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Quantitative Estimation of Photochemical in the Whole Plant Extract of Lycopus Sinnatus (Nutt.) Benth and Their Tests for Allelopathic Effect on Crop seed Germination

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Abstract – The plant authenticated as Lycopus sinnatus (Nutt.) Benth is a common weed of crop fields collected from near the maize crop field of O.U.A.T. farm campus during September 2015 to October 2015.The aquous extract of the whole plant was prepared by Soxhalation. The quantity of Alkaloids, Flavonoids and Phenols estimated are 980.46mgATE/100gmDW, 713.06mgQUE/100gmDW and 827.66mgGAE/100gmDW respectively. Two different concentrations of water solution of the extract i.e. 0.906% and 1.188% were tested for their effect on seed germination of Helianthus annus L., Lycopersicon esculentum L.,Triticum aestivum L., Oryza sativa L. and Vigna mungo L. The % of germination in control is 96 in H.annus,90 in L.esculentum,96 in T.aestivum,80 in O. sativa,28 in V.mungo. The % of germination in treatment with0.906% solution was found to be 54% in H.annus,20% in L.esculentum,58% in T.aestivum,30% in O. sativa and 16% in V.mungo whereas the % of germination in treatment with 1.188% solution was found out to be68% in H.annus,20% in L.esculentum,66% in T.aestivum,88% in O.sativa and 24% in V.mungo. Statistical analysis shows significant inhibition of germination in all cases with a good correlation between the concentration and germination percentage except in cases of O.sativa and V. mungo. The extract may be stimulatory at higher concentration. Field treatment to eliminate or prevent the formation of phytotoxins after the crop harvest may be suggested to minimize the autointoxication exhibited by some crop residues like the above.

Keyword: Common Weed, Soxhalation, Estimation,% of Seed Germination, Phytotoxin.

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I. INTRODUCTION

Human development is dependent upon the best utilization of his plant resources. Natural plants have limitless abilities to synthesize chemical substances. More than 12,000 of such chemicals have been isolated so far. These products are non-nutritive, non-essential, bioactive compounds such as Alkaloids, Phenols, Flavonoids, Tannin, and Phenolic acids etc., which serve for the defence mechanism of plants against predation by microorganisms, insects, harmful weeds and herbivores. Today due to the increasing importance of bioactive phytochemicals in human life several of them have been isolated and studied for their pharmacological activities as neutraceutics as well as their utilization in industry and Nano-biotechnology. Various environmental factors such as climate, altitude, rainfall and other conditions may affect growth of plants which in turn affect the quality of herbal ingredients (bioactive compounds) present in a particular species even when it is produced inside the same geographical boundary. Phytochemical screening techniques will help to understand a variety of chemical compounds produced by plants and quantification of those metabolites will help to extract, purify and identify the bioactive compounds for useful aspects.

Several reports says that the present day demands of increased productivity of crops using chemical herbicides or weedicides is toxic to the consumers transferred through the food chain because of bio-accumulation, bio-magnification, etc. This imposes to find out a natural way of weed management alongwith increased productivity and maintenance of sustainable environment for development.

There were reports that a large number of plants possess inhibitory effects on the germination and growth of neighbouring or successional plants by releasing allelopathic chemicals into the soil either as exudates / leachates from living tissues or by

decomposition of plant residues (Inderjit & Duke, 2003) (Lovett & Hoult, 2013). (Putnam & Tang, 1986). Allelopathic activity of plants should be the major factor enabling implementation of growth management between neighbours and defence mechanisms developed during long co-evolution with their competitors and enemies. Allelopathy gives the knowledge about allelotoxicity which helps in avoiding unexpected harvest loss. In order to construct a sustainable ecosystem the relationship between allelochemicals, microorganisms and biodegradation processes must be known, High specificity and low doses needed for allelochemicals to control crop behaviour facilitates waste water management and vegetable resource management. The election of plant species or allelochemicals with germination and growth stimulation capabilities will be crucial to assure a success in space crop establishment (Francisco, et. al., 2003).

Being the major part in the array of natural plants, the weeds seek maximum attention due to their richness in possesing maximum varieties of phytochemicals [20]. .They are mainly used because of their wide distribution, easy availability, easy storage and handling. Being undesirable materials for farmers it can be availed free of cost. As they contain wide range of chemicals,they show wide range of applications with different impacts and thereby open various options for experiment s.

Basing upon the above facts the present work takes interest in a systematic approach towards the quantitative estimation of phytochemicals like alkaloids, phenols and flavonois of a selected a common crop field weed authenticated to be in the group of Lycopus sinnatus (Nutt.)Benth. and its' unexplored allelopathic properties at the first stage of analysis. As per the literature, these weeds are native to Europe, Asia, Australia and North America and its' related species are rich in the phytochemicals like tannins, lithospermic acid, lycopene, flanvoneglycosides, phenolic derivatives, essential oils, magnesium and resin and are expected to be present in this weed. The medicinal use so far known, is for the control of hyperthyroidism etc. and ethnobotanical history of Lycopus says about the preparation of black dye from the juice of these weeds. The germination of treated seeds of crops belonging to ., Helianthus annus L., ., Lycopersicon esculentu L. ., Triticum aestivum L., Oryza sativa L. and Vigna mungo L. were taken as test materials for allopathic study

II. MATERIALS AND METHOD

(a) Collection of Plant Materials : The plant material of Lycopus sinnatus (Nutt.)Benth. was collected at their stage of flowering from near the maize crop field of OUAT farm campus at the beginning of winter season during September 2015 to October 2015. They were then washed thoroughly to remove any dirty particles attached to their body and soaked with paper towel to absorb excess of water stick to their surfaces. Thereafter the fresh weight was taken till constancy and recorded(table-I) and then, they were subjected for description and authentication. The test crop seeds were purchased from local market.

(b) Description & Authentication: This is perennial herb growing along the edges of the maize crop field with hairy and quadrangular stem, reaching upto 30-80cm tall. The oppositely arranged green leaves have oval to lanceolate blades with sinnuate margin. The leaves have reticulate venation. Cluster of tiny white flower occur in the leaf axils showing verticellaster arrangement. The plant have a minty scent. Root is tap root system (fig.1).

The plants were identified with reference to the herbarium specimens no. 247662 of Michigan state university herbarium catalogue, herbarium specimen no. NY: herbarium: 01191653 of New York botanical garden, online virtual flora of Wisconsin state herbarium, Madison no. V0079425WIS and Kew herbarium catalogue herbarium no K000929982, K000929980, K000929970, K000929981, K000929982, K000929983,GBIF ID-5605581,GBIF ID-786926 and confirmed to be the Lycopus sinnatus (Nutt.) Benth. The synonym is Lycopus americanus Muhl ex WPC Barton and the basionemes are L.vulgaris Nutt. &Lycopus vulgaris Pers.

Fig.1 Plant of Lycopus sinnatus (Nutt.) Benth

Lycopus sinnatus (Nutt.)Benth (Fig.I)is a species of flowering plants in the mint family. It is also known as bugleweed, Virginia water horehound, American water horehound. They are herbaceous plants native to Europe, Asia, Australia, and North America. The species are most often found in wetlands, damp meadows, and stream banks. Some of the wetland

species have become endangered. (From Wikipedia, the free encyclopedia for the spider genus Lycopus.

(a) **Preparation of Plant Materials for Subsequent Use :** After taking the fresh weight, the plant materials were oven dried between 40-45°C for12 to 16 hours till complete drying and then the dry weight was taken till constancy and recorded in table-I. The oven dried plant materials were ground to form a coarse powder using a domestic grinder and stored airtight inside a container under dark for further utilization.

(b) **Determination of Physicochemical Characters:**

(i) **Loss on drying:** It was calculated by the following formula and recorded in Table-1% of loss =[(Fresh weight –Dry weight)/ Fresh weight]⁄100

(ii) Colour of the dried powder was observed to be Broom yellow by comparing with the colour chat and recorded in Table-1.

(iii) Texture was observed to be coarse texture by visual observation and recorded in Table-1.

(iv) **Test for solubility:** 0.5gms of powdered plant material was added to two stoppered glass tubes one containing 10ml. of distilled water and the other containing 10ml. of ethanol and shaken thoroughly. The tubes were then left for complete solubilization for four days. Thereafter the solutions of both the tubes were filtered by preweighed Whatman's No.1 filter paper., Residues were oven dried and weighed again. The percentage of solubility was calculated by the following formula and recorded in the table-1 % of solubility= [(Initial weight of the sample—weight of the residue)/ Initial weight of the sample] ⁄100.

(v) **Test for fluorescence activity:-**The method followed by Rama swami Nanna et. al., 2013, was followed here. 0.5gms of powdered plant materials were taken in three stoppered glass tubes containing 10ml. of distilled water, 10ml. of ethanol and 10ml. of acetic acid (Glacial acetic acid, 100%) in each and left for four days for the release of the phytochemicals into the solution [Fig.2.(A)]. Thereafter they were placed under UV light of 30 watt capacity inside a UV chamber and the response of the chemicals to the ultra violet radiation was observed [Fig.2.(B)] and recorded in the table-1.

Sl. No.	Plant Name	Growth status	f.w. in gm.	d.w. in gm.	% of loss in d.w.	Colour	Texture	Solubility		UV fluorescence activity					
								Water	Alcohol	Water		Alcohol		Acetic acid	
										Before exposure (visible light)	After	Before (visible light)	After	Before (visible light)	After
1	Lycopus sinuatus(nutt.) Benth.	Perennial,Flowering stage	511.33 gm.	125.44gm.	75.47%	Broom yellow	Coarse	8%	28%	Burgundy	Bistro green	Mid night blue	Mid night blue	Mid night blue	Mid night blue

Table-I - Physicochemical characteristics

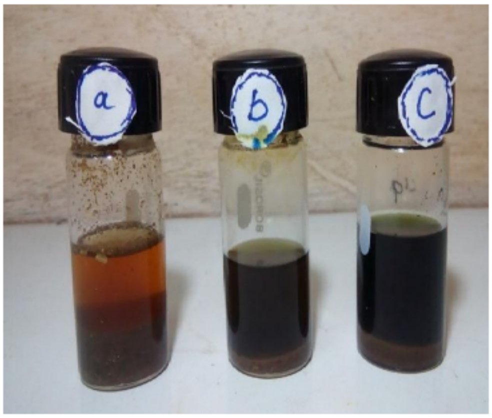

Fig. 2(a) Phytochemicals in solution before exposure to UV

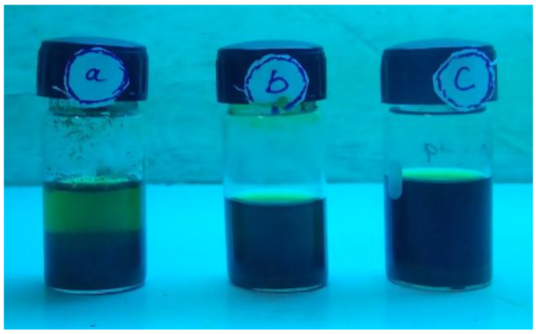

Fig. 2(b) Phytochemicals in solution after exposure to UV

(a) **Extraction by Soxhalation**

The extraction was carried out two times i.e.Extract 'A',prepared during February of 2016 and Extract-'B' prepared during February of 2017.The phytochemicals from powdered plant material was extracted using the soxhlet apparatus.For extract 'A' 15gm of powdered plant material(inside the thimble) was extracted with 250 ml. of distilled water(inside the flask) whereas for extract'B' 15gm powdered plant materials(inside the thimble) was extracted with 300ml of distilled water (inside the flask). This was boiled inside the soxhlet apparatus at 60° C for 83hrs. .After completion of the extraction process the solution was filtered through the Whatman's No.1 filter paper into a clean dry conical flask to filter out the insoluble substances. Then the volume extracted is 191 ml for extract 'A' and 287 ml for extract 'B'. Extract 'A' was used directly for quantitative

estimation of phytochemicals . Extract 'B' was evapourated into a semisolid concentrate by boiling for 6hr and 30 minutes inside the flask of the soxhlet apparatus and weighed to a measure of 4.5059g. The apparent extractability for extract 'B' was calculated by the following way:- % of extractability=[4.5059/15]⁄100 = 30.03

(b) Estimation of Total Alkaloids:-

(i) Previously prepared extract 'A' was used here.The method followed by Rajendra Patel et al.,2015[17], was followed with slight modification. A part of extract-'A'(5ml) was treated with 2N HCl and then filtered.This solution was transferred to separating funnel and washed with 10 ml. of chloroform up to 3 times. The P^H of the solution was adjusted to neutral with 0.1N NaOH. Then 5ml. of BCG(69.8mg of bromocresol green heated with 3ml of2N NaOH and 5ml of distilled water and then diluted to1000ml with distilled water)solution and 5ml. of phosphate buffer(pH 4.7) were added to this solution. The mixture was shaken and the complex extracted with 1, 2, 3, 4 ml. chloroform by vigorous shaking. The extract was then collected in a 10ml. volumetric flask and diluted with chloroform to make up the volume.The absorbance of the complex in chloroform was measured at 470 nm. OD was taken 3 times and average was recorded.

(ii) **Preparation of Standard Curve: -** Accurately measured aliquots of 0.4, 0.6, 0.8, 1.0 and 2.0 ml. of Atropine standard solution (1mg of pure atropine dissolved in 10ml of distilled water) was transferred to different separating funnel. Then 5ml. of phosphate buffer of P^H 4.7 and 5ml. of BCG solution was added and the mixture was shaken and the complex with extracted with 1, 2, 3, 4ml. of chloroform. The extracts were then collected in 10ml. volumetric flask and diluted to make up the volume with chloroform. The absorbance of the complex in chloroform was measured at spectrum of 470nm in UV spectrophotometer (Systronic-118) against the blank prepared as above but without Atropine. The values were plotted on the graph (conc. verses absorbance) and by comparing with this standard graph the alkaloid content of the whole plant extract was found out and recorded in the table-2, Fig-3 & fig.-4 .

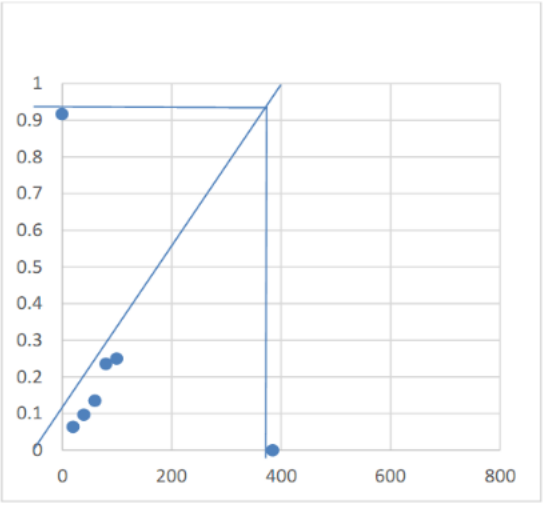

Fig. 3 Standard Graph for estimation of Alkaloids

(a) Estimation of Total Flavonoids

Previously prepared extract "A" was used here. The method followed by C.T. Sulaiman & Indira Balachandran, 2012,was followed. Total flavonoid content was measured by Aluminium chloride chlorimetric assay. An aliquot of 1ml.of the extract-'A' or of standard solution of Quercetin (0.02, 0.04, 0.06, 0.08, 0.1mg/ml.) was added to volumetric flask containing 4ml. distilled water. To the flask 0.3ml. of 5% $NaNO_2$ was added and after 5min, 0.3ml. of 10% $AlCl_3$ was added. 2ml. of 1M NaOH was added and the volume was made up to 10ml. with distilled water. The solution was mixed and absorbance was measured against the blank at 510nm.OD was taken for 3 times and average was taken. The total flavonoid content was expressed as mgQuercetin equivalent per 100gm dry weight and recorded in the table-2 &fig-4

(b) Estimation of Total Phenols:-

Previously prepared extract "A" was used here. The method as followed by C.T. Sulaiman & Indira Balachandran,2012, was followed. The total phenolic content was determined by using follin ciocalteu reagent. An aliquot 1ml. of the extract-'A' or standard solution of Gallic acid (0.02, 0.04, 0.06, 0.08, 0.1mg/ml.) was added to 25ml. of volumetric flask containing 9ml. of distilled water. 1ml of follin ciocalteu reagent was added to the mixture. The volume was then made up to mark. After incubation for 90min at room temperature the absorbance against reagent blank was determined at 550nm. Total phenolic content was expressed as mg Gallic acid equivalent per 100 gm dry weight and recorded in the table-2 &fig-4.

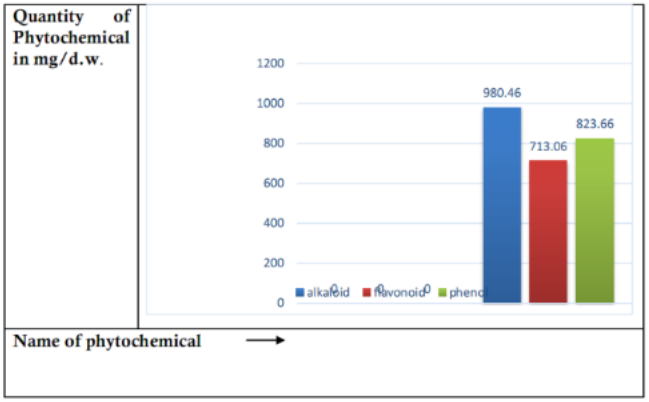

Fig. 4 Histogram for quantitative estimation of phytochemicals

Table-2

Quantitative Estimation of Phytochemicals

Name of the plant	Quantity of Alkaloids	Quantity of Flavonoids	Quantity of Phenols
Lycopus sinnatus (nutt.) Benth.	980.46mgATE/100gm DW	713.06mgQUE/100gmDW	827.66mg GAE/100 gmDW

(a) Test for Allelopathic Effect:

For this the method followed by Garcia-Mateos,R. et al.2002[7], Sangita chandra et. al., 2012 and Aan Beatriz Gatti et al.,2010, with slight modification was followed. In the process the concentrated extract-'B' was made into two different concentration of 1.188% or 0.89gm/75ml and 0.906% or 0.68gm/75ml by adding 75ml of distilled water to each. Each concentration was equally distributed into five clean stoppered glass tubes each containing 15ml of the solution. Another set of five clean stoppered glass tubes were taken each containing 15ml of distilled water.

To the tubes containing distilled water, 50 no.s of untreated seeds of each of Oryza sativa L., Triticum aestivum L., Lycopersicon esculentu L., Helianthus annus L., and Vigna mungo L., were added for soaking for around 6days.Thereafter 50 soaked seeds of each kind were transferred to each glass tube containing 15ml of both 1.118% concentration and 0.906% concentration. The rest 50 seeds in each of the 5 glass tubes containing distilled water were left for control treatment. After 6 days of this treatment of soaking, all the soaked seeds were placed evenly in 15 separate mud pots with well aerated garden soil. They were allowed for germination for 8 days with frequent watering by water spray to avoid drying. Percentage of germination was calculated and recorded(Table-3) at regular interval for 8 days to screen the allelopathism (fig-5& fig- 6).All the readings were statistically analyzed by coefficient of variation,, variance ratio, F-ratio, Correlation coefficient ,and chi square value and recorded in table-3.

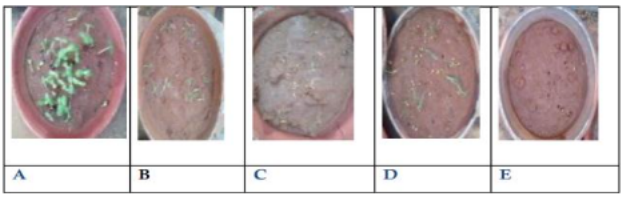

Fig.-5 Seed germination in control

(i) Helianthus annus L.,

(ii) Lycopersicon esculentu L.,

(iii) Triticum aestivum L.,

(iv) Oryza sativa L.,

(v) Vigna mungo L.

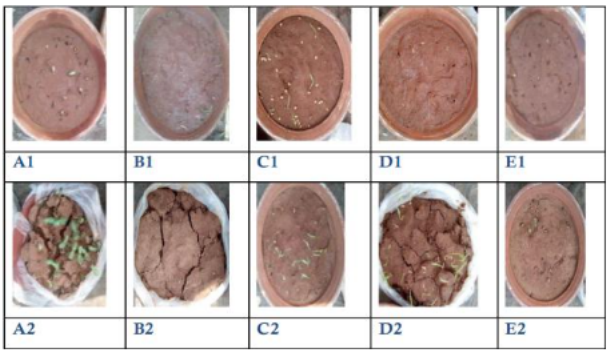

Fig. 6 Effect of plant extract on seed germination

(a) Treatment with plant extract of 0.906% concentration

(b) Treatment with plant extract of 1.188% concentration (A1), (A2)-Helianthus annus L.(B1), (B2)-Lycopersicon esculentu L.; (C1), (C2)- Triticum aestivum L.;(D1), (D2)-Oryza sativa L.;(E1), (E2)- Vigna mungo L.

3. RESULT

(a) Physicochemical Charactristics And Quantitaative Estimation of Phytochemicals :

The physico-chemical characteristics recorded in the Table- I showed that the collected plant material measured to 511.33 gm in fresh weight and 125.4 gm. in dry weight. After drying the dry powder made was broom yellow in colour & the texture was coarse. The loss on drying was calculated to be 75.47%. The solubility in water and alcohol was determined to be

8% and 28% respectively. The colour of the fluorescence of the dry powder in water was observed to be Burgundy before exposure to UV and Bistro green after exposure to UV, whereas the colour of the fluorescence of dry powder in both alcohol and acetic acid remained same (Mid night blue) both before and after exposure to UV. The result in table- II showed that the quantity of alkaloids, flavonoids and phenols are 980.46mg, 713.06 mg and 827.66 mg respectively (fig 3 &4).

(b) Tests for Allelopathism

Result recorded in the table-3 and figure- 5 & 6 showed the percentage of germination for H.annus L. in control ,in treatment with 0.906% of extract 'B' and in treatment with 1.188% of extract 'B' were 96%, 54% and 68% respectively. For Lycopersicon esculentum L. The % of germination was 90% in control, 20% with 0.906% treatment and 20% with 1.188% treatment. The % of germination in Triticum aestivum L. was 96%, 58% and 66% in control,in treatment with 0.906% and in treatment with 1.188% respectively. In Oryza sativa L. the % of germination was 80% in control, 30% with 0.906% treatment and 88% with 1.188%. In Vigna mungo L., 28% in control, 16% with0.906%treatment and 24% with1.188%treatment. The values were statistically analysed using the functions like % of variation, variance ratio, F-ratio, correlation coefficient and chi square technique. The % of variations for Helianthus anus L. is 29.1 at 1.1885conc and 43.7 at 0.906%conc., for Lycopersicon esculentum L.it is 77.7 at both 1.188% conc. and 0.906% conc., for Triticum aestivum L. it is 31.2 at 1.188% conc. and 39.58 at 0.906%conc., for Oryza sativa L. it is 10% at 1.188%conc. and 62.5 at 0.906%conc., for Vigna mungo L. it is 14.28 at 1.188% conc. and 42.85 at 0.906%. The correlation coefficient for Helianthus anus L. is -0.85, for Lycopersicon esculentum L. is -0.97, for Triticum aestivum L. is -0.91, for Oryza sativa L. is -0.17and for Vigna mungo L.it is -0.59.The chi square values for Helianthus anus L. is 26.54, for Lycopersicon esculentum L. is 108.89, for Triticum aestivum L. is 24.42, for Oryza sativa L. is 32.05, for Vigna mungo L. is 5.71.The variance ratio for H.. annus L. is 2.25 ,for Lycopersicon esculentum L. is 1.0 ,for T. aestivum L. it is 1.6 ,for O. sativa L. it is 39.06 and for V. mungo L. it is 9.0.The F-ratio is 457.35,1088.9, 414. 85, 988, 37.35 for H. annus, L. esculentum, T. aestivum, O. sativa and V. mungo respectively.

Sl No.	Name of plants	TREATMENTS									% of Variation.		Variance ratio	F-ratio between treatments	Correlation coefficient	Chi square value
		Control			0.906% of extract "A"			1.188% of extract "A"								
		Total No. of seeds	Total No. of seeds germinated	% of germination	Total No. of seeds	Total No. of seeds germinated	% of germination	Total No. of seeds	Total No. of seeds germinated	% of germination						
1	Helianthus annus L.	50	48	96	50	27	54	50	34	68	In0.906%	In 1.188 %	2.25	457.35	-0.85	26.54
											43.75	29.1				
2	Lycopersicon esculentul.	50	45	90	50	10	20	50	10	20	77.7	77.7	1.0	1088.9	-0.97	108.89
3	Triticum aestivum L.	50	48	96	50	29	58	50	33	66	39.58	31.25	1.6	414.85	-0.91	24.42
4	Oryza sativa L.	50	40	80	50	15	30	50	44	88	62.5	10	39.06	988	-0.17	32.05
5	Vigna mungo L.	50	14	28	50	8	16	50	12	24	42.85	14.28	9.0	37.35	-0.59	5.71

Table No. 3: The Effect Of Plant Extract On Seed Germination

IV. DISCUSSION

(a) Analysis on physicochemical characteristics:

The physicochemical characteristics recorded in the Table- 1 showed the loss on drying is 75.47%. This is quite reasonable for susceptibility of the plant to environmental interaction to compete with the nearby crops. It is supportive to its perennial habitat. According to Nilsen, 2002, allelopathic interactions are primarily based on the synthesis and release of secondary metabolites by higher plants that initiates a wide array of biochemical reactions which induce several biological changes. In nature many plant species grow together and interact with each other by inhibiting or stimulating the growth and development through allelopathic interactions in an ecosystem the dominant plants growing within it are exhibited in the form of pure stands or monothickets. Such ecosystem always show the zones of inhibition around them. The ecosystem infested by dominant weed show drastic alteration in their structure and functions. The weeds of the dynamic ecosystems like crop fields originate in natural environment and become hurdle to the crops. The colour (Broom yellow) speaks about the properties of the phytochemicals present in the dry powder that it is a mix of both acidic and basic types. However the solubility test shows that those are having low solubility. This may be due to coarse texture of the prepared powder. More solubility in alcohol indicates the nonpolar nature of the phytochemicals.Fluorescence Activity of the plant materials : The result of fluorescence study in table- 1 & fig. 2(A) & 2(B) showed that there is change of colour with water solution on exposure to UV light where as there is no colour change in solution with alcohol and acetic acid on exposure to UV light. Change of colour is an indication of positive fluorescence activity. This is correlated to the fact as described by Rama Swamy Nnna et. al. 2013, that the phytochemicals present in the plant material are UV sensitive. Under UV those phytochemicals converted into fluorescence derivatives which fluorescences. This is an important parameter for

pharmacognostic evaluation. It justifies the ethnobotanical use of this plant in the preparationof black dye[14].

(b) Quantitative estimation of phytochemicals:

The quantity of alkaloid (980.46mgATE/100gmD.W.), flavonoid (713.06mgQUE/100gmD.W.) and phenols (827.66mgGAE/100D.W.) as recorded in the table- 2 & fig.3 & 4, is quite considerable. It is rich in phytochemicals. This is in favour of its perennial habit. This is also in accordance with the report of John R. Steep & Daniel E. Moerman, 2001, that means in perennial weeds which grows under dynamic ecosystem or in drastical areas, always invest more in the quantity than quality of phytochemicals.

(c) Analysis on test for allelopathic effect:

The result recorded in the table -3 and figure- 5 & 6 showed that the percentage of germination is 96% in control for Helianthus anus, 90% for Lycopersicon esculentum, again 96% for Triticum aestivum, 80% for Oryza sativa and 28% for Vigna mungo whereas with 0.906% conc. of extract 'B' it is 54% for H.anus, 20% for L.esculatum, 58% for T.aestivum, 30% for Oryza sativa and 16% for Vigna mungo and with 1.188% conc. of extract 'B' it is 68 % for H.anus, 20% for L.esculatum, 66% for T.aestivum, 88% for O.sativa and 24% for V.mungo. The values are significant at all probability levels of chi square tests. The % of germination in control is higher than the treatments in all cases except in O.sativa at 1.188% conc. This correlates to the fact that there is inhibitory effect at the present concentration, but with 1.188% conc., all shows significant increase in the percentage of germination than at 0.906% conc. of extract. It correlates to the fact that there is inhibitory effect at low concentration and may be stimulatory at higher doses. The inhibition is concentration dependent. This slightly differed from the view of Mallik and Williams, 2005. According to them the higher concentrations of allelochemicals usually inhibit the growth of recipient plants and soil microorganisms or both. However they have stimulatory effects at lower concentrations on growth, development flowering, fruiting and yield. Nie et. al. 2003 (a,b) also reported the inhibitory effect of aqueous extract of Wedelia trilobata on Brassica parachinensis where they found the reduction in seed germination percentage fresh weight of roots and aerial parts, plant height, and chlorophyll contents. They claimed these effects are due to inhibited activities of peroxidase, superoxide dismutase, nitrate reductase and disruption of nitrogen metabolism. Similarly Penna et al., 2003, reported the inhibitory effect of aqueous extracts of Chenopodium ambrosioides on seed germination of Bidens pilosa. Sangita Chandra et al.,2012, reported that hydroalcoholic extract of root of Withania sominifera exhibit remarkable negative allelopathic effect on seed germination and radical growth of Cicer arietinum and Triticum aestivum .Triticum aestvum was found to be more sensitive than Cicer arietinum. In the present report more sensitivity was found in Vigna mungo According to Sangita Chandra et al. plnt exhibit allelopathic activity due to release of allelochemicals of different classes mainly plyphenolic compounds(flavonoids, tannins), Cyanogenic glycosides and alkaloids. The quantitative estimation of phytochemicals in the table - 2 of the present work justified this. Rice,1984 and Mandava,1986, indicated that the allelochemicals act through negative or positive impact on i) cell division and cell elongation, ii) phytochrome induced growth iii) membrane permeability iv) mineral uptake v) stomatal opening and photosynthesis vi) respiration vii)protein synthesis and changes in lipid and organic acid metabolism viii) inhibition and stimulation of specific enzymatic activities. The values of coefficient of variation shows the is consistent. The values of correlation coefficient in cases of H.anus, L. esculentum and in T. aestivum is significant except in o. sativa and Vigna mungo is insignificant. This indicates good correlation (positive/negative) between the conc. and the percentage of germination. The chi square values shows significant property of the result at all probability levels excepting the case of V.mungo where it is significant at 0.05 level only. The variance ratios and F-ratios are all significant at 0.05 and 0.01 probability levels which justifies that there is definite effect of the phytochemicals over the percentage of germination of crop seeds and justify them as allelopathic.

V. CONCLUSION

The physicochemical characteristics said that the phytochemicals present in the extract are able to absorp the UV range of electromagnetic radiation. It is a pharmacognostic character which will be helpful for the diagnosis of right drugplant during drug dulteration. However the use of uv absorbing phytochemicals should be restricted in case of use in cosmetics etc. The presence of good amount of phytochemicals in the plant may be subjected to isolation and purification and identification for further use in medicineindustry or pharmacological industry.

The allelopathic property of the phytochemicals on test crops H. annus, L. esculentum, T. estivum, O. sativa, V. mungo in 2 different concentrations says that they may be stimulatory at higher concentrations and subjected to further research for positive allelopathism over the crops.However according to Khalid , S. et al.,2002, this weed can be used for field treatment to reduce the autointoxication by some crops like the test crops.

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