SUMMARY AND CONCLUSIONS

Allelopathy generally refers to the inhibitory or Stimulatory affects of one plant species (the donor) on the germination, growth or development of other plant species (the recipient). The donor plants release allelochemicals into the environment through decomposition of plant residues, roof exudates, leachates and vitalization. Accumulation of more allelochemicals from weeds in the fields causes Soil Sickness and autotoxicity, resulting in loss of crop yield.

India is blessed with favorable conditions for the cultivation of many crops, besides there are numerous weed species. These weeds are harmful to crops drastically reduce the crop yield.

Celosia argentea L is a predominant weed of leguminous crop fields and has been reported to reduce the yield of pearl-millet, maize and pulse legume.

It is belong into family Amaranthaceae. It is probably endemic to tropical Africa, but spreading early through out tropical and subtropical area.

It is annual herb, simple or with many ascending branches strongly ridged quite glaberous. Leaves lanceolate oblong to narrowly linear, acute to obtuse, shortly mucronate with the excurrent midrib and glaberous.

Inflorescence many flowered ,spike, silvery to pink, terminal on the stem and branches, bractiate and bracteolate lanceolate perianth narrowly elliptical oblong acute to rather blunt. Anthers and filaments are creamy to magenta, stigmas 2-3, very short filiform style and ovary 4-8 ovulate, seeds black shining testa very finely reticulate.

Recently *Celosia argentea* L. forms a very common weed and covering several hectares of crop field especially leguminous crop field

Mung [*Vigna radiata* (L) wilezek] is important pulse crop cultivated in almost all states of India. It is grown in Kharif as well as in a Rabbi season. The mature seeds of this plants are rich in protein content and cooked seeds & dal is a constituent of the diet of considerable people of the country. Mung is esteemed as food as it does not produce heaviness and flatulence. The tender pods are eaten as a vegetable. The ripe seeds are used as dhal. It is employed as a light diet during fever and is considered to have cooling and astringent effect. The seeds are sprouted and seedlings of four day

growth are eaten as vegetable.

In china, Tankin and Singapore they are used in the preparation of a sort of vegetable cheese resembling vermicelli. The flour of mung is used as an excellent substitute for soap for cleaning the body.

Medicinally the pulse is prescribed in Malaya for Vertilago. In the Philippines a decotion of the seeds is used as an effective diuretic in beri-beri. The mung extract is said to have protective and curative properties in Polyneuritis galllinarum.

Pear millet is an imp. Millet in India 2nd no Jowar in area & production Bajra is grown as a pure or mixed crop & is rotated with cotton, sorghum, wheat & in Rabbi with pulses.

Bajra grain usually broken into rice and cooked or ground into flour and made into roti or chapatti. Flour of bajra cooked in water till it becomes a paste of suitable consistency (sangati, hittu or mudde). The bread is eaten with butter and flavored with condiments. In Punjab, bajra grains are used in the preparation of rabari i.e. bajra flour mixed with fresh butter milk, and cooked in the evening on fire after adding necessary salt and spices. It is also used in the preparation of kichri of mung or rice.

These two imp crops are taken for the allelopathic study in the present investigation. The *C. argentea* L. Plants were collected from local agricultural fields. The leaf, Inflorescence & roots were separated.

Celosia argentea L. were collected from agricultural fields in satara district. Leaves, inflorescence and roots were separated from whole weed plant. These separated materials were dry in sunlight. After drying this material crushed all material separately and make it in powdered form and these powder were stored in plastic jar. These powders were used as a source of leachate. Seeds of *Vigna mungo* L. (mung) and *Pennisetum typhoides* Burm (Bajara) were used as a source of crop plants. Local variety of Mung and Bajara were obtained from local market of Satara

For the preparation of leachate inflorescence, leaf and roots were used. Dried

plant material were weighed, washed quickly with tap water to remove surface dust and soaked in distilled water for 72 hrs. leachates were filtered through Whatman No. 1 filter paper and filterates were used for further studies Healthy seeds of Bajara and Mung were surface sterilized by treating with 0.1% mercuric chloride for 5 min. Then seeds were rinsed with distilled water for 4 to 5 times. 25 seeds were placed in sterilized petriplates with moistened filter paper. 5 ml of each leachate i.e. root inflorescence and leaves were added in it. The petriplate supplied with distilled water served as control. The petriplate arranged in triplicates for each treatment. Seeds were allowed to germinate at 27 ^{0}C in dark.

Germination percentage was recorded after 24 hrs. upto 72hrs. Growth analysis was carried out after 72 hrs of germination. Percentage of germination was recorded.

From germination studies concentration of root, leaf and inflorescence leachates viz. 20%, 40%and 60% were selected for the further study.

Different biochemical constituents such as carbohydrates, proteins, polyphenols were determined from the germinating seedlings as well as allelopathic effect of *Celosia argentea* L was studied in the different enzymes such as Protease, Catalase, Peroxidase, Acid, Phosphatarse & Nitrate eductase

The plants of bajara & mung raised in earthern pots by seed treatment with the leachates used for the study of allelopathic effect on photosynthetic pigments and enzyme; Peroxidase, enzyme acid phosphatase & Nitrate reductase.

The significant findings presented following pages.

I. GERMINATION STUDIES : -

A. Germination percentage –

The root lactates, Inflorescence lactates & leaf lichgates of Celosia argental L. caused delay in the germination of Mung & bajra seeds.

Seedling growth –

1. Shoot growth in Bajra & Mung was affected by all the type of leachates of *Celosia argentea* L. with increasing concentration of

the leachates

2. The root length was decreased with increase in concentration of the leaf leachate root leachate & Inflorescence leachate the higher concentration 60% of all the leachates caused maximum reduction in root length.

B. **Organic Constituents.**

1. The reducing sugar, total sugar & starch content decreased with increasing the concern of Inflorescence, root & leaf lactates in Mung & bajara plants.

2. The protein content increased with increase in concern of all the three types of leach ate treatments in Mung & Bajara plants.

3. The total polyphenols increased with increases in concern of Inflorescence leachate, root leachates and leaf leachates which indicated stimulation in secondary metabolism due to leachate treatment in mung & bajra plants.

C. **Enzyme Studies**

1. General reduction in acid phosphates activity was recorded in mung & bajra seedlings with the treatment of Inflorescence, root & leaf leachates.

2. The Nitrate reductase activity in the germinating seeds of Mung & Bajra was decreased with increasing concern of Inflorescence, leaf and root leachates.

3. The level of peroxide was reduced in mung & Bajra seedings with the treatment of Inflorescence, root & Leaf leachates.

4. The catalase activity was enhanced in mung plants with the lower concentration treatment of roof leachates but at higher Concentration Significantly decreased. In Bajra Leaf,

Inflorescence, root leachates caused decreased in the catalase activity.

5. The protease activity decreased with increase in Concentration of inflorescence, Leaf & root leachates in both plants.

D. Mineral Analysis

1. Potassium, Iron content accumulated due to treatment of inflorescence leachates in mung while magnesium phosphorus & sodium content was decreased reverse trend is found in bajra.

2. Potassium, Phosphorus, Iron in mung increased with increase in leaf leachate Concentration while marginal reduction was found in magnesium & sodium content. In bajra there was accumulation of calcium, magnesium and phosphorus & effectively reduced iron & sodium.

3. Root leachate treatment in mung gradual decreased potassium, magnesium, phosphorus & sodium while increase calcium content. In bajra significant reduction is caused in potassium & sodium with the treatment of root leachates.

4. Inflorescence leachate treatment in mung caused gradual reduction in manganes but zinc & copper level not much affected but manganese level concentration wise also not affected but manganese level concentration wise increased & zinc level was decreased.

5. In mung gradual decreased in manganese & copper while the zinc level is not disturbing similar trend was found in bajra due to leaf leachate treatment.

6. Accumulation of manganese & copper was found in mung & bajra while reduction in zinc due to the treatment of root leachates.

II. POT EXPERIMENTS:

A. Photosynthetic pigments

1. Chlorophyll content in mung and bajra decreased gradually with increasing concentration of inflorescence leachates, leaf leachates and root leachates.
2. Carotenoid content increased with the increasing concentration of inflorescence, leachates, leaf leachates and root leachates.

B. Enzyme studies

1. The activity of enzyme acid phosphatase decreased in mung & bajra plants due to treatment of leaf leachates, inflorescense leachates and root leachates.
2. Nitrate reductase activity decreased in Mung Plants due to treatment of leaf leachates, inflorescence leachates & root leachates.
3. Peroxidase activity decreased in bajra plants due to treatment of leaf, inflorescence and root leachates.

Plants including weeds metabolically active and self sufficient in a specific time after it's plantation so the plant material used for extraction of allelochemical is harvested in that specific stage only *i.e.* in mature stage. In this stage it's synthesizes various phytochemicals which are synthesized gets leached into the soil and causes it's positive and negative effects according to the nature concentration and properties. Considering this in the present investigation to study it,s allelopathic effects we have selected a fully mature weed plants in a flowering stage. The experimental crop plants Mung and Bajra when treated by the leachates and extracts of leaf, root and inflorescence showed negative effects in various parameters like germination study, organic constituent, enzyme study, mineral analysis, photosynthetic pigment. It can be concluded and suggested that to avoid these effects the weeds should be irradicated in very early stage. Which will help to reduce it's negative effects and ultimately the crop yield will be increased.