
Journal of Science and Humanity

[Vol. 1 No. 2]

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ICPL 87.**

Effect of Leaf Extract of Some Plants on Seed Germination and Seedling Development of Pigeon pea (*Cajanus cajan* (L.) Millsp. Var ICPL 87.

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ABSTRACT

Some allelochemicals present in plants showed effect on germination. In present study effect of 15 aqueous leaf extract at 6 hour soaking period and (10%) concentration were tested on seed germination and seedling development of pigeon pea. The distilled water was used as control. The *Eupatorium odoratum* L. and *Pogonia pinnta* (L.) Panigrahi both plant extracts showed stimulatory effect on seed germination and seedling development as compare to control after 7 days, followed by *Cassia uniflora* Mill, *Ipomoea carnea* Jacq, *Hyptis suaveolens*(L.) Poit., *Achyranthus aspera*,L These plants showed positive result in case of root length and shoot length as compare to control. Ramming *Lantana camara*, *Ageratum conyzoides*(L.)L, *Tridax procumbens*, *Alternanthera sessilis*, (L.) R.Br, *Xanthium strumarium* L., *Oxalis corniculata* L., *Vitex negando* L., *Parthenium hysterophorus* L., *Arginum maxcina* L. inhibitory effect on root and shoot length and vigor index.

Key words: , *Cajanus cajan*, Leaf extract, Seed germination.

Introduction:

Allelopathy is defined as any direct or indirect, harmful effect of plant on another plant through release of chemicals into the environment (Rice, 1948). A plant produces some chemical compound and releases in environment which are called as allelochemicals. These allelochemicals shows helpful or harmful effects on seed germination, growth and progress of other plants. (Ghodake *et.al.*2012, Dhole *et.al* 2011, Mohammed *et.al.* 2012). A number of studies have indicated that the allelochemicals are noxious which may reduce seedling development and seed germination. *Cajanus cajan* (pigeon pea) is a valuable pulse crop in cultivated in India. Pigeon pea is one of the major pulse crops of

Maharashtra grown in Kharif season. The present work has done to investigate allelopathic effects of some plant extracts on seed germination, root length, shoot length, vigor index and seed germination.

MATERIALS AND METHODS:

Fresh leaves of selected plants like *Eupatorium odoratum*, *Cassia uniflora*, *Ipomoea carnea*, *Arginum maxcina*, *Achyranthus aspera*, *Lantana camara*, *Ageratum conyzoides*, *Tridax procumbens*, *Alternanthera sessilis*, *Oxalis corniculata*, *Vitex negando*, *Hyptis suaveolens*, *Parthenium hysterophorus*, *Pogamia pinnta*, *Xanthium strumarium* were collected from agricultural fields near collage campus in February 2014. The leaves were washed gently with tap water then drying with clean absorbent paper and allow drying in laboratory for few days. The air dried leaves were finely powdered with grinder and placed in polythene bags to prevent it from moisture and contamination. Then aqueous extracts (W/V) were prepared by extracting 10 g of powder with 100 ml distilled water for 24 hours. The mixture was then filtrate through filter paper and this 10% extract filtrate used for this experiment.

Seeds of *Cajanus cajan* were collected from Gov. seed farm Karad, then these seeds were soaked for 6 h in 10% concentrations of the different extracts. For control, seeds were soaked only in distilled water. The seed surface sterilized by 0.1% HgCl₂ and washed again distilled water and used for experiment. The seeds were allowed to germinate in glass petriplates between wet filter papers. The sets were arranged that each petriplate contained 10 seeds. In this ways each variant was laid out in three replications. These samples were placed in laboratory at a temperature of 25⁰C for 7 days. The following characteristics were determined, percentage of seed germination, root length, shoots length, lateral root number, vigor index. The germination percentage and vigor index was calculated by following formulas.

$$GP = \frac{\text{Number of germinated seeds}}{\text{Total number of observation}} \times 100$$

Vigour index was calculated by using the formula proposed by (Abdul-Baki and Anderson, 1973).

$$VI = (\text{Root length} + \text{Shoot length}) \times \text{Germination percentage}$$

The observations were plotted in the observation table.

Data analysis

Variance analysis of data was performed by SPSS 15. Mean comparisons were carried out by Duncan's multiple range test at 0.001, 0.01 and 0.05 probability levels. Graphs were drawn with Microsoft Office Excel 2003 software.

Result: Effect of different plant leaf extracts on *Cajanus cajan* seed germination percentage and seedling development is shown in table. At 10 % concentration and 6 hour soaking treatments by *Eupatorium odoratum* and *Pogamia pinnta* shows stimulatory effect as compare to control where seed germination increased while it reduced in remaining treatments due to inhibitory effect. The treatment of *Tridax procumbens* shows only (20%) seed germination followed by, *Oxalis corniculata* (26.6%), *Alternanthera sessilis* (30.30%), *Lantana camara* (40%), *Xanthium strumarium* (48.3%).were much reduced seeds germination. In case of, *Cassia uniflora* (60%), *Ipomoea carnea* (50%), *Vitex negando* (50%), *Hyptis suaveolens* (60%) and *Arginum maxcina* (66.6%) *Ageratum conyzoides* (60%), *Parthenium hysterophorus* (60%) was slightly reduced seed germination as compare to control treatment.

Another seedling parameter root, shoot length and numbers of lateral roots were observed. The Maximum root, shoot length and number lateral root was observed in *Eupatorium odoratum* and *Cassia uniflora*, followed by *Arginum maxcina*, *Ageratum conyzoides*, *Ipomoea carnea*. In case of *Ageratum conyzoides* and *Hyptis suaveolens* only shoot length was slightly increased as compare to control. The lowest root, shoot length and number of laterals root in plant extracts were observed in *Lantana camara*, *Tridax procumbens*, *Oxalis corniculata* and *Xanthium strumarium* followed by *Ageratum conyzoides*, *Vitex negando*. Overall maximum vigor index shows in treatment of *Eupatorium odoratum* and lowest in *Parthenium hysterophorus*. The highest lateral roots number observed in *Ipomoea carnea* and *Cassia uniflora* plant extracts treatment but in case of *Ipomoea carnea* lowest in root, shoots length and seed germination also as compare to control.

Discussion: The experiment results clearly demonstrated that most of the plant species inhibited seed germination, root, shoot length and number of lateral root numbers as compare to control. While some plant species showed that positive effect in *Cajanus cajan*. The present findings corroborate with the conclusion of Patil, (2014) in *Cicer arietinum* seeds, they used as different weed species leaf extracts on *Cicer arietinum* seeds. They obtained results that most of weed species inhibited growth parameters and some weed species stimulatory affects on *Cicer arietinum* seeds at the time of germinations. Here also obtained same findings in plant extract of *Pogamia pinnta* and *Eupatorium odoratum* shows stimulatory

effect as compare to control. Similar results obtained by *kulkarni et.al* (2014), they used leaf leachet of *Pogamia pinnta* and *M. Indiacca* showed positive responses to root length of sorghum. The present

Sr. No	Name of plant extract	Root length (Cm)	Shoot length (Cm)	Number of lateral roots	Vigor index	Seed germination %

findings agree with reports of Gantayet *.,et.al* (2014),. Benyas *et.al* (2010).

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1	<i>Vitex negando</i> L.	2.41 ± 0.49 ^{a,b}	4.53 ± 0.88 ^{c,d}	3.700 ± 0.8 ^b	347	50
2	<i>Oxalis corniculata</i> L.	1.1^{**} ± 0.29 ^a	1.15 ± 0.419 ^a	0.96^{**} ± 0.357 ^a	61.85	26.66
3	<i>Xanthium strumarium</i> L.	1.5^{**} ± 0.29 ^a	2.53 ± 0.767 ^a	1.80^{**} ± 0.372 ^a	322.6	48.3
4	<i>Pogamia pinnta</i> (L.) Panigrahi	4.12 ± 0.36 ^d	5.03[*] ± 0.94 ^{c,d}	2.36 ± 0.59 ^{a,b}	689	85.6
5	<i>Parthenium hysterophorus</i> L.	3.4 ± 0.92 ^c	3.07 ± 0.69 ^b	6.58 ± 1.02 ^{c,d}	447.6	60
6	<i>Achyranthus aspera</i> L.	3.86 ± 0.62 ^c	4.73 ± 0.74 ^{c,d}	2.60 ± 0.38 ^{a,b}	567.17	60.66
7	<i>Alternanthera sessilis</i> (L.) R.Br.	2.26 ± 0.61 ^{a,b}	2.2 ± 0.58 ^a	2.06 ± 1.47 ^{a,b}	15.11	30.33
8	<i>Tridax procumbens</i> (L.) L	0.18^{**} ± 0.5 ^a	1.7 ± 0.52 ^a	2.80 ± 0.63 ^{a,b}	38.2	20
9	<i>Hyptis suaveolens</i> (L.) Poit.	3.53 ± 0.32 ^c	6.65[*] ± 0.80 ^{c,d}	3.2 ± 0.34 ^b	490.8	60
10	<i>Eupatorium odoratum</i> L.	6.67 ± 0.25 ^{c,d}	5.1 ± 0.55 ^{c,d}	4.55 ± 0.46 ^c	552	90.12
11	<i>Argemone maxicana</i> L.	3.91 ± 0.72 ^c	2.64 ± 0.80 ^a	2.40 ± 0.660 ^b	61.47	66.6
12	<i>Ageratum conyzoides</i> (L.)L	2.20 ± 0.57 ^{a,b}	3.2 ± 0.88 ^b	4.96 ± 0.92 ^c	449.4	60
13	<i>Ipomoea carnea</i> Jacq.	3.1 ± 0.89 ^c	2.19 ± 0.77 ^a	11.6[*] ± 2.061 ^d	425	50
14	<i>Cassia uniflora</i> Mill.	4.3.2 ± 0.92 ^d	3.73 ± 0.77 ^b	11.2[*] ± 1.71 ^d	594	60
15	<i>Lantana camara</i> L.	0.10^{**} ± 0.39 ^a	1.54 ± 0.32 ^a	0.10^{**} ± 0.73 ^a	6.56	40
16	Control	3.67 ± 0.25 ^c	3.09 ± 0.24 ^b	0.85^{**} ± 0.34 ^a	720	80

Table. Effect of different plant extracts on *Cajanus cajan* at 10% concentration in 6 hour soaking period.

*Values in the columns followed by Duncan's the same letters (s) are not significantly different ($p < 0.05$) according to Duncan's Multiple test(DMRT)