.3637
	1.00	-4.6938 *	.3238	.000	-5.3326	-4.0550
	5.00	-3.2800 *	.3192	.000	-3.9098	-2.6503
	10.00	-.7414 *	.3305	.026	-1.3935	-8.9263E-02

Based on observed means.
* The mean difference is significant at the .05 level.

Table (18).
The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on Root length of *Cucumis sativus*. (Conc. Chloroform fraction)

Tests of Between-Subjects Effects
Dependent Variable: CUCUMIS

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	474.636	55	8.630	3.924	.000
Intercept	1134.009	1	1134.009	515.577	.000
FERQENCE	318.194	1	318.194	144.667	.000
REP	156.443	54	2.897	1.317	.206
Error	68.184	31	2.199		
Total	1676.830	87			
Corrected Total	542.821	86			

a R Squared = .874 (Adjusted R Squared = .652)

Table (19).
The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on Root length of *Cucumis sativus*. (Conc. Hexane fraction)

Tests of Between-Subjects Effects
Dependent Variable: CUCUMIS

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Model	5764.777	62	92.980	27.472	.000
REP	5258.356	57	92.252	27.257	.000
FERQENCE	506.421	5	101.284	29.926	.000
Error	1401.193	414	3.385		
Total	7165.970	476			

a R Squared = .804 (Adjusted R Squared = .775)

Multiple Comparisons
Dependent Variable: CUCUMIS
LSD

(I) FERQENCE	(J) FERQENCE	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
.00	1.00	1.2658 *	.2892	.000	.6973	1.8344
	5.00	1.3287 *	.3067	.000	.7258	1.9316
	10.00	2.9618 *	.3206	.000	2.3315	3.5921
	15.00	3.7481 *	.3408	.000	3.0783	4.4180
	20.00	3.9941 *	.4804	.000	3.0498	4.9384
1.00	.00	-1.2658 *	.2892	.000	-1.8344	-.6973
	5.00	6.288E-02	.2338	.788	-.3967	.5225
	10.00	1.6960 *	.2518	.000	1.2010	2.1909
	15.00	2.4823 *	.2770	.000	1.9379	3.0267
	20.00	2.7283 *	.4374	.000	1.8684	3.5881
5.00	.00	-1.3287 *	.3067	.000	-1.9316	-.7258
	1.00	-6.2883E-02	.2338	.788	-.5225	.3967
	10.00	1.6331 *	.2717	.000	1.0990	2.1671
	15.00	2.4194 *	.2952	.000	1.8392	2.9997
	20.00	2.6654 *	.4492	.000	1.7824	3.5484
10.00	.00	-2.9618 *	.3206	.000	-3.5921	-2.3315
	1.00	-1.6960 *	.2518	.000	-2.1909	-1.2010
	5.00	-1.6331 *	.2717	.000	-2.1671	-1.0990
	15.00	.7863 *	.3096	.011	.1777	1.3950
	20.00	1.0323 *	.4588	.025	.1304	1.9342
15.00	.00	-3.7481 *	.3408	.000	-4.4180	-3.0783
	1.00	-2.4823 *	.2770	.000	-3.0267	-1.9379
	5.00	-2.4194 *	.2952	.000	-2.9997	-1.8392
	10.00	-.7863 *	.3096	.011	-1.3950	-.1777
	20.00	.2460	.4731	.603	-.6840	1.1759
20.00	.00	-3.9941 *	.4804	.000	-4.9384	-3.0498
	1.00	-2.7283 *	.4374	.000	-3.5881	-1.8684
	5.00	-2.6654 *	.4492	.000	-3.5484	-1.7824
	10.00	-1.0323 *	.4588	.025	-1.9342	-.1304
	15.00	-.2460	.4731	.603	-1.1759	.6840

Based on observed means.
* The mean difference is significant at the .05 level.

Table (20). The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on root length of *Cyndon dactylon*

Treatment	Extract concentration mg/ml	Root length(cm)
Hexane Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.53(±0.05)
Chloroform Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.0 (±0.0)
Ethyl acetate Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.0(±0.0)
aqueous Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.65(±0.2)
	0.05	1.37(±0.85)
	0.01	1.37(±0.78)
Control Ethanol	1 ml/75 ml D. water	0.0(±0.0)
Control D.Water	Sterile D. water	1.45(±1.17)

Table (21).
The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on root length of *Cyndon dactylon.*(extracts)

Tests of Between-Subjects Effects
Dependent Variable: CYNDON

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Model	203.261	39	5.212	8.240	.000
EXTRACT	159.954	5	31.991	50.577	.000
REP	43.307	34	1.274	2.014	.010
Error	34.789	55	.633		
Total	238.050	94			

a R Squared = .854 (Adjusted R Squared = .750)

The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on root length of *Cyndon dactylon.* (Conc. Equoes fraction)

Tests of Between-Subjects Effects
Dependent Variable: CYNDON

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Model	203.229	37	5.493	7.763	.000
FERQENCE	162.275	5	32.455	45.872	.000
REP	40.954	32	1.280	1.809	.031
Error	33.961	48	.708		
Total	237.190	85			

a R Squared = .857 (Adjusted R Squared = .746)

Table (22).

- The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on root length of *Cyndon dactylon.*(Conc. Chloroform fraction)

Tests of Between-Subjects Effects
Dependent Variable: CYNDON

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	46.375	33	1.405		
Intercept	67.765	1	67.765		
FERQENCE	2.053	1	2.053		
REP	44.322	32	1.385		
Error	.000	0			
Total	114.140	34			
Corrected Total	46.375	33			

a R Squared = 1.000 (Adjusted R Squared = .)

The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on root length of *Cyndon dactylon*(Conc. Hexane fraction)

Tests of Between-Subjects Effects
Dependent Variable: CYNDON

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Model	114.990	37	3.108	621.568	.002
FERQENCE	70.672	5	14.134	2826.861	.000
REP	44.318	32	1.385	276.991	.004
Error	1.000E-02	2	5.000E-03		
Total	115.000	39			

a R Squared = 1.000 (Adjusted R Squared = .998)

Table (23). The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on wet weight of *Hordeum vulgare*

Treatment	Extract concentration mg/ml	wet weight(g)
Hexane Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0066 (±0.012)
	0.1	0.0066(±0.006)
	0.05	0.018 (±0.017)
	0.01	0043. (±0.003)
Chloroform Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.03 (±0.026)
Ethyl acetate Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.0(±0.0)
aqueous Fraction	0.3	0.0(±0.0)
	0.2	0.016(±0.003)
	0.15	0.027(±0.0028)
	0.1	0.037(±0.0028)
	0.05	0.044(±0.04)
	0.01	0.084 (±0.003)
Control glyphosate	1 ml/75 ml D. water	0.0(±0.0)
Control D.Water	Sterile D. water	0.052 (±0.002)

Table (24). The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on wet weight Cucumis sativus

Treatment	Extract concentration	wet weight(g)
Hexane Fraction	0.3	0(±0)
	0.2	0.033(±0.003)
	0.15	0.034(±0.003)
	0.1	0.042(±0.0024)
	0.05	0.043(±0.006)
	0.01	0.039(±0.006)
Chloroform Fraction	0.3	0(±0)
	0.2	0(±0)
	0.15	0(±0)
	0.1	0(±0)
	0.05	0(±0)
	0.01	0.060(±0.0028)
Ethyl acetate Fraction	0.3	0(±0)
	0.2	0(±0)
	0.15	0(±0)
	0.1	0(±0)
	0.05	0(±0)
	0.01	0.067(±0.004)
aqueous Fraction	0.3	0(±0)
	0.2	0(±0)
	0.15	0.064(±0.005)
	0.1	0.101(±0.009)
	0.05	0.125(±0.01)
	0.01	0.13(±0.008)
Control glyophosate	1 ml/75 ml D. water	0(±0)
Control D.Water	Sterile D. water	0.095(±0.0035)

Table (25). The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on wet weight *Cyndon dactylon*

Treatment	Extract concentration	wet weight(g)
Hexane Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.0023(±0.0006)
Chloroform Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.0018(±0.0003)
Ethyl acetate Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.0(±0.0)
aqueous Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.001(±0.001)
	0.05	0.0033(±0.0002)
	0.01	0.0036(±0.0005)
Control glyphosate	1 ml/75 ml D. water	0.0(±0.0)
Control D.Water	Sterile D. water	0.0038(±0.00025)

Table (26).

METOUT

Data file: METDATA2
Title:

Function: FACTOR

Experiment Model Number 2:
Completely Randomized Design for Factor A, Factor B
is a Split Plot
Data case no. 1 to 108.

Factorial ANOVA for the factors:
Replication (Var 1: rep) with values from 1 to 3
Factor A (Var 2: extract) with values from 1 to 6
Factor B (Var 3: tret) with values from 1 to 6

Variable 4: hordeum

Grand Mean = 0.015 Grand Sum = 1.904 Total Count = 108

A N A L Y S I S O F V A R I A N C E T A B L E

K Value	Source	Degrees of Freedom	Sum of Squares	Mean Square	F Value	Prob
2	Factor A	5	0.046	0.009	320.2756	0.0000
-3	Error	12	0.001	0.000		
4	Factor B	5	0.006	0.001	13.8326	0.0000
6	AB	25	0.009	0.000	4.0356	0.0000
-7	Error	60	0.006	0.000		
	Total	107	0.068			

Coefficient of Variation: 54.80%

s_ for means group 2: 0.0021 Number of Observations: 18
y

s_ for means group 4: 0.0023 Number of Observations: 18
y

s_ for means group 6: 0.0056 Number of Observations: 3
y

Variable 5: cucumes

Grand Mean = 0.037 Grand Sum = 3.990 Total Count = 108

A N A L Y S I S O F V A R I A N C E T A B L E

F Value	Source	Degrees of Freedom	Sum of Squares	Mean Square	F Value	Prob
2	Factor A	5	0.144	0.029	167.0294	0.0000
-3	Error	12	0.002	0.000		
4	Factor B	5	0.026	0.005	417.6915	0.0000
6	AB	25	0.046	0.002	145.7903	0.0000
-7	Error	60	0.001	0.000		
	Total	107	0.219			

Coefficient of Variation: 9.63%

$s_{\bar{y}}$ for means group 2: 0.0031 Number of Observations: 15

$s_{\bar{y}}$ for means group 4: 0.0003 Number of Observations: 15

$s_{\bar{y}}$ for means group 6: 0.0021 Number of Observations: 3

Variable 6: cyndon

Grand Mean = 0.001 Grand Sum = 0.100 Total Count = 105

A N A L Y S I S O F V A R I A N C E T A B L E

F Value	Source	Degrees of Freedom	Sum of Squares	Mean Square	F Value	Prob
2	Factor A	5	0.000	0.000	107.8850	0.0000
-3	Error	12	0.000	0.000		
4	Factor B	5	0.000	0.000	53.6500	0.0000
6	AB	25	0.000	0.000	20.6576	0.0000
-7	Error	60	0.000	0.000		
	Total	107	0.000			

Coefficient of Variation: 30.43%

$s_{\bar{y}}$ for means group 2: 0.0001 Number of Observations: 15

$s_{\bar{y}}$ for means group 4: 0.0001 Number of Observations: 15

$s_{\bar{y}}$ for means group 6: 0.0002 Number of Observations: 3

Table (27). The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on dry weight of *Hordeum vulgare*

Treatment	Extract concentration	dry weight(g)
Hexane Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.001(±0.0)
	0.1	0.001(±0.0004)
	0.05	0.0012(±0.0025)
	0.01	0.01(±0.0025)
Chloroform Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.0033(±0.0029)
Ethyl acetate Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.0(±0.0)
aqueous Fraction	0.3	0.0(±0.0)
	0.2	0.0037(±0.001)
	0.15	0.0038(±0.001)
	0.1	0.0047(±0.0003)
	0.05	0.005(±0.004)
	0.01	0.0023(±0.0003)
Control glyphosate	1 ml/75 ml D. water	0.0(±0.0)
Control D.Water	Sterile D. water	0.015(±0.0026)

Table (28). The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on dry weight of **Cucumis sativus**

Treatment	Extract concentration	dry weight(g)
Hexane Fraction	0.3	0.0(±0.0)
	0.2	0.02(±0.0006)
	0.15	0.024(±0.003)
	0.1	0.023(±0.0009)
	0.05	0.023(±0.003)
	0.01	0.021(±0.001)
Chloroform Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.021(±0.0009)
Ethyl acetate Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.022(±0.002)
aqueous Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.021(±0.0009)
	0.1	0.022(±0.0026)
	0.05	0.022(±0.0003)
	0.01	0.022(±0.0006)
Control glyphosate	1 ml/75 ml D. water	0(±0)
Control D.Water	Sterile D. water	0.018(±0.0023)

Table (29). The effect of *Haplophyllum tuberculatum* Extracts Fractionated by different solvents from ethanol extracts on dry weight of *Cyndon dactylon*

Treatment	Extract concentration	dry weight(g)
Hexane Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.0001(±0.0)
Chloroform Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0.00013(±0.00006)
Ethyl acetate Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.0(±0.0)
	0.05	0.0(±0.0)
	0.01	0 .0(±0.0)
Aqueous Fraction	0.3	0.0(±0.0)
	0.2	0.0(±0.0)
	0.15	0.0(±0.0)
	0.1	0.000067(±0.000058)
	0.05	0.00066(±0.0001)
	0.01	0.00045(±0.00015)
Control glyphosate	1 ml/75 ml D. water	0.0(±0.0)
Control D.Water	S. D. water	0.00050(±0.0001)

Table (30).

DRAYANO

Data file: :DRAYDATA:
Title:

Function: FACTOR

Experiment Model Number 2:
Completely Randomized Design for Factor A, Factor B
is a Split Plot
Data case no. 1 to 108.

Factorial ANOVA for the factors:
Replication (Var 1: rrep) with values from 1 to 3
Factor A (Var 2: extract) with values from 1 to 6
Factor B (Var 3: tret) with values from 1 to 6

Variable 4: hordeum

Grand Mean = 0.004 Grand Sum = 0.379 Total Count = 108

A N A L Y S I S O F V A R I A N C E T A B L E

F Value	Source	Degrees of Freedom	Sum of Squares	Mean Square	F Value	Prob
2	Factor A	5	0.003	0.001	63.8132	0.0000
-3	Error	12	0.000	0.000		
4	Factor B	5	0.000	0.000	7.4656	0.0000
6	AB	25	0.000	0.000	4.6762	0.0000
-7	Error	60	0.000	0.000		
	Total	107	0.003			

Coefficient of Variation: 37.61%

s_ for means group 2: 0.0007 Number of Observations: 18
y

s_ for means group 4: 0.0003 Number of Observations: 18
y

s_ for means group 6: 0.0003 Number of Observations: 3
y

Variable 5: cucumis

Grand Mean = 0.010 Grand Sum = 1.043 Total Count = 103

DRAYAND

ANALYSIS OF VARIANCE TABLE

K lue	Source	Degrees of Freedom	Sum of Squares	Mean Square	F Value	Prob
2	Factor A	5	0.006	0.001	170.4175	0.0000
3	Error	12	0.000	0.000		
4	Factor B	5	0.002	0.000	251.1529	0.0000
6	AB	25	0.003	0.000	80.7861	0.0000
7	Error	60	0.000	0.000		
	Total	107	0.012			

Coefficient of Variation: 13.51%

$s_{\bar{y}}$ for means group 2: 0.0006 Number of Observations: 18

$s_{\bar{y}}$ for means group 4: 0.0003 Number of Observations: 15

$s_{\bar{y}}$ for means group 6: 0.0003 Number of Observations: 3

==========

Variable 6: cyndon

Grand Mean = 0.000 Grand Sum = 0.012 Total Count = 105

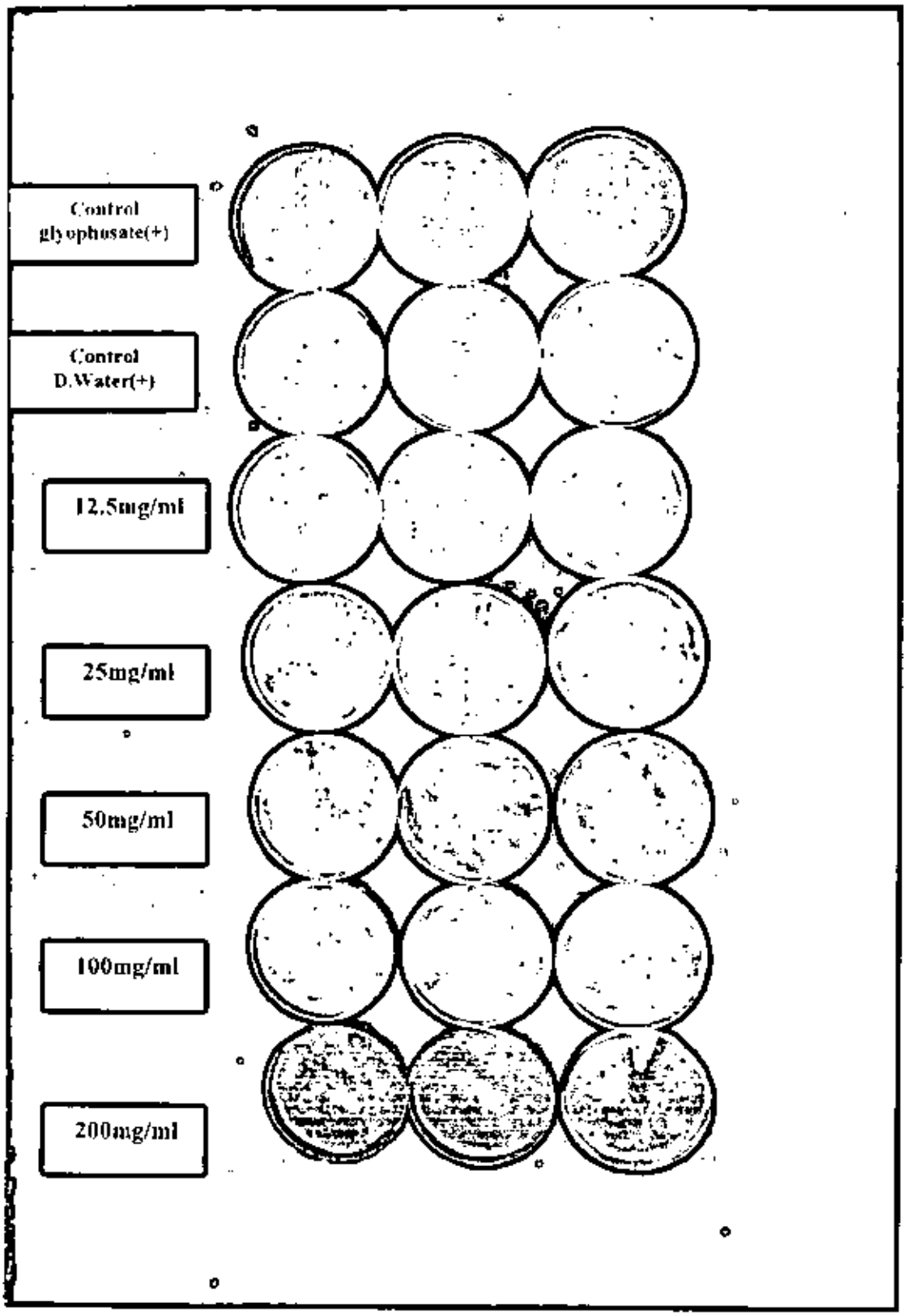
ANALYSIS OF VARIANCE TABLE

K lue	Source	Degrees of Freedom	Sum of Squares	Mean Square	F Value	Prob
2	Factor A	5	0.000	0.000	14.5871	0.0001
3	Error	12	0.000	0.000		
4	Factor B	5	0.000	0.000	13.5779	0.0000
6	AB	25	0.000	0.000	6.8661	0.0000
7	Error	60	0.000	0.000		
	Total	107	0.000			

Coefficient of Variation: 63.05%

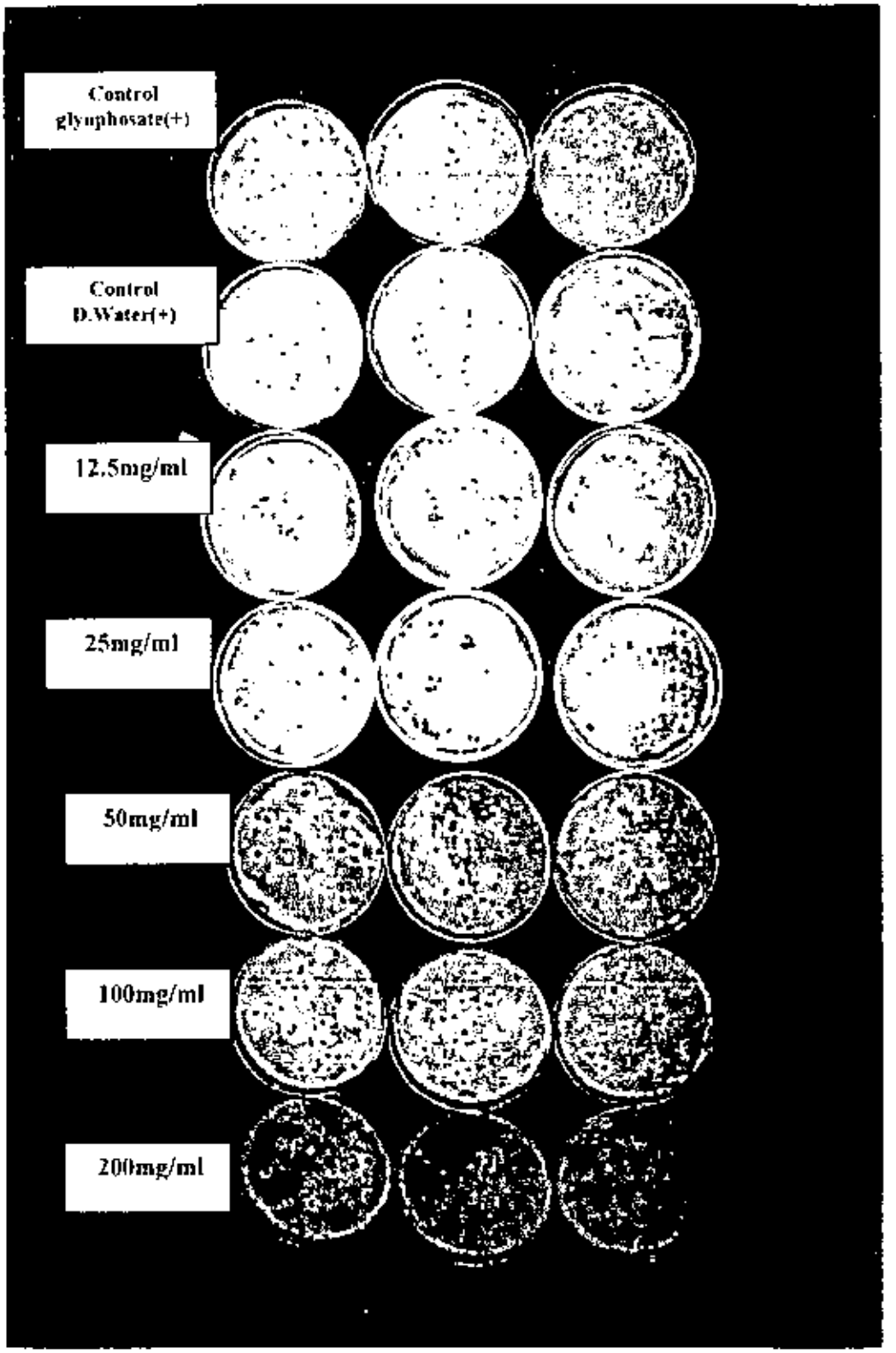
$s_{\bar{y}}$ for means group 2: 0.0000 Number of Observations: 18

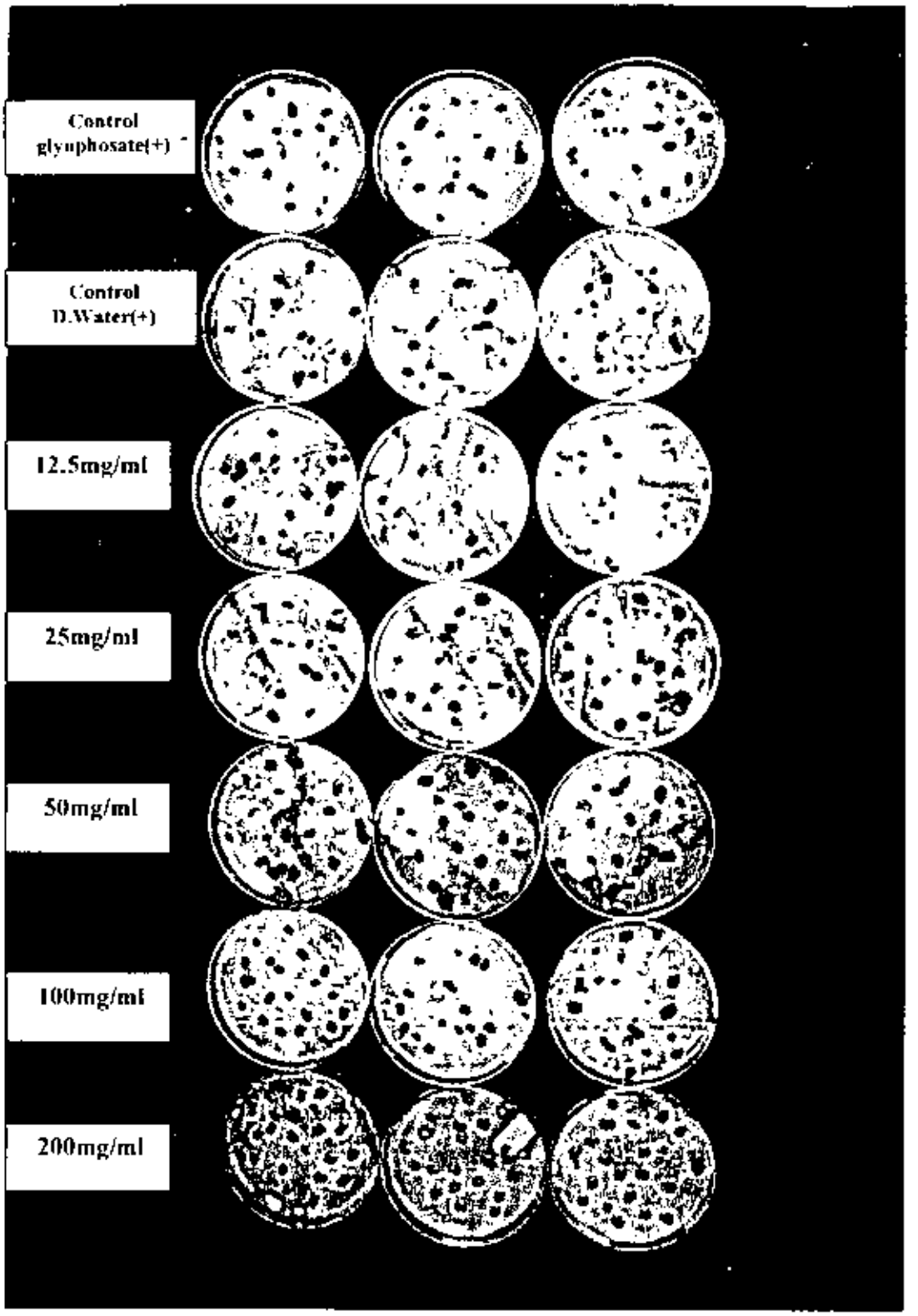
$s_{\bar{y}}$ for means group 4:	0.0000	Number of Observations: 15
$s_{\bar{y}}$ for means group 6:	0.0000	Number of Observations: 3



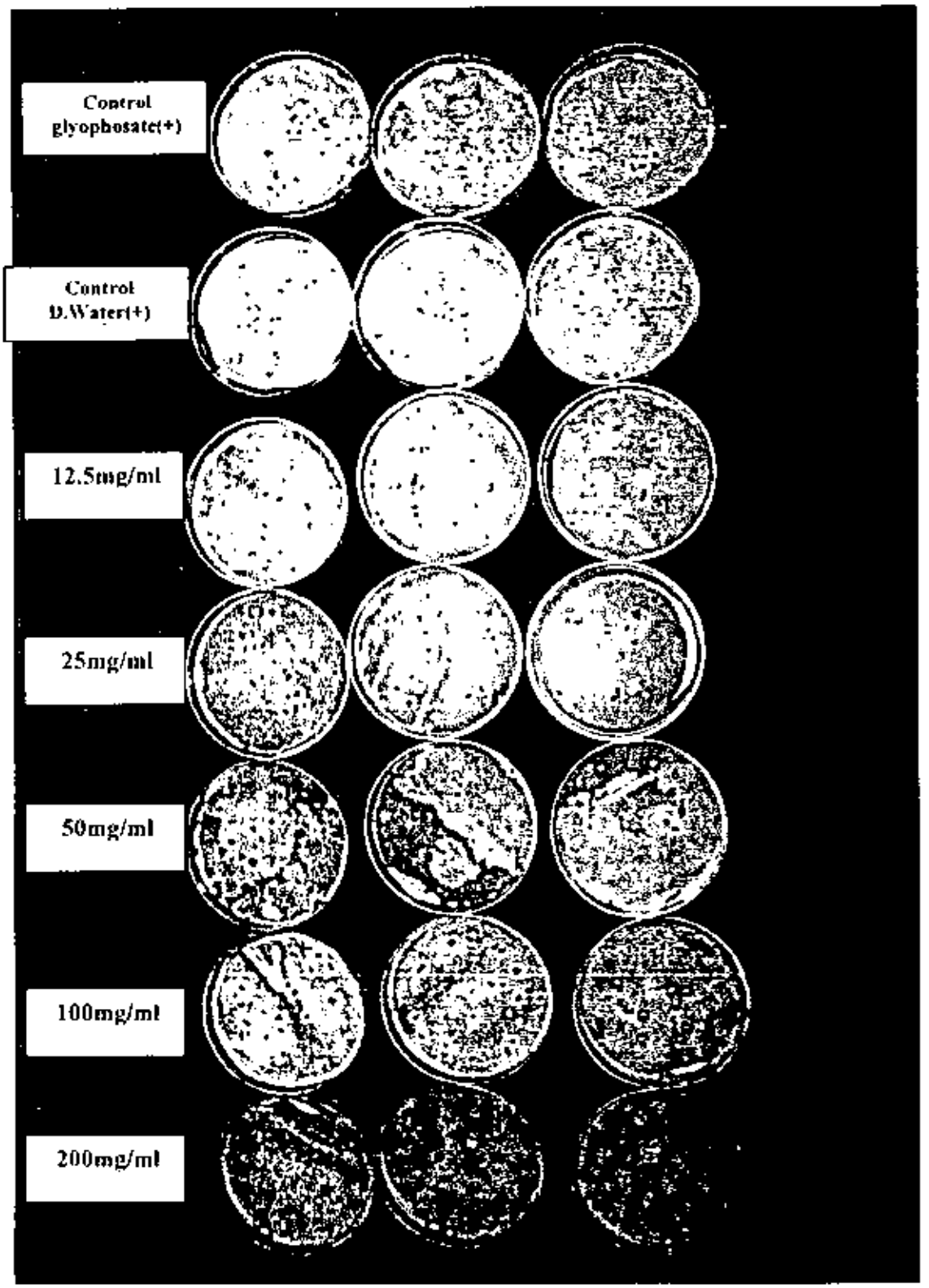
Plate(1)
Anagalis arvensis

Plate(2) *Ocimum basilium*



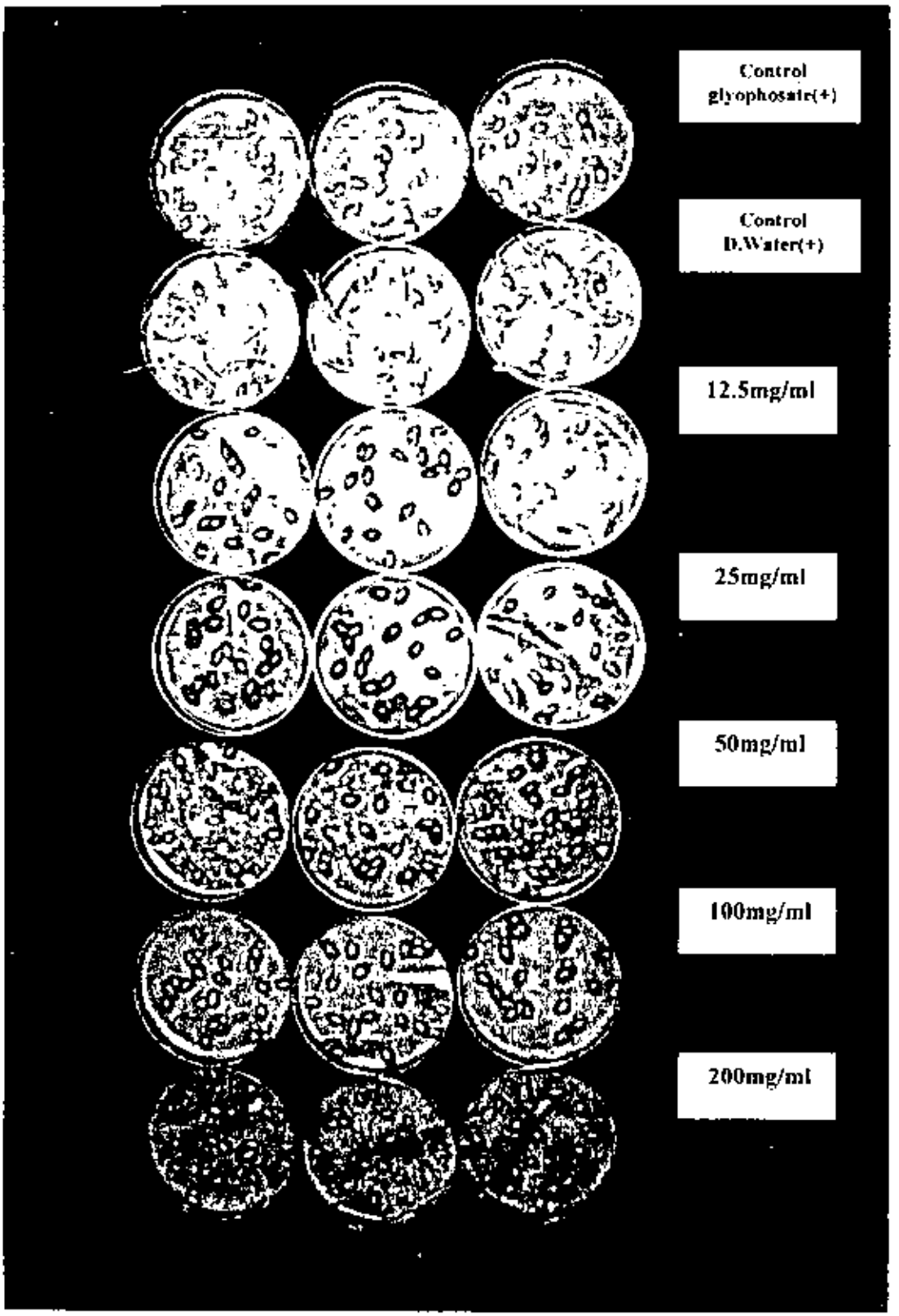


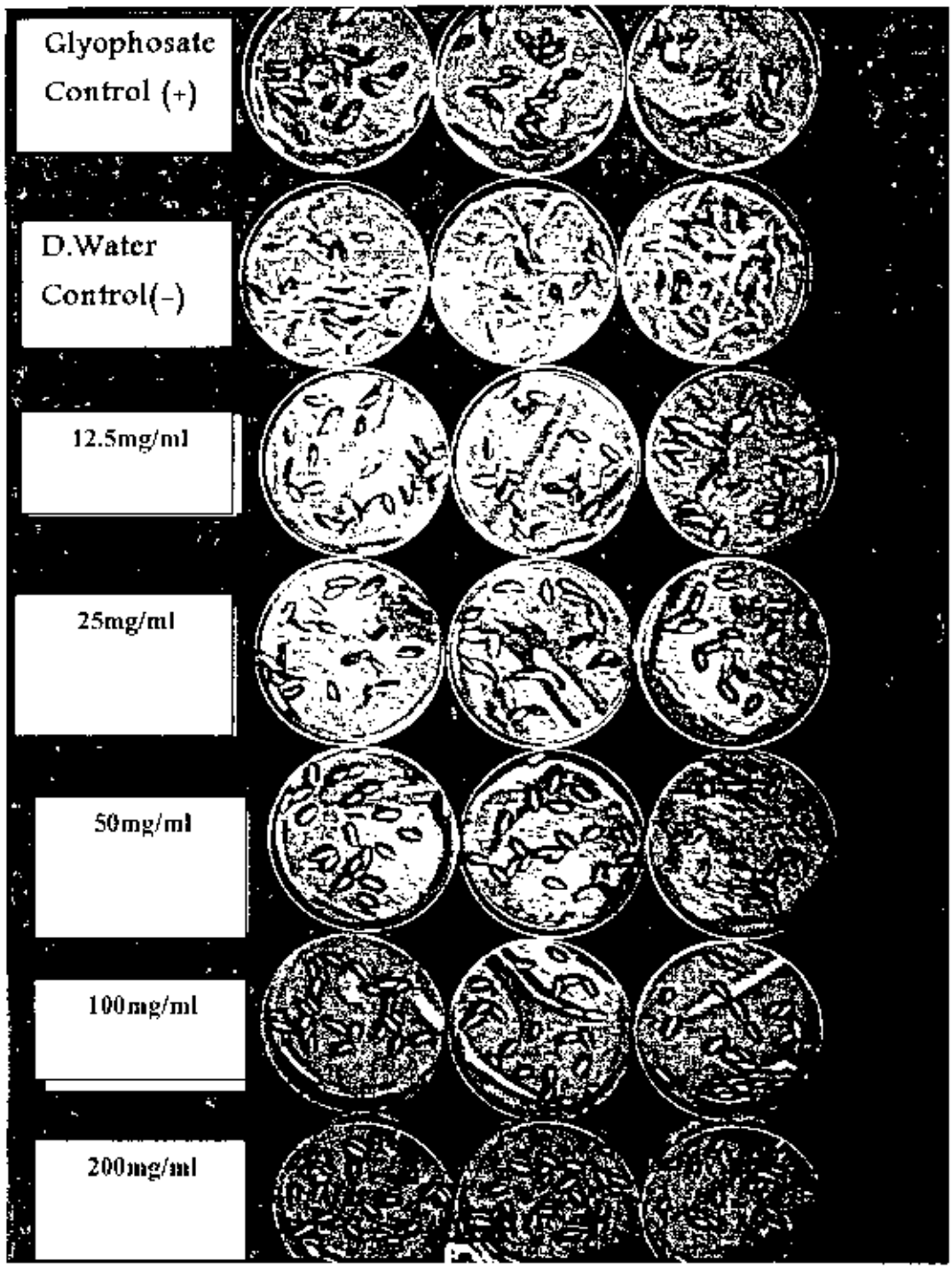
Plate(3)*Emax spinosus*



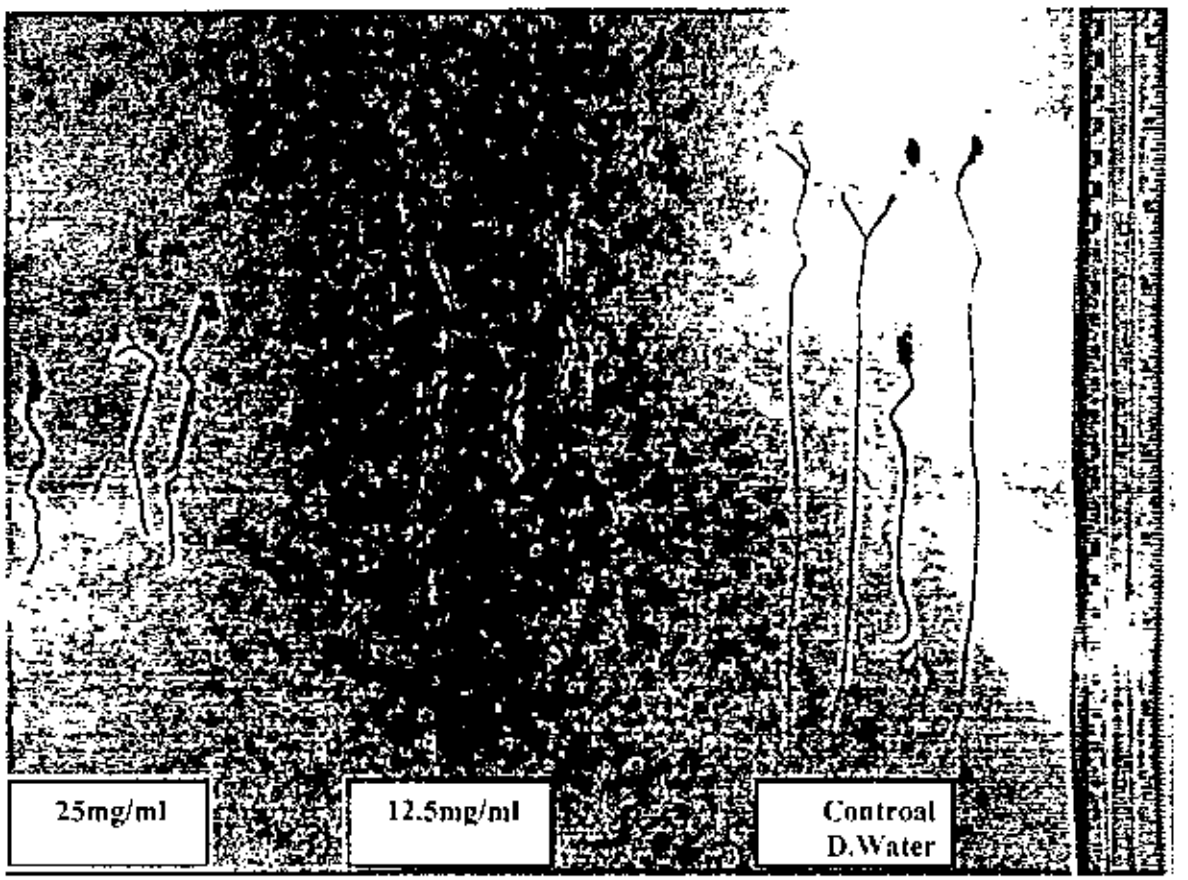
Plate(4)*Daucus carota*

Plate(5) ***Hordeum vulgare***

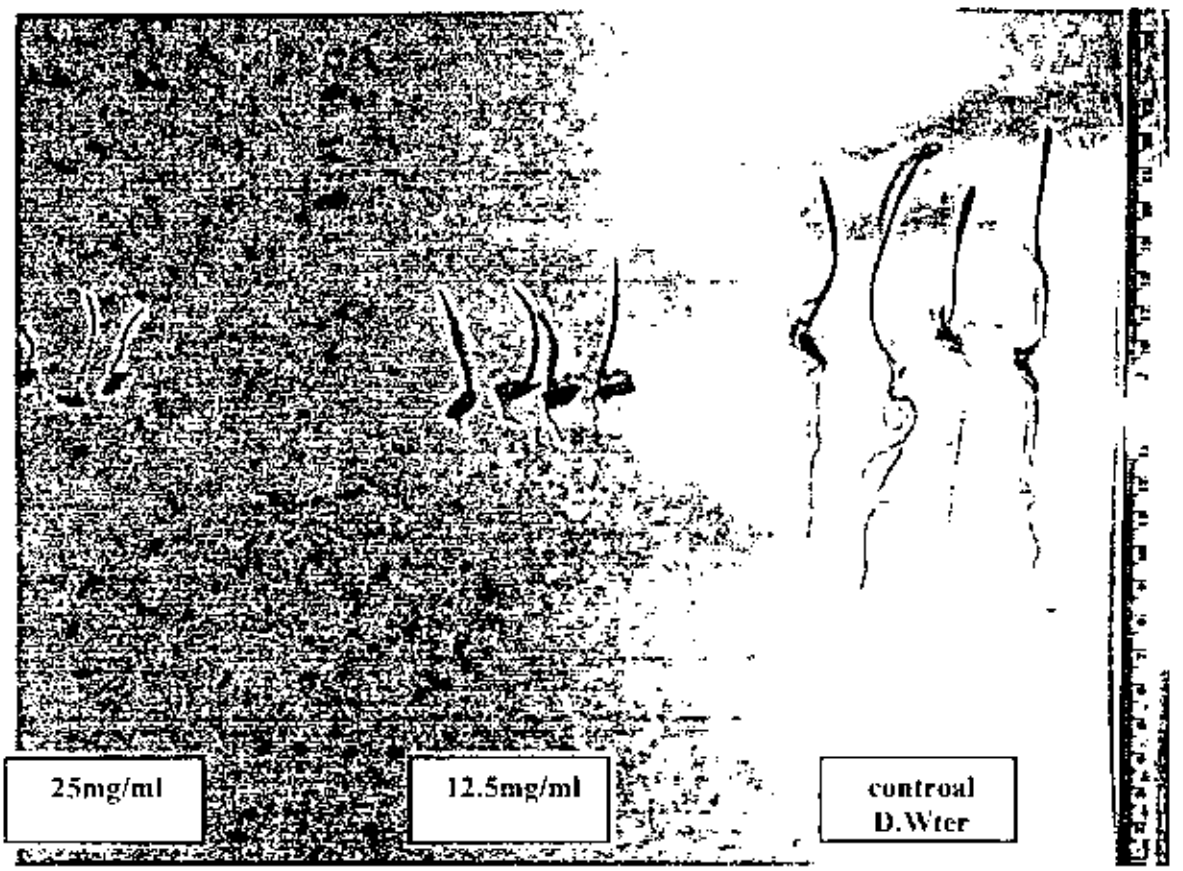




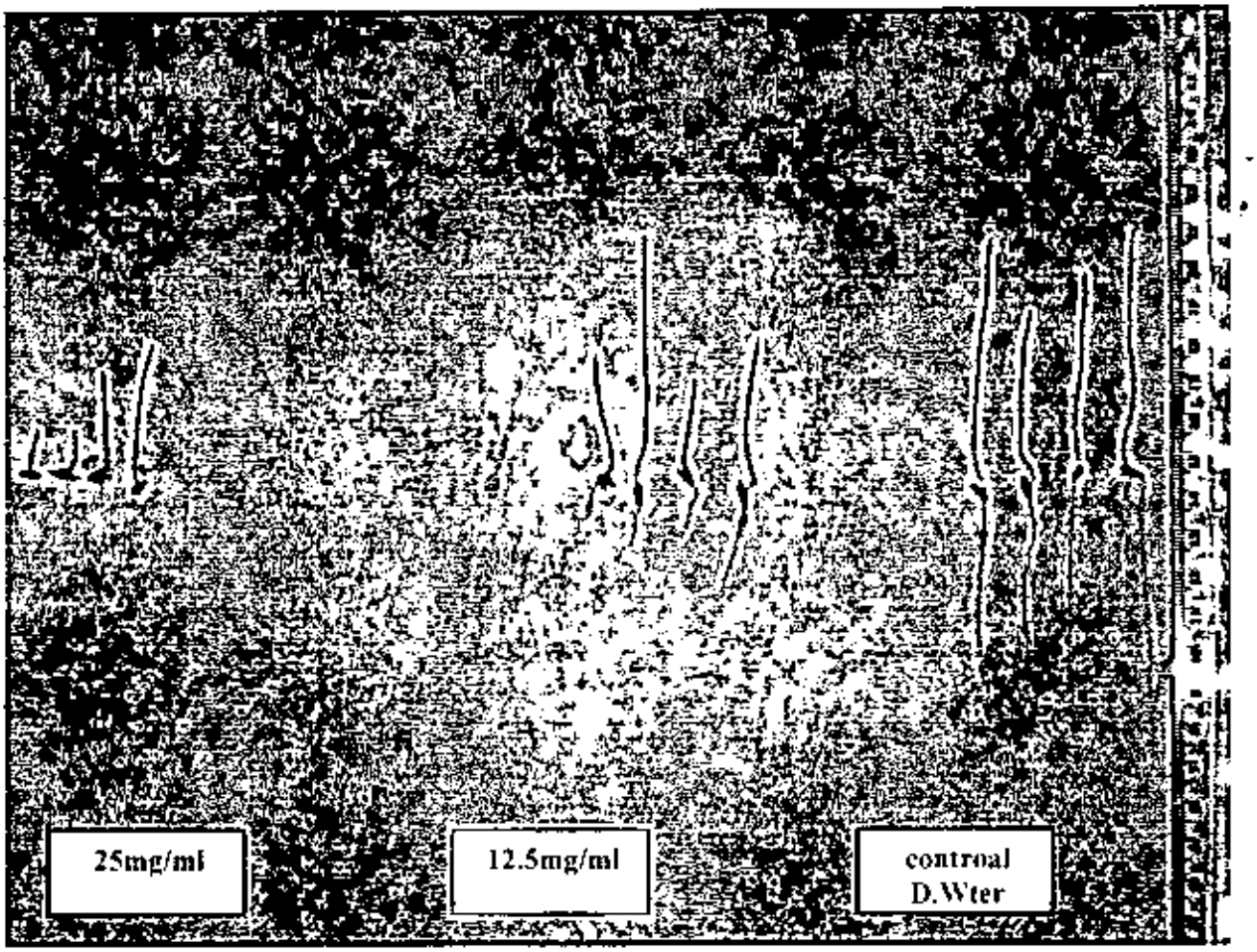
Plate(6)*Cucumis sativus*



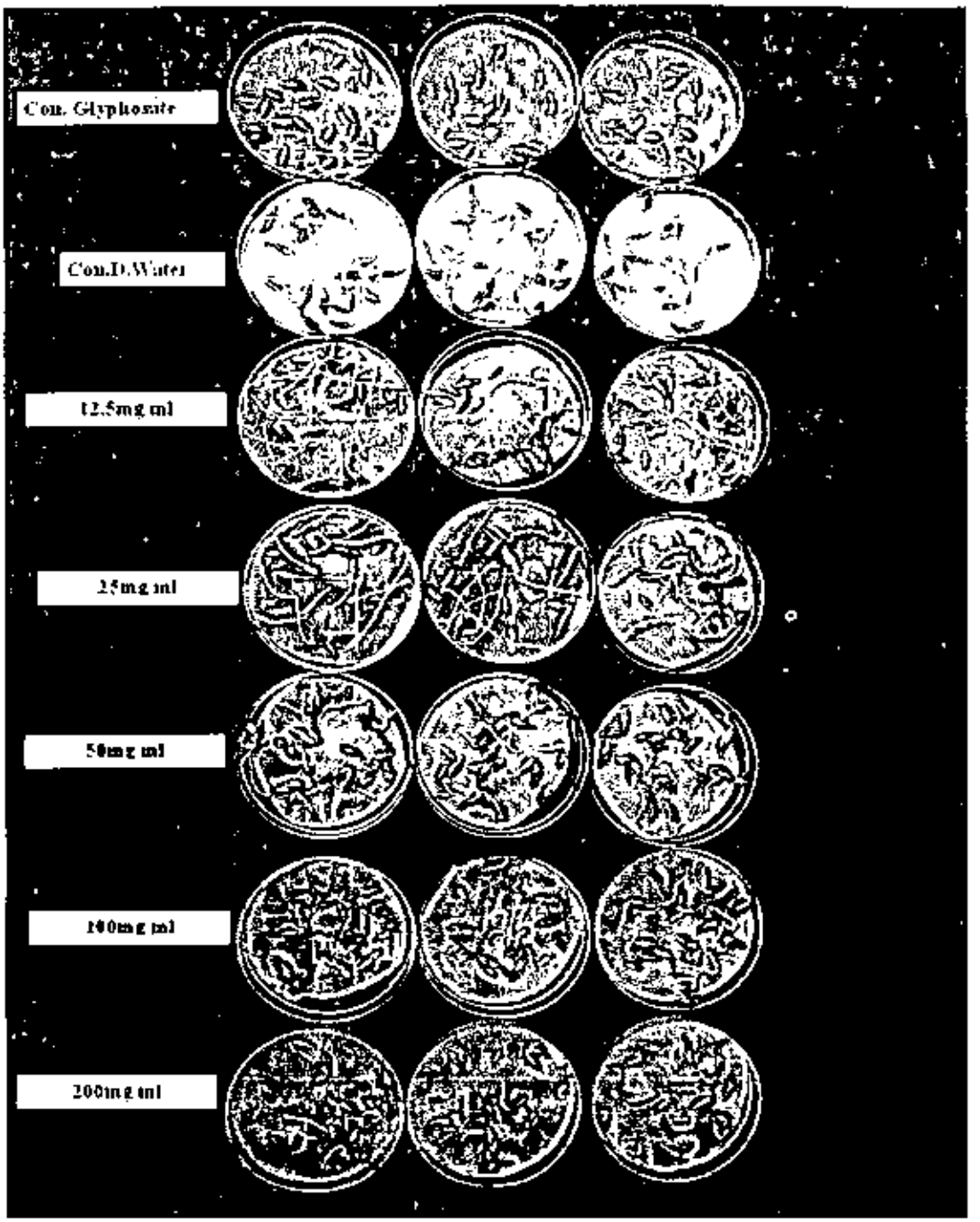
Plate(8) Effect of *Haplophyllum tuberculatum* Dist. water extracts on *Emax spinosus*



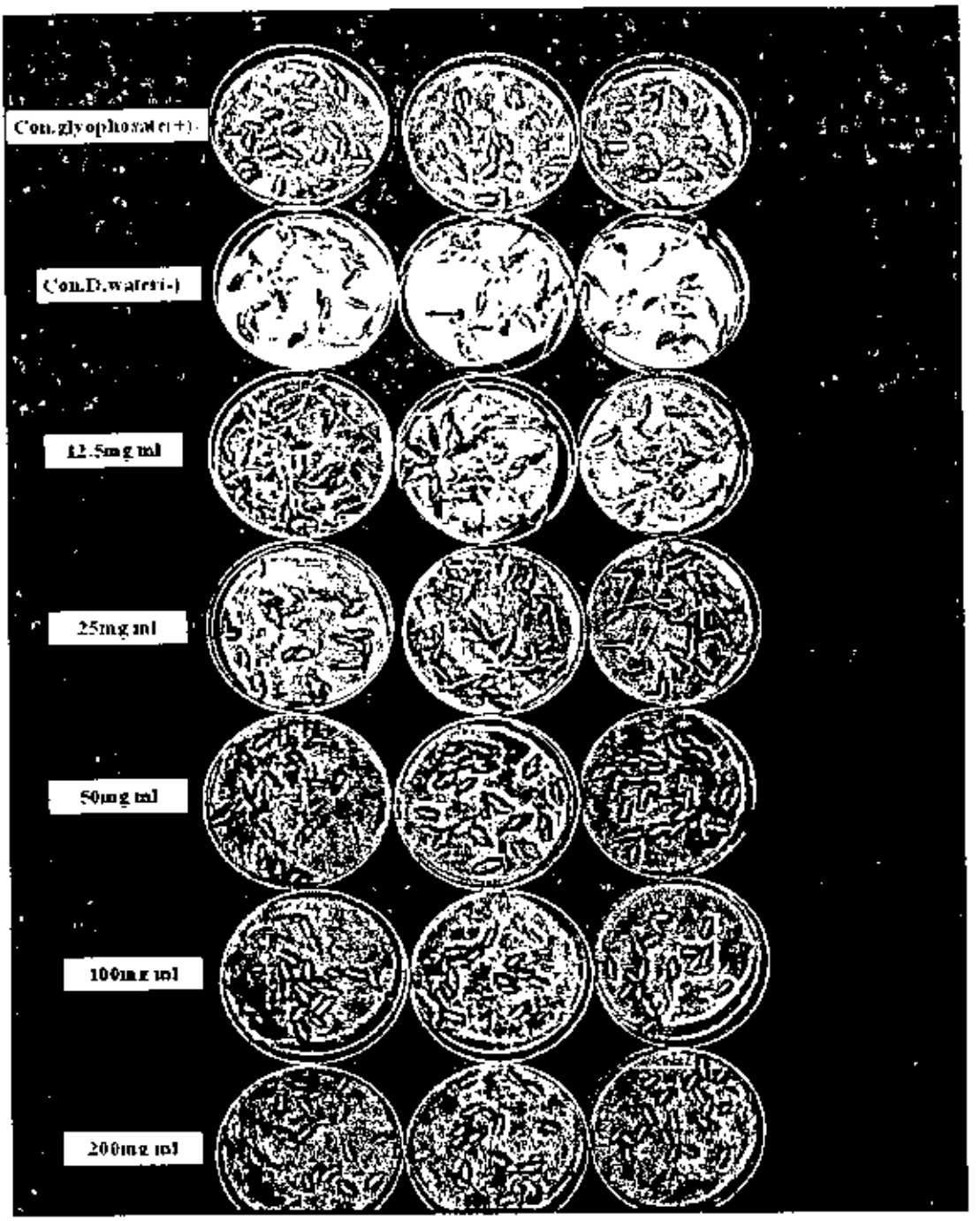
Plate(9)Effect of *Haplophyllum tuberculatum* Dist. water extracts on *Hordeum vulgare*



st. water extracts on *Cyndon dactylon*.Plate(10) Effect of

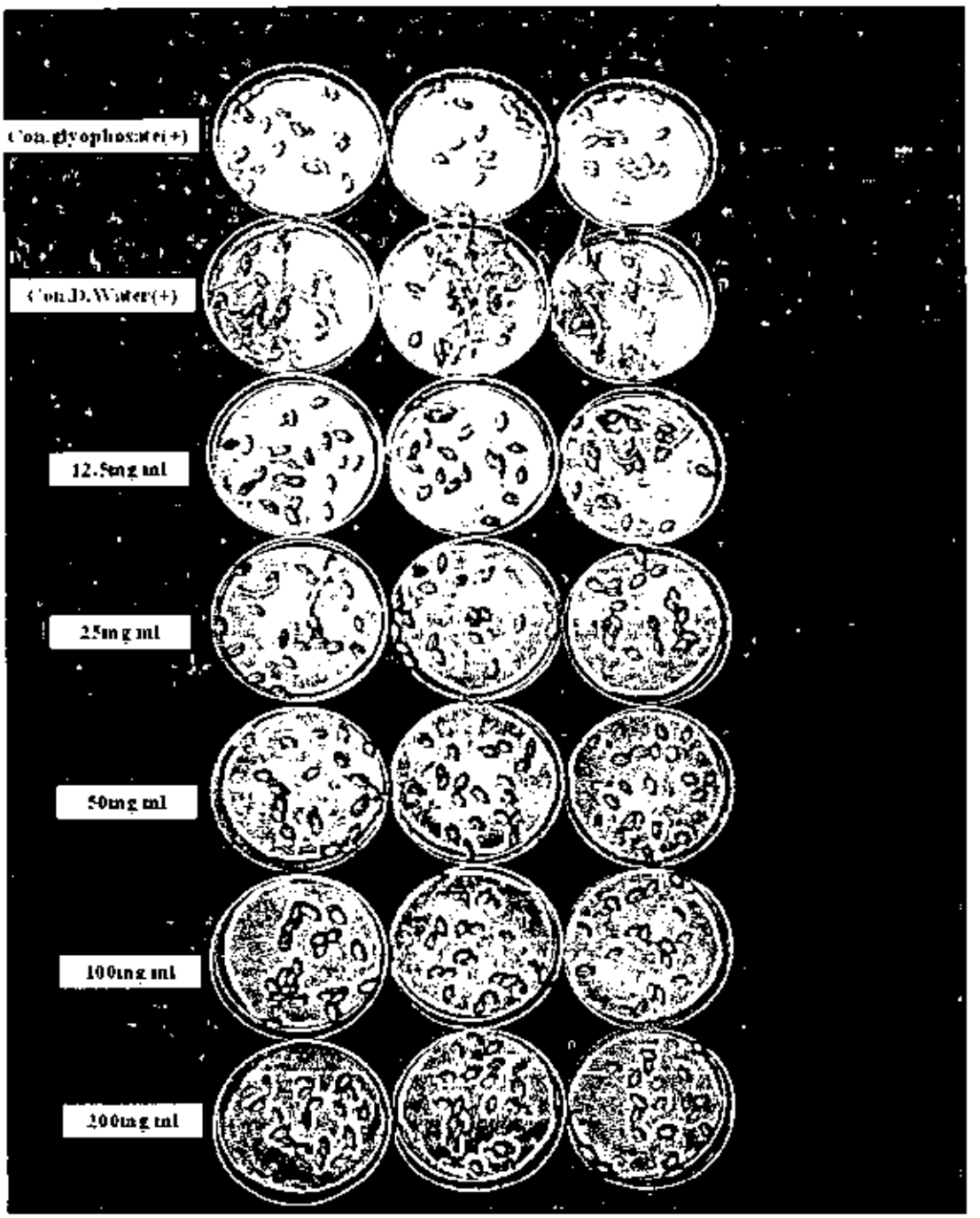


Plate(11) **The effect of *Haplophyllum tuberculatum* root extracts on *Cucumis sativus***

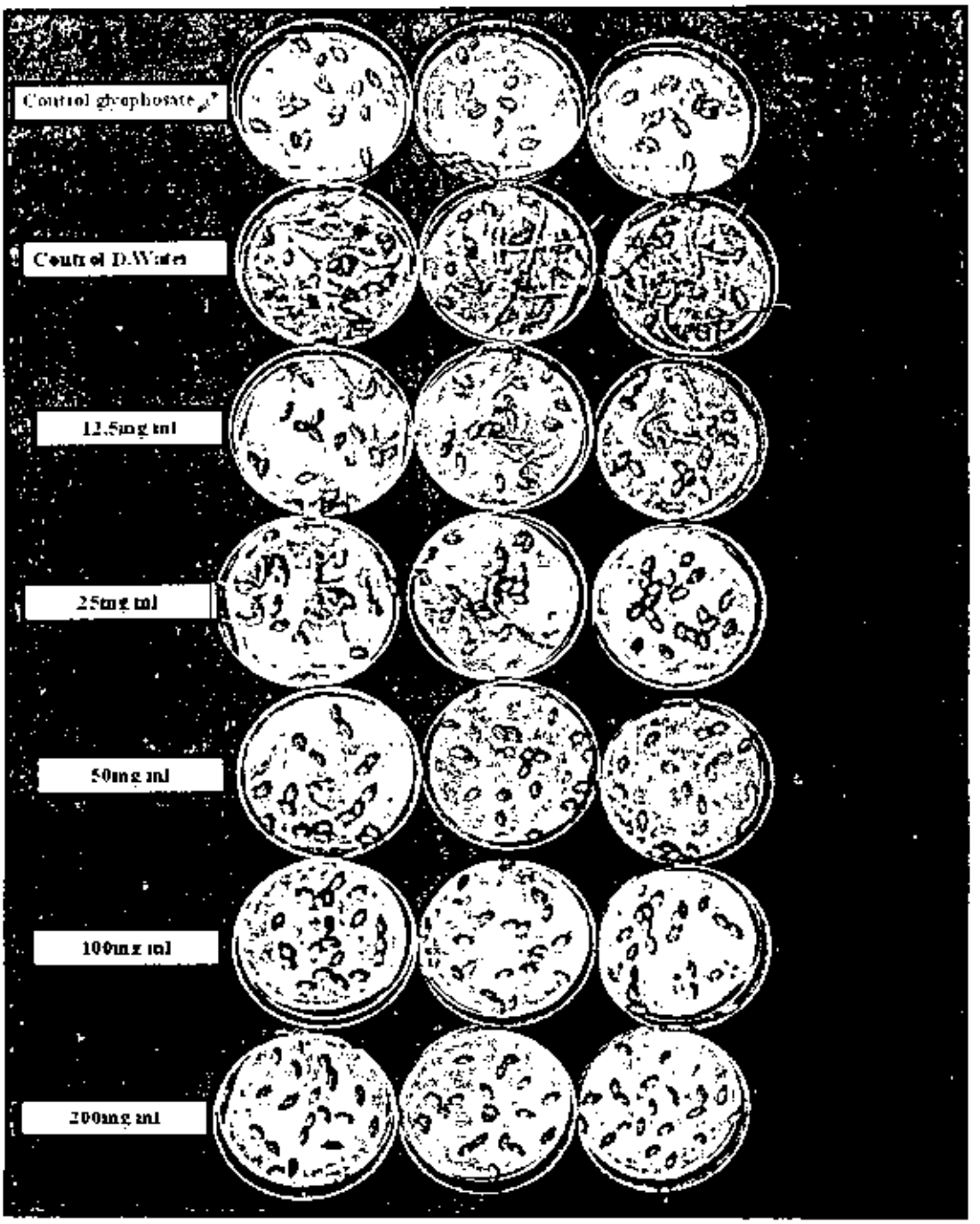


Plate(12)The effect of Haplophyllum tuberculatum flower Extracts on

Cucumis sativus

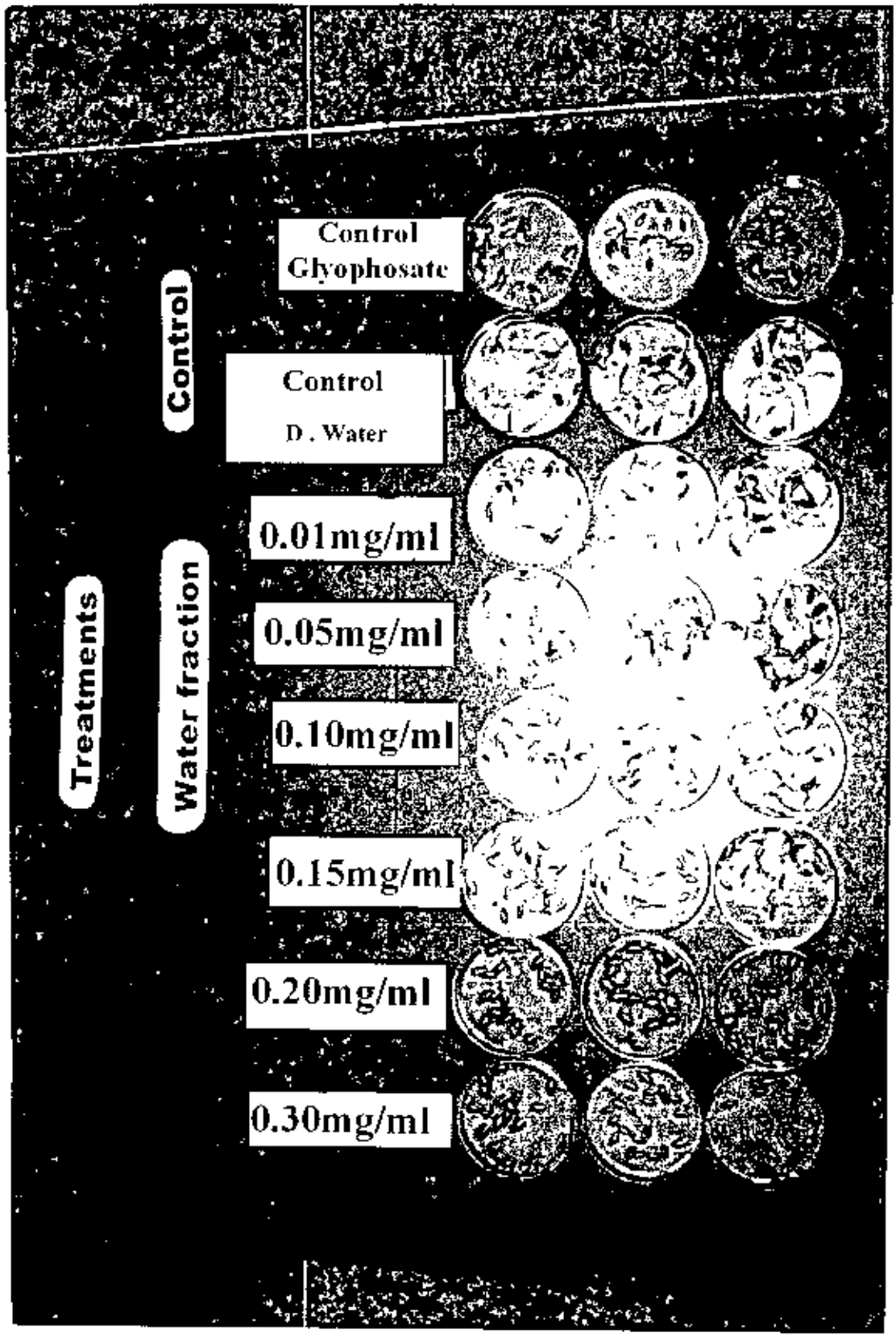


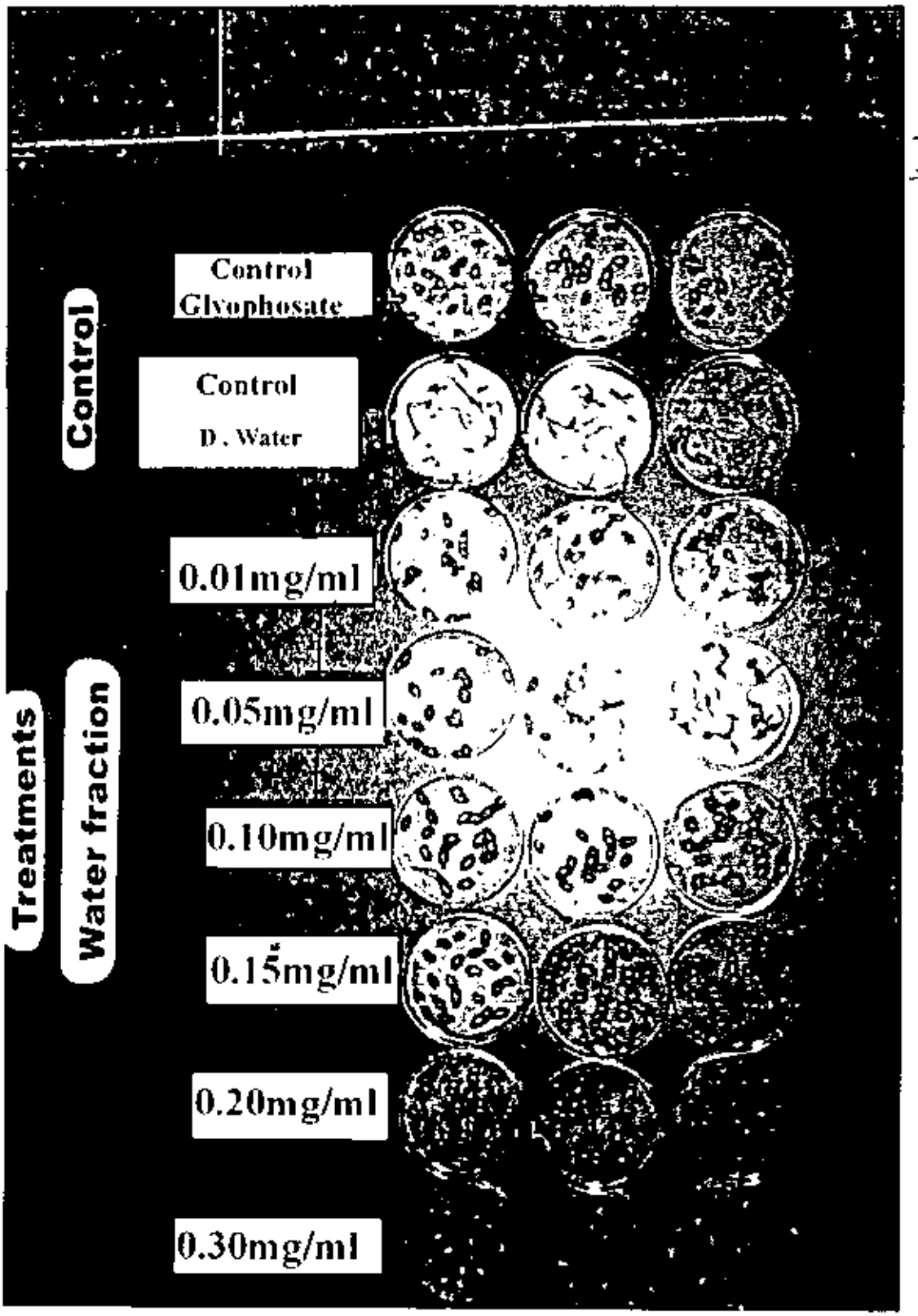
Plate(13) The effect of *Haplophyllum tuberculatum* flower Extracts *onHordeum vulgare*



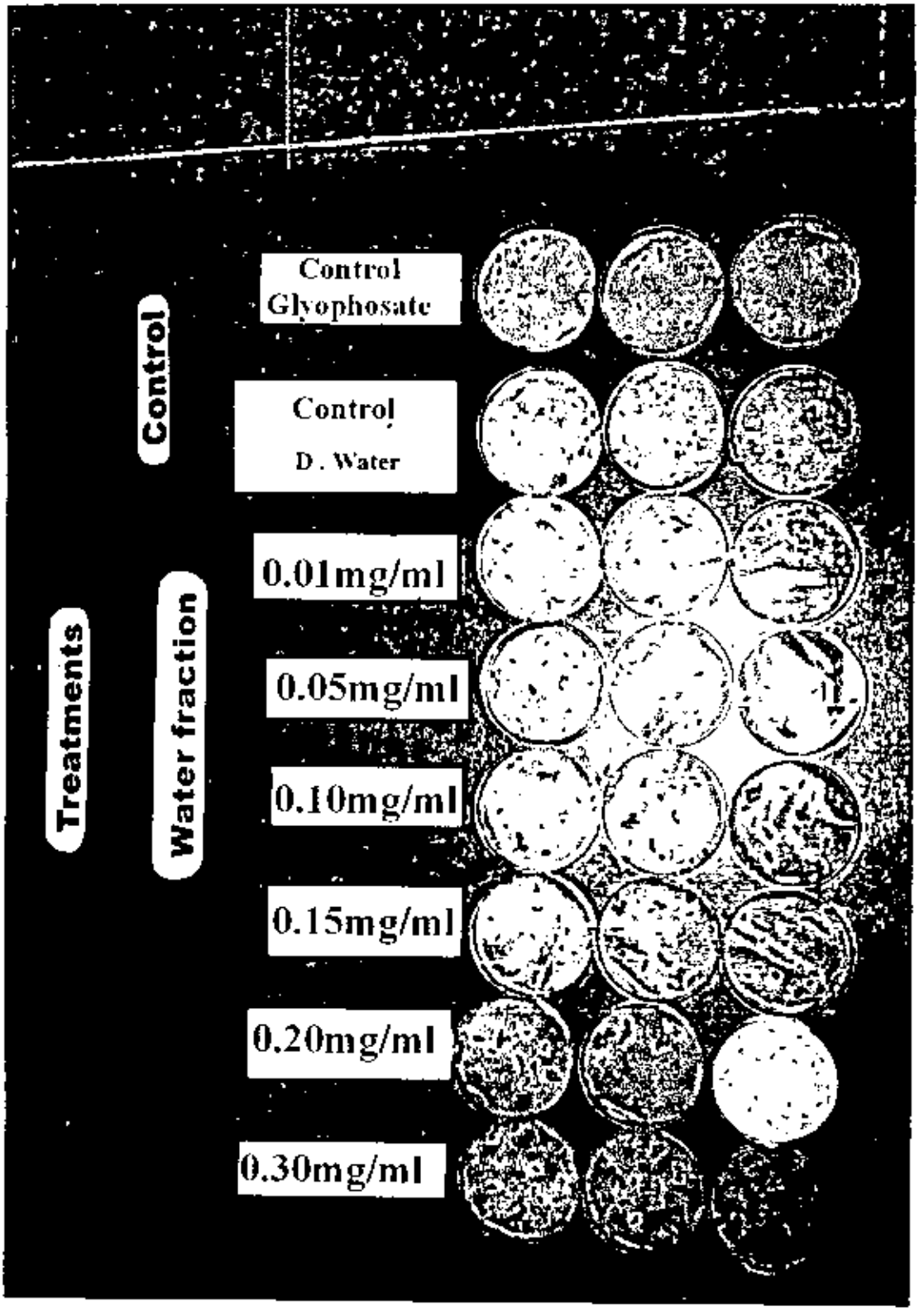
Plate(14)The effect of *Haplophyllum tuberculatum* root Extracts *onHordeum vulgare*

Plate(15)


Control
Glyophosate
Control
Control
D . Water
Treatments
Water fraction
0.01mg/ml
0.05mg/ml
0.10mg/ml
0.15mg/ml
0.20mg/ml
0.30mg/ml

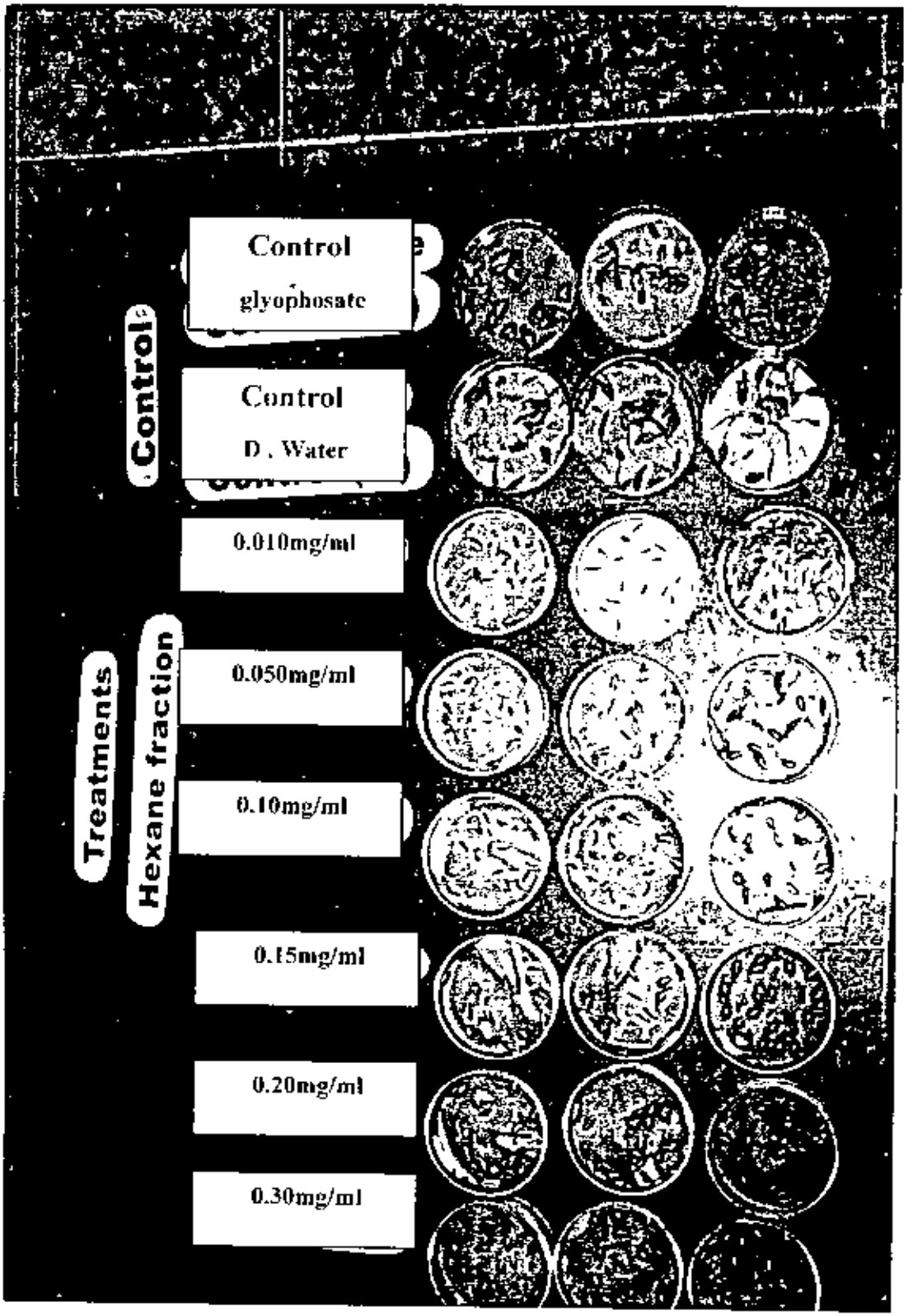

Control
Treatments
Water fraction
Control
Glyophosate
Control
D . Water
0.01mg/ml
0.05mg/ml
0.10mg/ml
0.15mg/ml
0.20mg/ml
0.30mg/ml

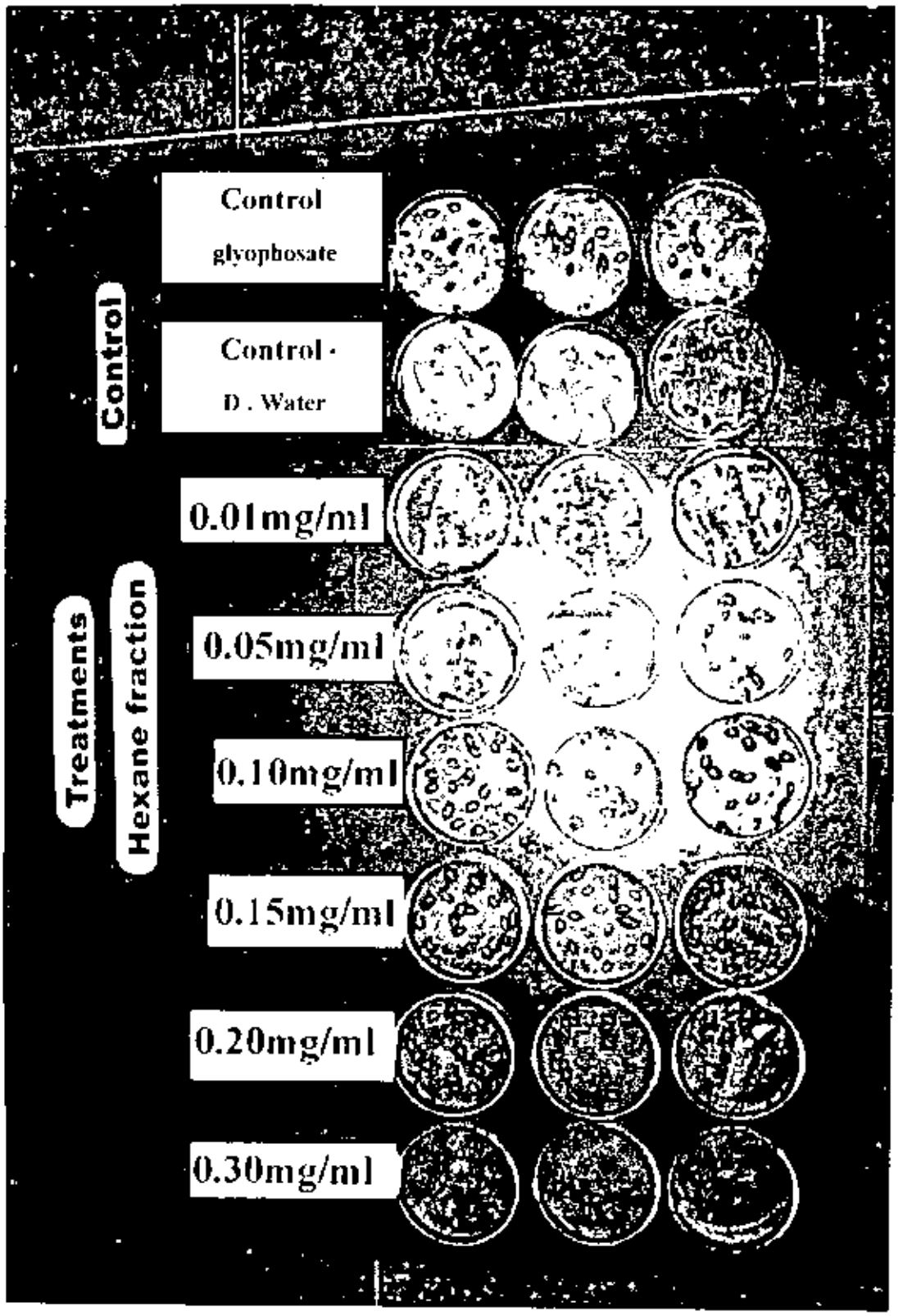
Plate(16)


Treatments
Control
Water fraction
Control
Glyophosate
Control
D . Water
0.01mg/ml
0.05mg/ml
0.10mg/ml
0.15mg/ml
0.20mg/ml
0.30mg/ml

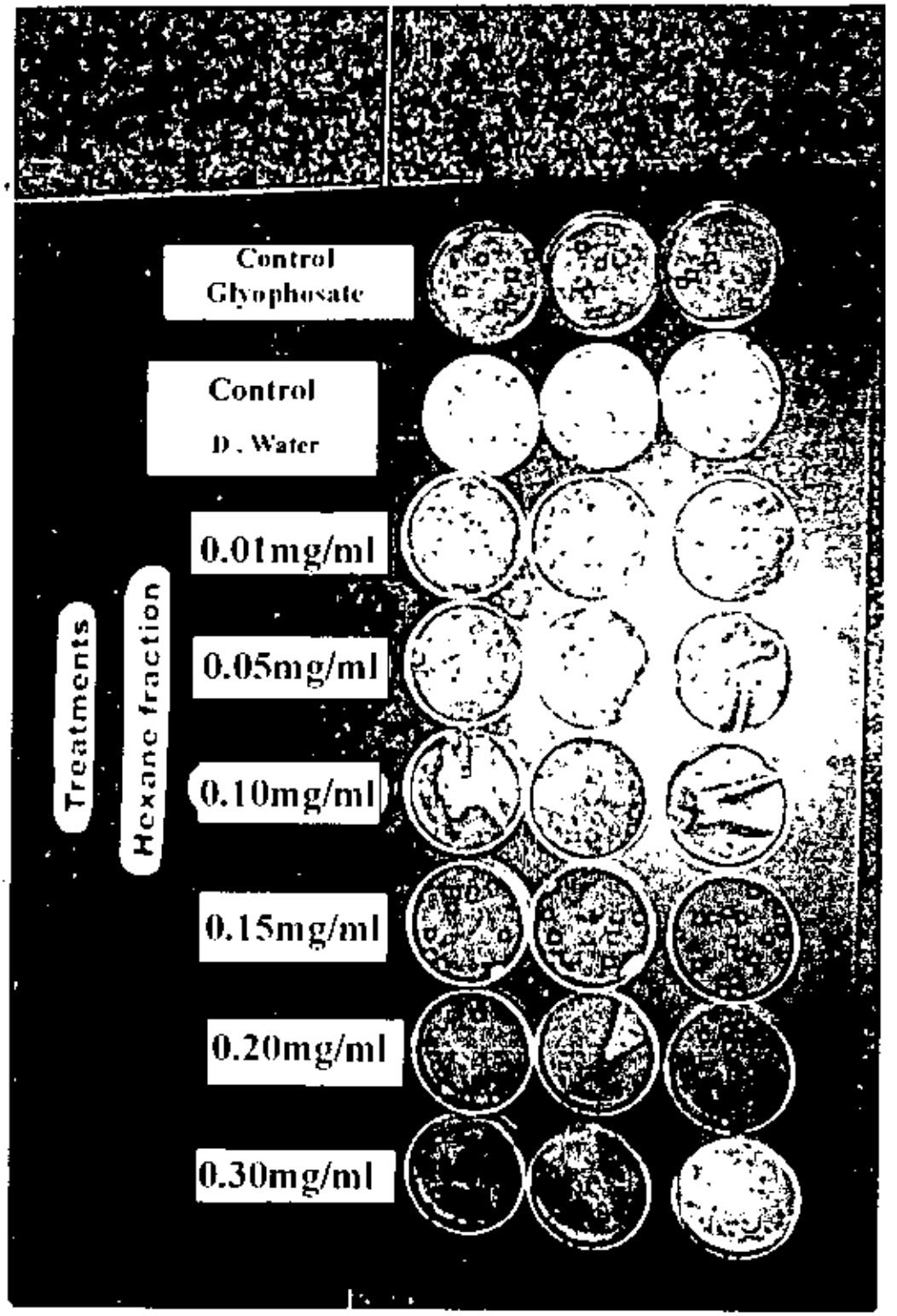
Plate(17)

Plate(18)

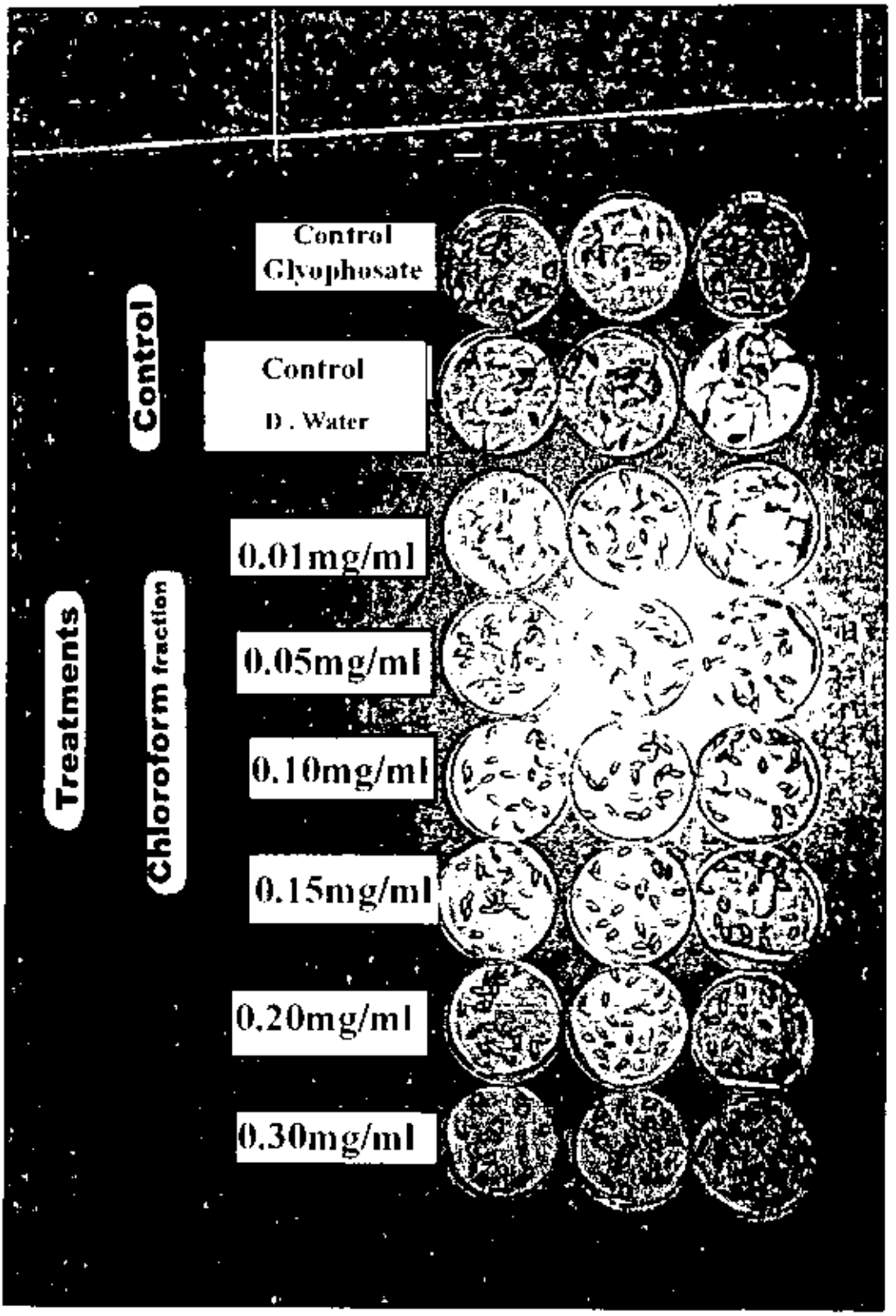

Control
Control
glyophosate
Control
D . Water
Treatments
Hexane fraction
0.010mg/ml
0.050mg/ml
0.10mg/ml
0.15mg/ml
0.20mg/ml
0.30mg/ml


Control
glyophosate
Control
Control ·
D . Water
Treatments
Hexane fraction
0.01mg/ml
0.05mg/ml
0.10mg/ml
0.15mg/ml
0.20mg/ml
0.30mg/ml

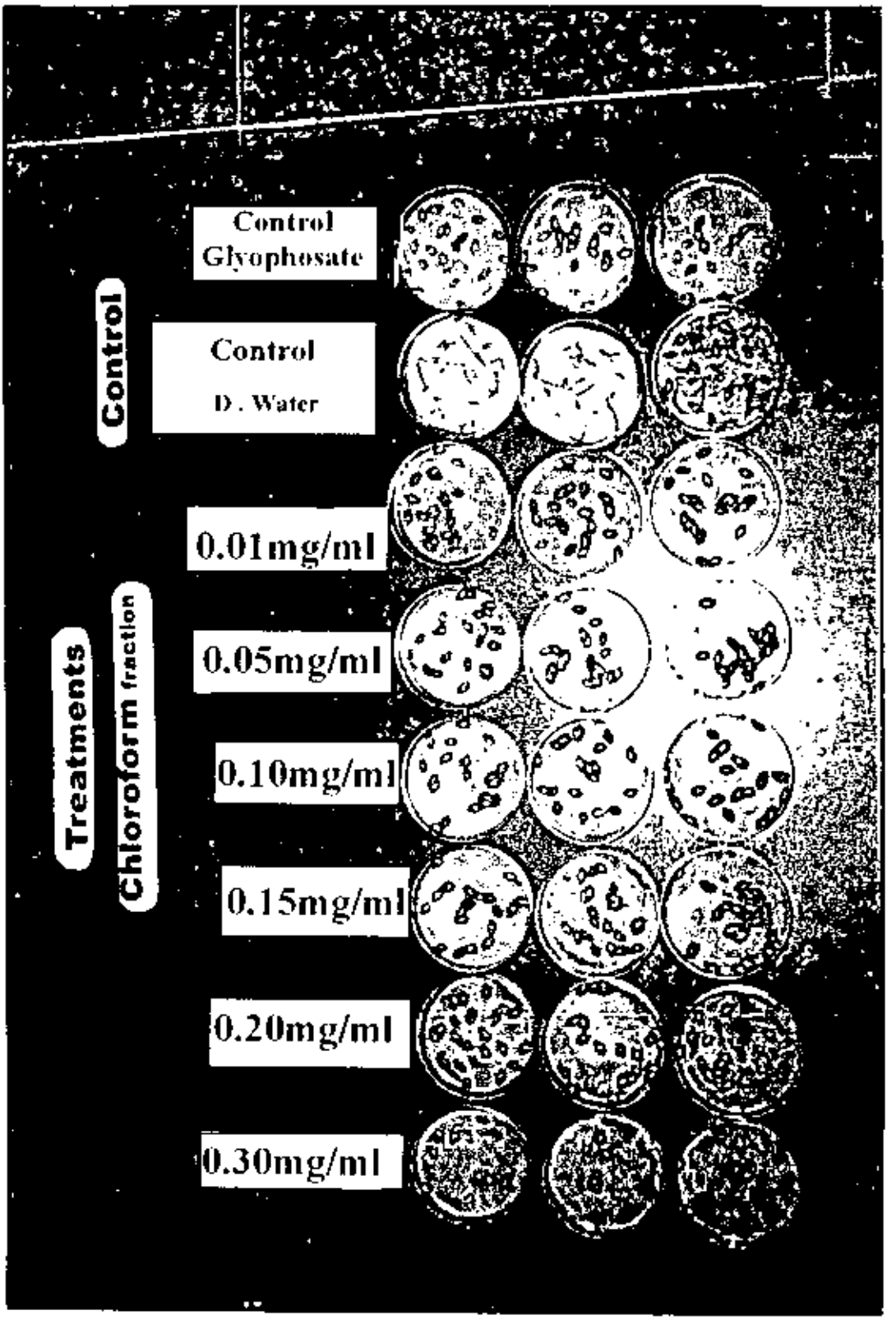
Plate(19)


Control
Glyophosate
Control
D . Water
0.01mg/ml
0.05mg/ml
0.10mg/ml
0.15mg/ml
0.20mg/ml
0.30mg/ml
Treatments
Hexane fraction

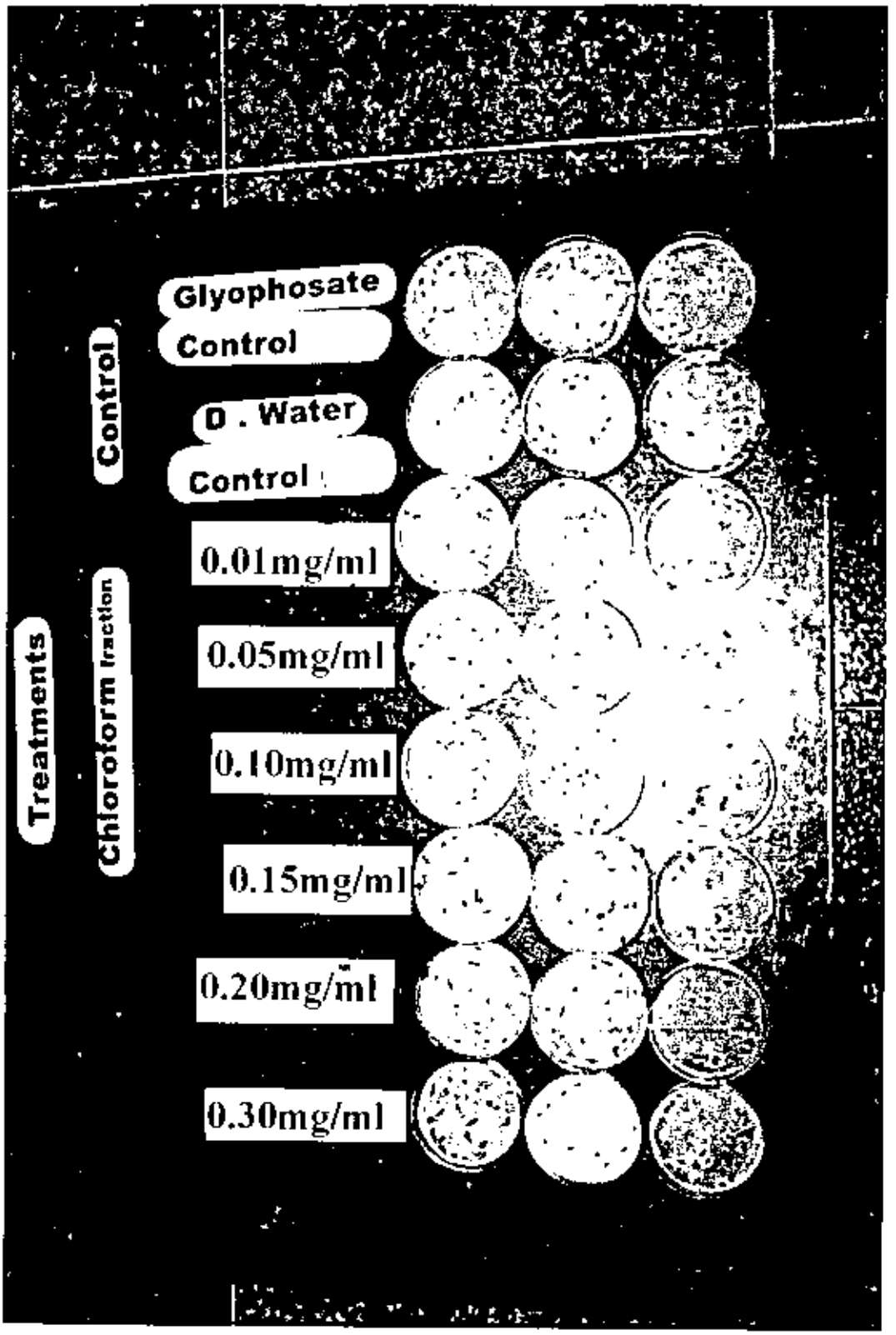
Plate(20)


Control
Glyophosate
Control
D . Water
Treatments
Chloroform fraction
0.01mg/ml
0.05mg/ml
0.10mg/ml
0.15mg/ml
0.20mg/ml
0.30mg/ml

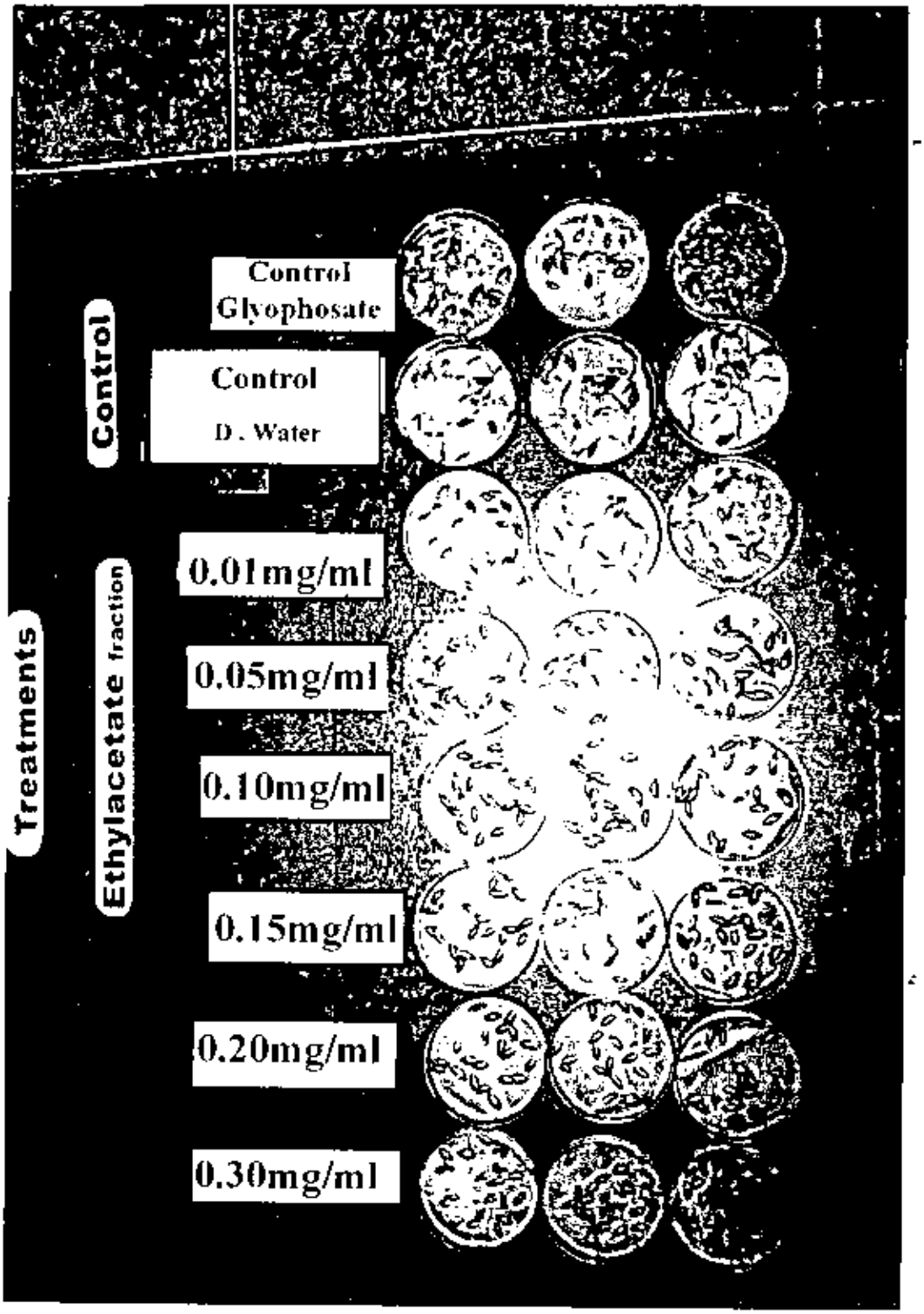
Plate(21)


Control
Glyophosate
Control
D . Water
Control
0.01mg/ml
0.05mg/ml
0.10mg/ml
0.15mg/ml
0.20mg/ml
0.30mg/ml
Treatments
Chloroform fraction

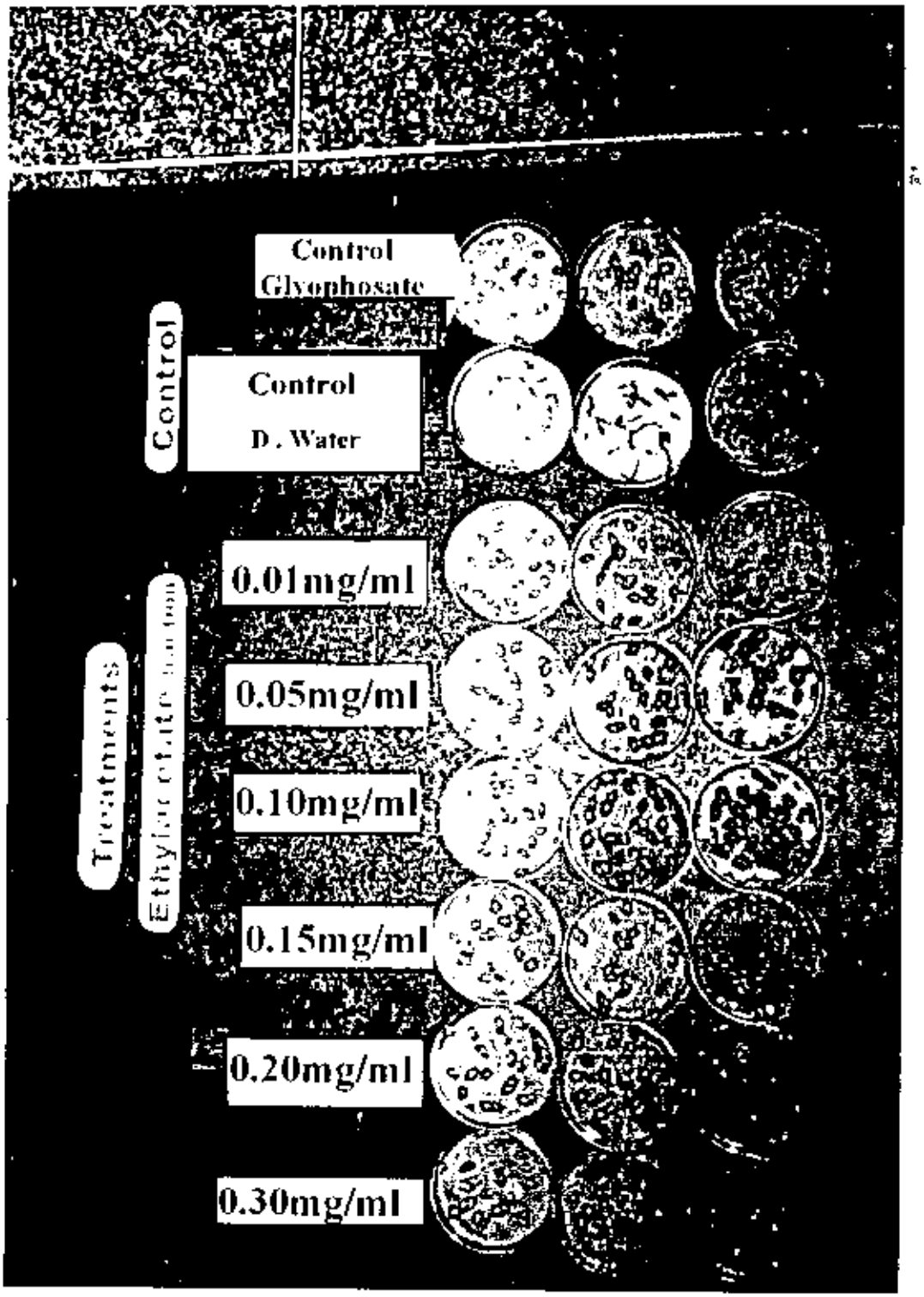
Plate(22)


Glyophosate
Control
D . Water
Control
0.01mg/ml
0.05mg/ml
0.10mg/ml
0.15mg/ml
0.20mg/ml
0.30mg/ml
Control
Chloroform fraction
Treatments

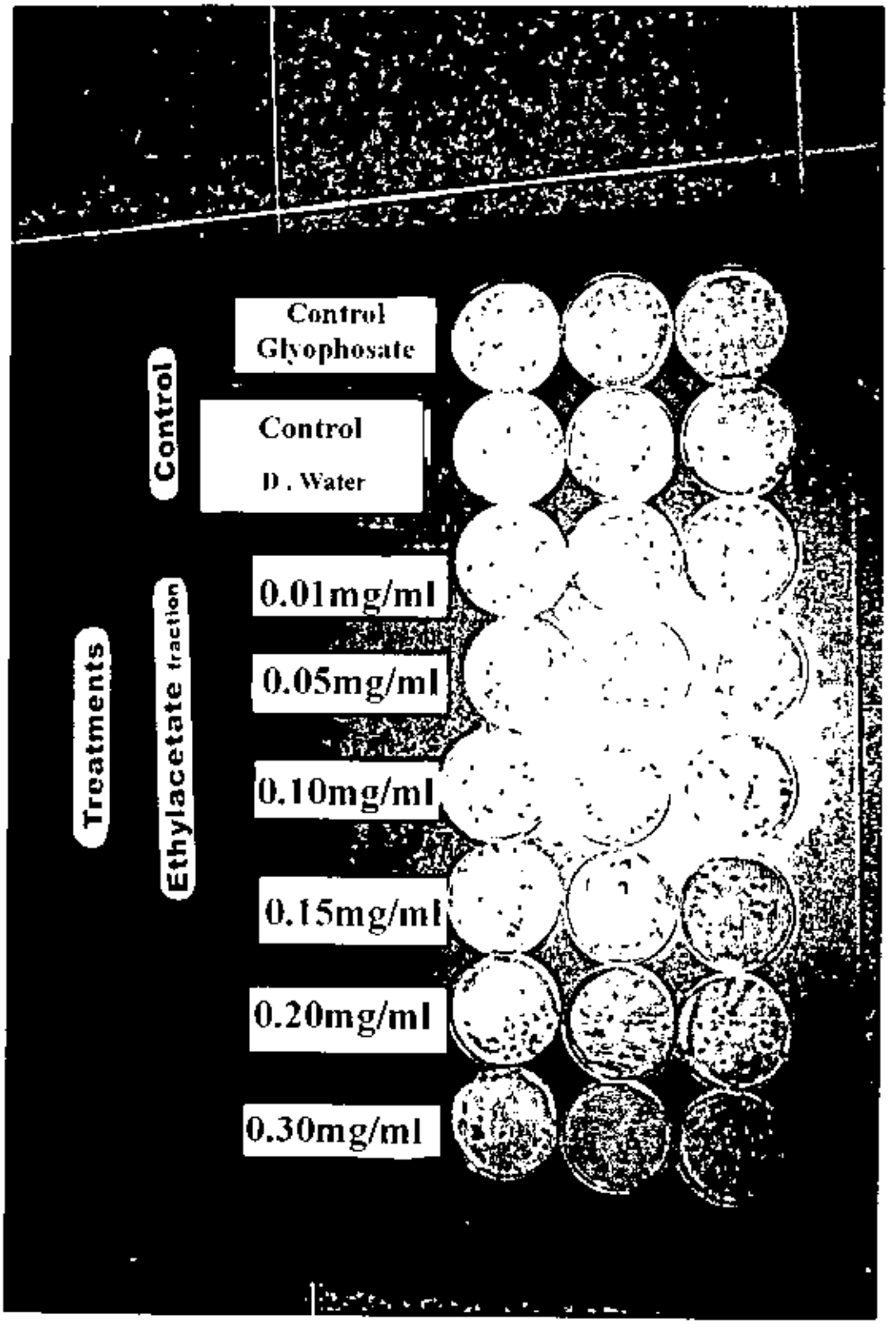
Plate(23)


Control
Glyophosate
Control
D . Water
Control
Treatments
Ethylacetate fraction
0.01mg/ml
0.05mg/ml
0.10mg/ml
0.15mg/ml
0.20mg/ml
0.30mg/ml

Plate(24)


Control
Glyophosate
Control
Control
D . Water
Treatments
0.01mg/ml
0.05mg/ml
0.10mg/ml
0.15mg/ml
0.20mg/ml
0.30mg/ml

Plate(25)


Control
Glyophosate
Control
D . Water
Control
0.01mg/ml
0.05mg/ml
0.10mg/ml
0.15mg/ml
0.20mg/ml
0.30mg/ml
Ethylacetate fraction
Treatments

Plate(26)

الملخص

النواتج الطبيعية للنباتات بعد تنظيم كبير للمكونات الثانوية مع النشاط الحيوي تشمل السمية النباتية .

العديد من هذه المكونات تمتلك إمكانية استخدمها بطريقة مباشرة كمبيدات حشائش أو تركيبات تودي إلى تصنيع مبيدات حشائش جديدة .

العديد من الدراسات ركزت على أن نواتج المركبات النباتية أو المركبات الكيميائية المصنعة التي تفترض تأثير مضاد في النبات تسمى ظاهرة التضاد allelopathy من النواتج التي حصلنا عليها خلال هذه التجارب اثبت إمكانية استخدام مستخلص نبات شجرة الريح كمضاد للحشائش ، المستخلص المائي للجزاء نبات شجرة الريح تم اختبار التأثير المضاد فيه على بعض الأنواع النباتية فيه بتركيزات 12.5 – 25 – 50 – 100 – 200 جرام لكل لتر مذابة في ماء مقطر .

هذه المعاملات من المستخلص قتلت بدرات بعض الأنواع النباتية عند تركيز 50 – 100 – 200 جرام لكل لتر .

أن تأثير المستخلصات المائية المختلفة لأجزاء نبات شجرة الريح (الأزهار ، والأوراق ، الجذور) عند تركيزات مختلفة 12.5 – 25 – 50 – 100 – 200 مللي جرام / مللي على النسب المئوية لأنبأت بعض الأنواع لوحظ في هذه النتيجة أن مستخلص الأوراق ومستخلص الأزهار هي الأعلى تأثير مقارنتاً بمستخلص الجذور .

تأثير مستخلصات نبات شجرة الريح المجزأ بواسطة مـذيبات مختلفـة (هكسـان ، كلوروفورم ، خلات الإثيل) من مستخلص ايثانول ، لها تأثير قوي و مضـاد مثـبط على نمو البذور (المتمثل في جزء خلات الإثيل و جزء الكلوروفورم علـى التـوالي عند تركيز 0.05 ملليجرام / مللي .

الأجزاء الأخرى المتمثلة في جزء الهكسان والجزء المائي أثبت بأنها مصـادر غيـر ملائمة لظاهرة التضاد allelopathy المؤثرة على نمو الأنواع النباتية المختبرة .

الجماهيرية العربية الليبية الشعبية الاشتراكية العظمى
جامعة التحدي
سرت

إن الدراسة ليست غاية في حد ذاتها
وإنما الغاية هي خلق الإنسان النموذجي الجديد

التاريخ : ....
الموافق : 2007
الرقم الاشاري : ....

كليـــة العلـــــوم

قســـم الأحياء

عنـــوان البحـــث

((إمكانية استخدام مستخلصات نبات شجرة الريح **Haplophyllum** "

" **Tuberculaum**كمبيد حشائش))

مقدمـــة مـــن الطـــالبة

محمد علي عبدالسلام

* * لجنـــة المناقشـــة :

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يعتمد :-

د. محمد علي سالم المرجاني

أمين اللجنة الشعبية لكلية العلوم

إمكانية استخدام مستخلصات نبات شجرة الريح *Haplophyllum tuberculatum* كمبيد حشائش .

مقدمه من

محمد علي عبد السلام سالم

اشراف د.محمد الدراوي العائب

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(2006)

قسم الأحياء

كلية العلوم

جامعة التحدي

سرت