



ORIGINAL RESEARCH ARTICLES

To find the efficacy of crude extract from plants on germination of seeds

Ravikumar Patil^{1*}, Chetan DM², Abhilash K B² and Raghupathi Achari²**Abstract**

Germination is the growth of an embryonic plant contained within a seed; it results in the formation of the seedling. The seed of a higher plant is a small package produced in a fruit or cone after the union of male and female sex cells. All fully developed seeds contain an embryo and, in most plant species some store of food reserves, wrapped in a seed coat. Some plants produce varying numbers of seeds that lack embryos, these are called empty seeds, and never germinate. Most seeds go through a period of quiescence where there is no active growth; during this time the seed can be safely transported to a new location and/or survive adverse climate conditions until circumstances are favorable for growth. Quiescent seeds are ripe seeds that do not germinate because they are subject to external environmental conditions that prevent the initiation of metabolic processes and cell growth. Under favorable conditions, the seed begins to germinate and the embryonic tissues resume growth. In the present study, research was done to find the effect of crude extract of plants on germination of seeds. The plants which we have chosen may show the positive or negative effect on the germination of seeds. This has some importance in the rain fed areas. Even the specific plant extract soaked and sow in land may helpful to tolerate the drought conditions. Also, study is helpful to agriculture or agricultural industry. It helps to find out the anti sprouting property of the plants. However, further work is needed to improve this method.

Keywords: Germination; seed coat; Quiescent seeds; embryo

Introduction

Germination demarcates the transition from the seed being dependent on food sources from the mother plant to an independent plant capable of taking up nutrients and growing independently. Hence, germination also makes up the last link in the chain of seed handling processes. Once germination has commenced, water, temperature and light stress can easily be fatal. Therefore, the best possible conditions during germination and establishment period are crucial. [1,2].

Once the seedlings have established themselves, some stress is gradually imposed thus adapting the plants to field conditions. For some species and in some environments it is possible to sow

seeds directly in the field and hence omit the nursery phase. Direct sowing is likely to be less successful in terms of survival rate than planting because germinating seeds do not have the competitive advantage over weeds which established seedlings have. Yet, where seeds are relatively cheap, and nursery and planting costs high. Germination is determined by seed quality, pretreatment and germination conditions such as water, temperature, substrate, light, and freedom from pathogens [3].

Germination is the growth of an embryonic plant contained within a seed; it results in the formation of the seedling. The seed of a higher plant is a small package produced in a fruit or cone after the union of male and female sex cells. All fully developed seeds contain an embryo and, in most plant species some store of food reserves, wrapped in a seed coat. Some plants produce varying numbers of seeds that lack embryos, these are called empty seeds, and never germinate. [4] Most seeds go through

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a period of quiescence where there is no active growth; during this time the seed can be safely transported to a new location and/or survive adverse climate conditions until circumstances are favorable for growth [5]. Quiescent seeds are ripe seeds that do not germinate because they are subject to external environmental conditions that prevent the initiation of metabolic processes and cell growth. Under favorable conditions, the seed begins to germinate and the embryonic tissues resume growth, developing towards a seedling [6].

Table 1 Plant: Crude extract of *Leucusaspera*.Seed: Horse gram.

% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	8.9	96
25%	4.7	82
50%	3.2	72
75%	1.5	63
100% SOLUTION	0.6	41
Seed: Green gram.		
% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	9.2	92
25%	4.1	71
50%	3.6	66
75%	1.8	55
100% SOLUTION	NIL	NIL
Seed: Jowar.		
% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	10.2	93
25%	5.8	84
50%	4.4	73
75%	3.6	61
100% SOLUTION	0.4	42
Seed: Millet.		
% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	11.5	89
25%	6.7	71
50%	5.2	53
75%	NIL	NIL
100% SOLUTION	0.7	36

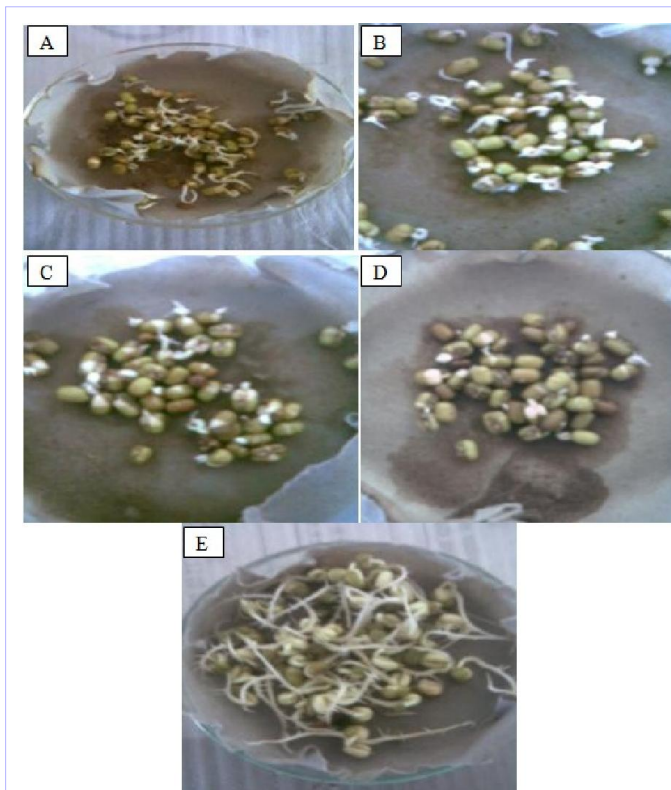


Figure 1 Plant:Crudeextract of *Leucus aspera*. Day 1. A-25%,B-50%,C-75%,D-100% solution,E-100% solution.

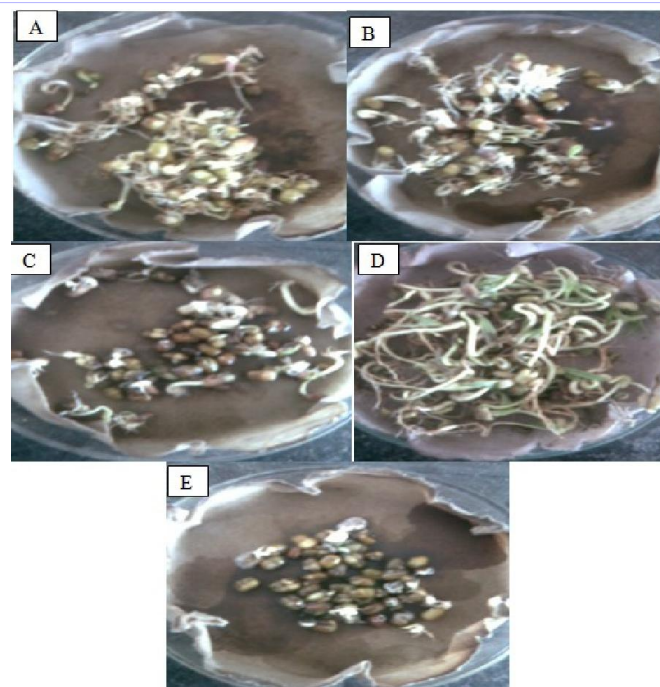


Figure 2 Plant:Crude extract of *Leucus aspera* Day 5. A-25%,B-50%,C-75%,D-100% solution,E-100% solution.

Table 2 Plant:Crudeextract ofVitexnegundo.Seed: Horsegram.

% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	9.2	87
25%	4.9	61
50%	2.3	52
75%	NIL	NIL
100% SOLUTION	NIL	NIL
Seed: Green gram.		
% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	9.9	89
25%	4.2	77
50%	2.4	53
75%	1.7	44
100% SOLUTION	NIL	NIL
Seed: Jowar.		
% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	8.0	85
25%	6.9	76
50%	4.5	58
75%	2.0	41
100% SOLUTION	0.2	33
Seed: Millet.		
% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	5.1	81
25%	4.2	59
50%	1.7	45
75%	1.3	38
100% SOLUTION	NIL	NIL

Material and Methods

Materials required: Petridish, Distilled water ,Crude extract of plants, What man filter paper No. 1.

Pestle and mortar, Pipette and Measuring jar.

Methodology

To study the effect of plant extracts on the germination and initial growth of green gram, horse gram, ragi(millet) and jowar. The entire plants including roots and shoots were collected. In

Table 3 Plant:Crude extract ofLantanacamara.

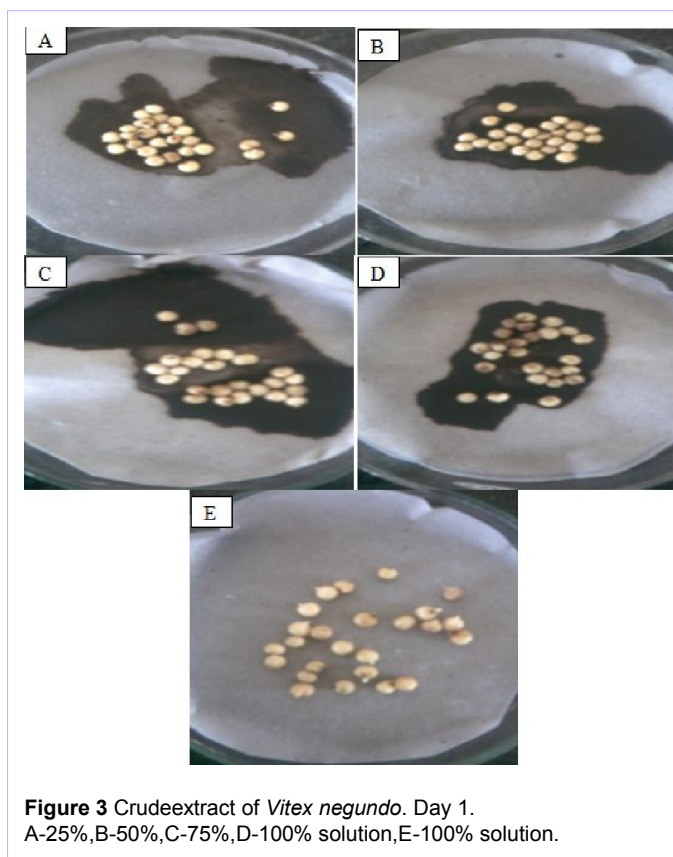
Seed:		Horse gram.
% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	12.3	90
25%	5.3	61
50%	2.6	56
75%	4.0	38
100% SOLUTION	NIL	NIL
Seed: Green gram.		
% OF EXTRACT	SPROUT LEGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	9.8	93
25%	10.2	78
50%	7.3	64
75%	6.0	51
100% SOLUTION	0.7	39
Seed: Jowar.		
% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	9.2	91
25%	4.1	72
50%	3.1	51
75%	2.6	42
100% SOLUTION	o.4	37
Seed: Millet.		
% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	6.4	83
25%	2.9	58
50%	2.4	44
75%	Nil	Nil
100% SOLUTION	Nil	Nil
Plant: Crude extract Of Lantana camara.		
Seed:Horse gram.		Seed:Green gram.

a set, fresh plant mass (250 g) of each plant species was un-boiled/grounded in one liter water and kept for 3 days with stirring a regular interval. The extracts were filtered through Whatman filter paper No. 1. The filtrates were used as extracts of plants in the experiment.

The germination of green gram, horse gram, ragi (millet) and jowar seeds was studied by petridish method. Two sets of trials, each with unboiled crude extracts for each crop, was performed. Twenty five seeds of each species were placed in each Petridish lined with double layer of filter paper and treated with plant extracts, 15 mL per petridish for all seeds control set with distilled water was run simultaneously at every time. The filter papers were kept constantly moist with their respective plant extracts. The experiment was laid out in randomized complete block design with three replications at a room temperature 28 ± 1 °C. Germination (%) and days required for complete germination was

Table 4 Plant:Crude extract of *Anisomeles indica*.

Seed:	Horse gram.	
% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	8.3	94
25%	8.4	72
50%	5.9	61
75%	NIL	NIL
100% SOLUTION	2.4	36
Seed:	Green gram.	
% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	10.6	93
25%	6.7	86
50%	2.3	71
75%	3.4	59
100% SOLUTION	1.3	47
Seed:	Jowar.	
% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	7.6	90
25%	5.0	75
50%	2.8	62
75%	0.8	55
100% SOLUTION	0.7	34
Seed:	Millet.	
% OF EXTRACT	SPROUT LENGTH (in cms) FOR 5 DAYS	% OF GERMINATON (no. of seeds)
100% WATER	6.6	92
25%	3.2	77
50%	2.4	61
75%	2.2	48
100% SOLUTION	NIL	NIL
Plant: Crude extract of <i>Anisomeles indica</i> .	Seed:Jowar.	



recorded in each case. The linear growth of root and shoot were separately recorded, for all seeds after day1 to day5 after seed placing respectively. The collected data were analyzed. [7–10].

Results and Discussion

The effect of crude extract of *Leucus aspera*, *Vitex negundo*, *Lantana camara* and *Anisomeles indica* were studied for Horse gram, Green gram, Jowar and Millet. Here each plant extract solution ranging from 25% to 100% is treated with all seeds to know its effect, along with control (100% water). After the germination of seeds for 5 days, in 100% solution we can observe inhibition of growth. This inhibition may be caused due to some of the chemicals present in the plant extract. In the same way, for control we got a good response. In some cases, at 75% of crude extract may also inhibit the germination of seeds as same as in case of 100% extract. Also, the graphs indicate that the percentage of germination in control is more when compared to 100% of crude extract. In contrast to this some findings or others research results includes as follows: The ethyl acetate soluble fraction of the extract showed similar activity against these organisms. Similarly, the methanol extract at 1000 µg/ml

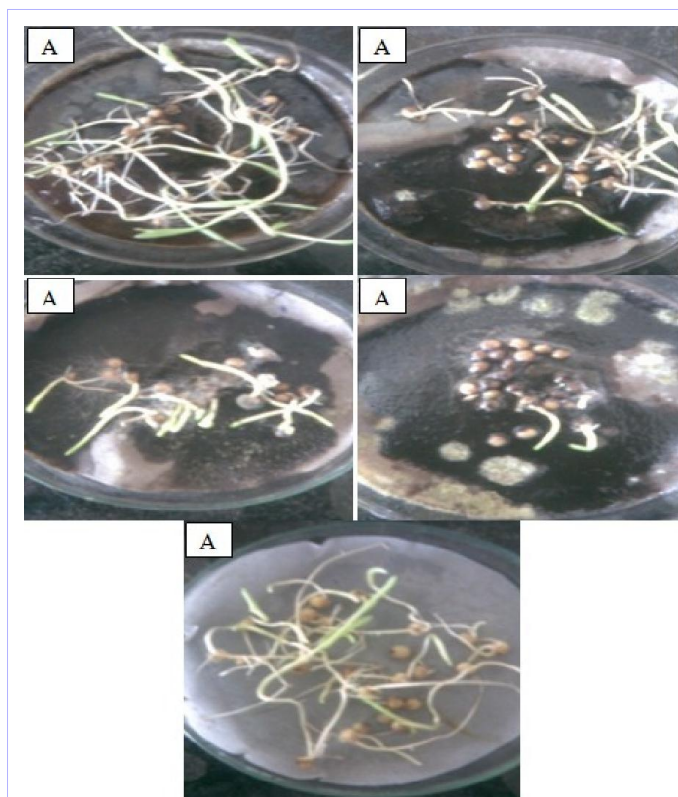


Figure 4 Plant:Crude extract of *Vitex negundo*. Day 5. A-25%,B-50%,C-75%,D-100% solution,E-100% solution.

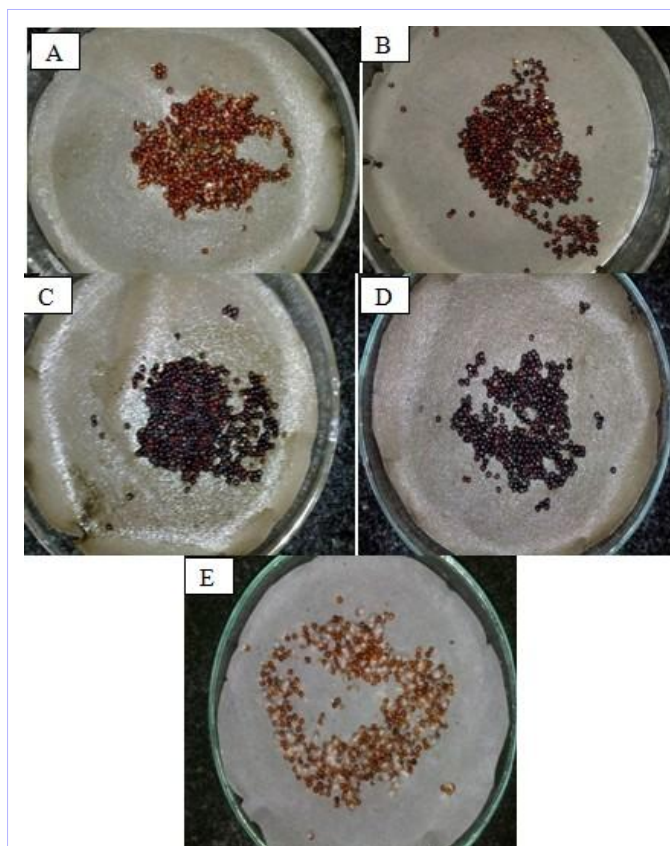


Figure 5 Plant:Crudeextract of *Lantana camara*.Day 1. A-25%,B-50%,C-75%,D-100% solution,E-100% solution.

and the ethyl acetate fraction at 50pg. m exhibited significant antioxidant activity in ferrous sulphate induced lipid per oxidation, 1, 1-diphenyl-2-picryl-hydrazyl (DPPH), Hydroxyl radical and superoxide scavenging models [11]. In ethanomedicine of Dharwad district Karnataka, of the plants used in oral health care. Their survey revealed that 35 plants belonging to 26 families were being used to treat different types of oral ailments like toothache, plaque and caries, pyorrhea and aphthae. It was shown that *Leucus aspera* was used to treat toothache and *casia tora* to treat plaque and caries [12]. Crude extracts from three green seaweeds (*Cladophora dalmatica*, *Enteromorpha intestinalis*, and *Ulva lactuca*) and the three red algae (*Corallina mediterranea*, *Jania rubens*, *Pterocladia pinnate*) were prepared. Their effects on germination, growth of seedlings, chlorophyll content and other metabolic activities of *Vicia faba* were investigated. The crude extract of *C. dalmatica* showed maximal activity, and it increased seed germination, length of main root and shoot systems and the number of lateral roots. All the crude extracts of seaweed increased protein content in root and shoot systems, total soluble sugars and chlorophyll content in leaves. The cytokinin content of the green algae was higher than that in red algae. Growth of seedlings of *V. faba* was stimulated but to dif-

ferent degrees [13]. A review of the literature on the evaluation of medicinal plant extracts shows that many studies into their antifungal activities have been carried out in recent years. Various research group have initiated antifungal screening programmes for plants used all over the world as anti-infectious agents in traditional medicine. Nineteen plant species from fourteen families used in traditional North American Indian medicine were tested for their fungicidal (*Cladosporium cucumerinum* and *Candida albicans*) activity. 1 Of the species investigated, nine were active against *Cladosporium cucumerinum* and nine against *Candida albicans*. A programme was designed for the pharmacological screening of species used by the Mayan people in the highlands of Chiapas in southern Mexico to treat gastrointestinal and respiratory diseases. 2 It demonstrated that 63% of the botanical species showed antifungal properties against *Candida albicans* [14]. Four alkaloids that have been isolated from *A. millefolium*; betaine, betonicine (= achilleine), choline (or choline chloride) and stachydrine (= leonocardine). A fifth alkaloid, trigonelline, has been detected by paper chromatography but not isolated. A sixth, homostachydrine (moschatine or N-

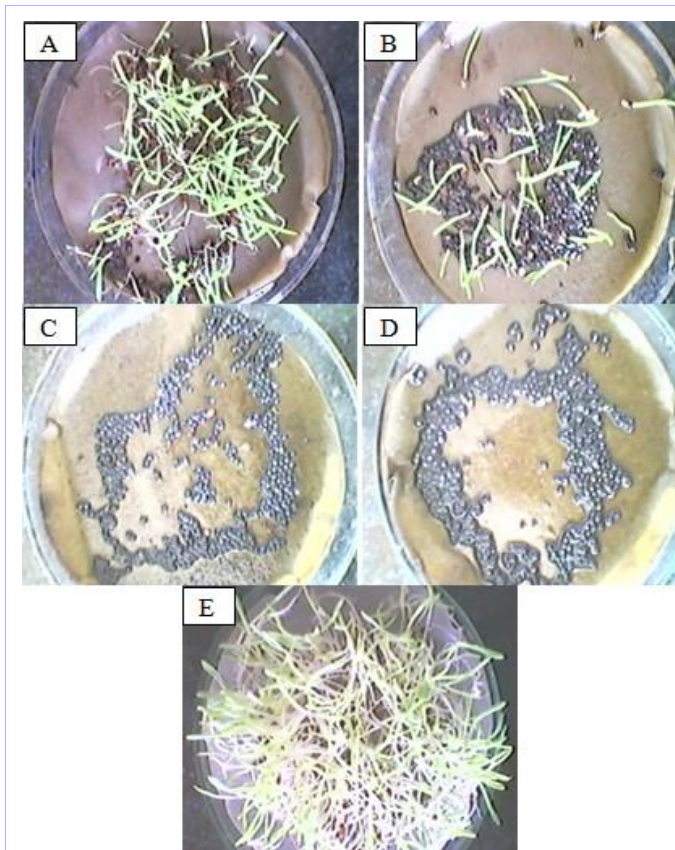


Figure 6 Plant:Crude extract of *Lantana camara*. Day 5. A-25%,B-50%,C-75%,D-100% solution,E-100% solution.

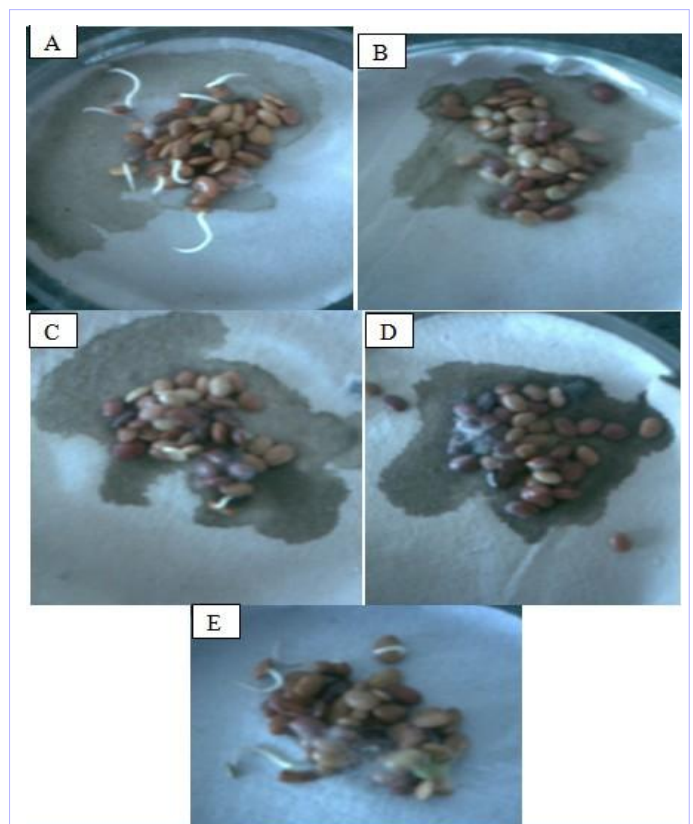


Figure 7 Plant:Crude extract of *Anisomeles indica*.Day 1. A-25%,B-50%,C-75%,D-100% solution,E-100% solution.

methyl piperidin-2-carboxylic acid methylbetaine), has not been isolated from *A. millefolium*, but from *A. moschata* Wulf [15].

Conclusion

In the present study, research was done to find the effect of crude extract of plants on germination of seeds. The plants which we have chosen may show the positive or negative effect on the germination of seeds. This has some importance in the rain fed areas. Even the specific plant extract soaked and sown in land may be helpful to tolerate the drought conditions. Also, study is helpful to agriculture or agricultural industry. It helps to find out the anti sprouting property of the plants. However, further work is needed to improve this method.

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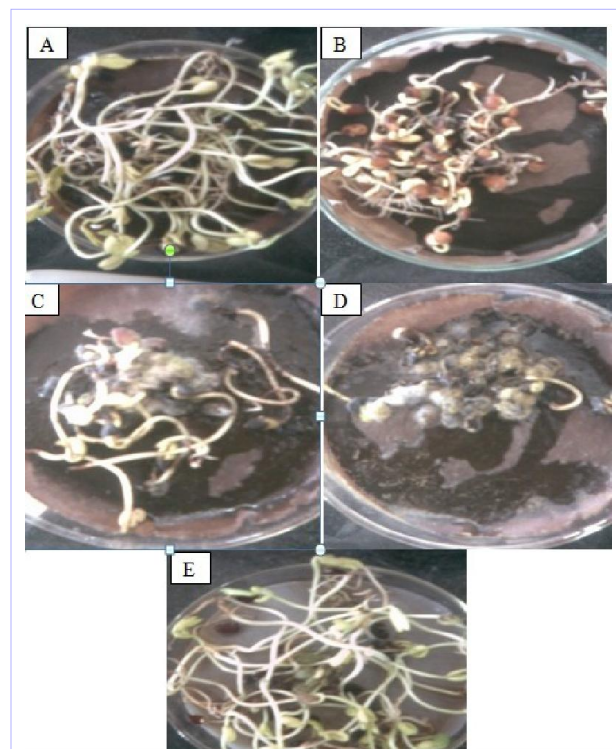


Figure 8 Plant:Crude extract of *Anisomeles indica*. Day 5. A-25%,B-50%,C-75%,D-100% solution,E-100% solution.

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