Assessing the efficacy of common household disinfectants and plant extracts in treatment of legume seeds.

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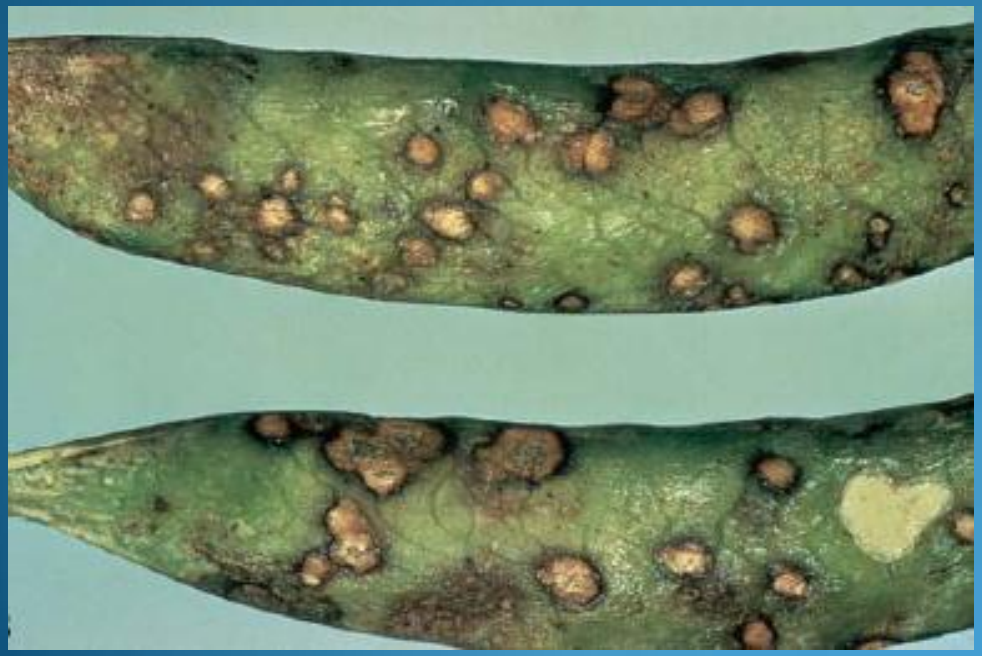
- Food- high protein content.
  Legumes are rich protein content
- Nitrogen fixation. They also fix nitrogen to the soil.
- Animal feed. The harvest of legumes can be used as animal feed.
- Employment. Legume seed treating companies offer employment

opportunities.

Problem statementp

- Presence of pathogens from the previous harvest.
- Diseases of beans.
- Expensive chemicals .
- Toxicity of chemicals.
- Decrease in expected yield.



JUSTIFICATION

- **Cost**
  expensive chemicals.

- **Improvement of production**
  Germination starts from the seeds, the product comes after germination so when one is able to control or to treat the seed then he/she is creating a secure and better future for the plant and mostly one of them being the product of the plant. That's why seed treatment is one of best treatments towards good, valuable products.
- **Improvement of quality of produce**
  The quality of the products depends on the seed also, a good seed brings the best product compared to a random normal seed therefore a treated seed is the best towards good, quality products.

GENERAL OBJECTIVE

To establish common household disinfectants and plant extracts that are effective in treatment of legume seeds.

Specific objectives

1. To evaluate the effectiveness of different household disinfectants in seed treatment.
2. To evaluate the effectiveness of different plant extracts in seed treatment.
3. To determine the germination rates of seeds treated with different household disinfectants and plant extracts.

MATERIALS AND METHODS

- The experiments were carried out in Plant pathology laboratory in College of Agriculture and Veterinary Sciences.
- From June to October 2013.
- legume seeds were treated with different household disinfectants and different plant extracts.

i. peas,
ii. bean(rose coco),
iii. green grams

Pl

Common name	English name	Scientific name	Plant part used
Neem	Margosa tree	*Azadirachta indica*	Leaves
Garlic	Garlic	Allium sativa	Bulb
Aloe vera	Aloe vera		Leaves
Chilli			Pods

Household disinfectants

- Jik
- Dettol
- Vinegar
- Hydrogen peroxide

Objective 1: **To evaluate the effectiveness of different household disinfectants in seed treatment**

Household solutions were obtained from the supermarket. Three serial dilutions were made from each disinfectant for each and every legume variety. The stock solution was considered as the first treatment. The first dilution was made by taking 1 ml from the stock and mixing it with 10 ml of sterile to give the first dilution (10^{-1}) e.g. vinegar 10^{-1}.The second dilution was made by taking 1 ml from the 10^{-1} and mix it with 10 ml of sterile water to give the second dilution (10^{-2}) e.g. vinegar 10^{-2}. 30 seeds of each legume variety are soaked in each treatment for 24 hrs. The legumes were then loaded in paper napkins for the germination test.

Load paper trial method

Plate 1. Load paper trial method

Preparation of plant extracts:

Fresh plant extracts were used. Weighing was done to make the plant extracts dilutions, 1gm of chilli, 7 gm aloevera, 8gm of neem leaves and 8gm of garlic.1gm of chilli was put in 10 ml of water, the 7gm of aloevera was put in 140 ml of water, the 8g of neem leaves was put in 140 ml of water and the 8 gm of garlic was put in 140 ml of water then boil the mixture for 10-15 minutes. After that the solution had to be sieved with a cheese cloth to have a clean solution. The solution is ready to use.

SEED TREATMENT WITH PLANT EXTRACT

The plant extracts were obtained from the school field fresh from the plants. Young, active parts were used. Serial dilutions of the plant extracts were prepared. After preparing the solutions the seeds had to be treated with the plant extracts. The stock was considered as the first treatment. The first dilution was made by taking 1 ml of the stock and mixing it with 10 ml of sterile water to give the first dilution (10^{-1}) e.g. chilli 10^{-1}

In vitro tests

Some serial dilutions were also made both for the household disinfectants and the plant extracts. The legumes were then soaked in the dilutions for 24 hours so that the seeds would imbibe the treatment and thereby observe whether the dilutions would treat them. The legume seeds would then be dipped onto the agar then the growths observed. The data would then be collected 3 – 4 days after dipping them.

Objective 3: To determine the germination rates of seeds treated with different household disinfectants and plant extracts

Each type of legume seeds were dipped onto the agar after being soaked for 24 hours.

21 seeds of each type of legume were used.

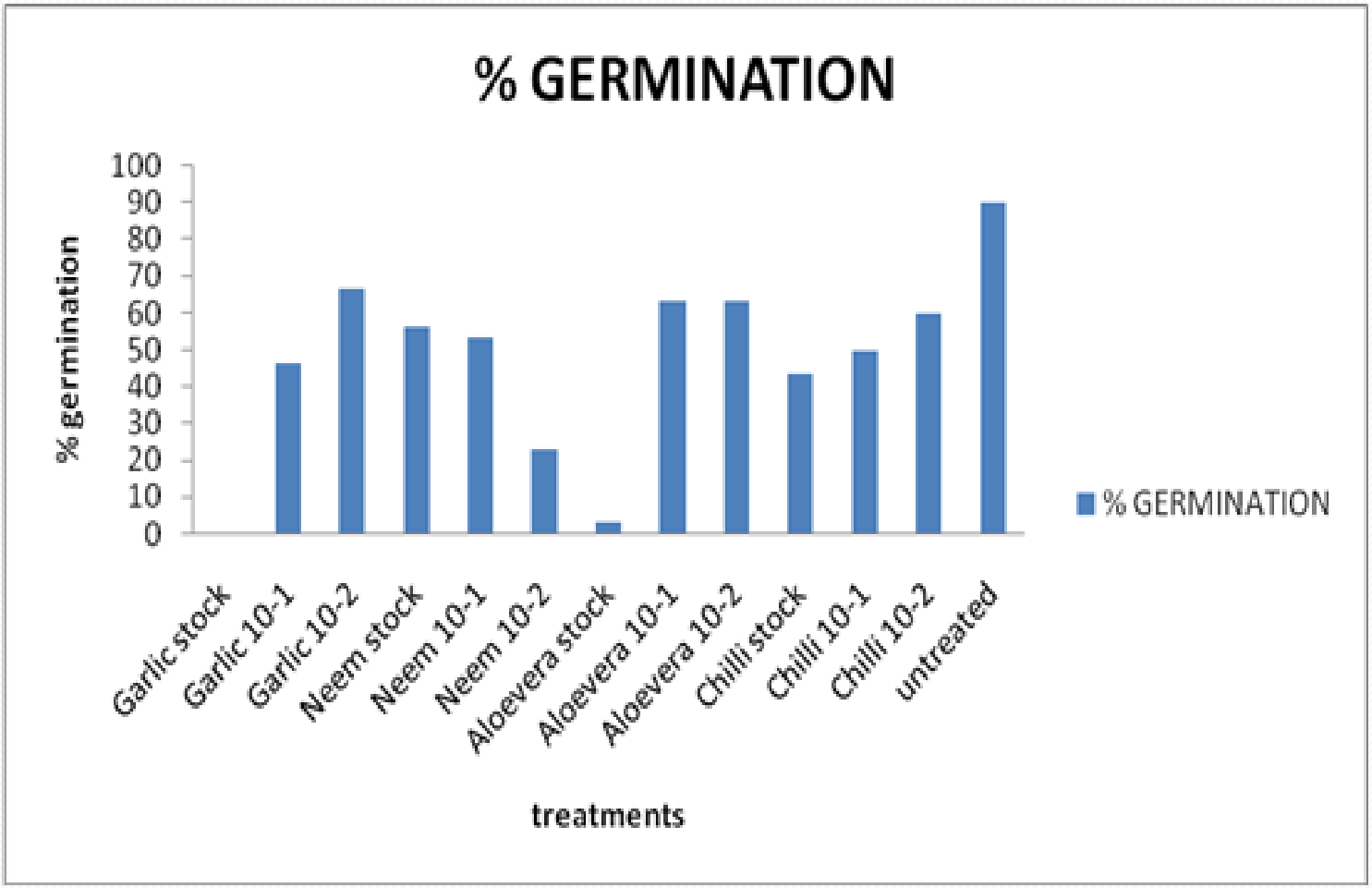
plan

ACTIVITY/ MONTHS	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
Treating seeds	XX				
Incubating treated seeds	XX				
In vitro tests	XX				
Data collection	XX	XX			
Data analysis		XX	XX		
Report writing			XX		
Report presentation					XX

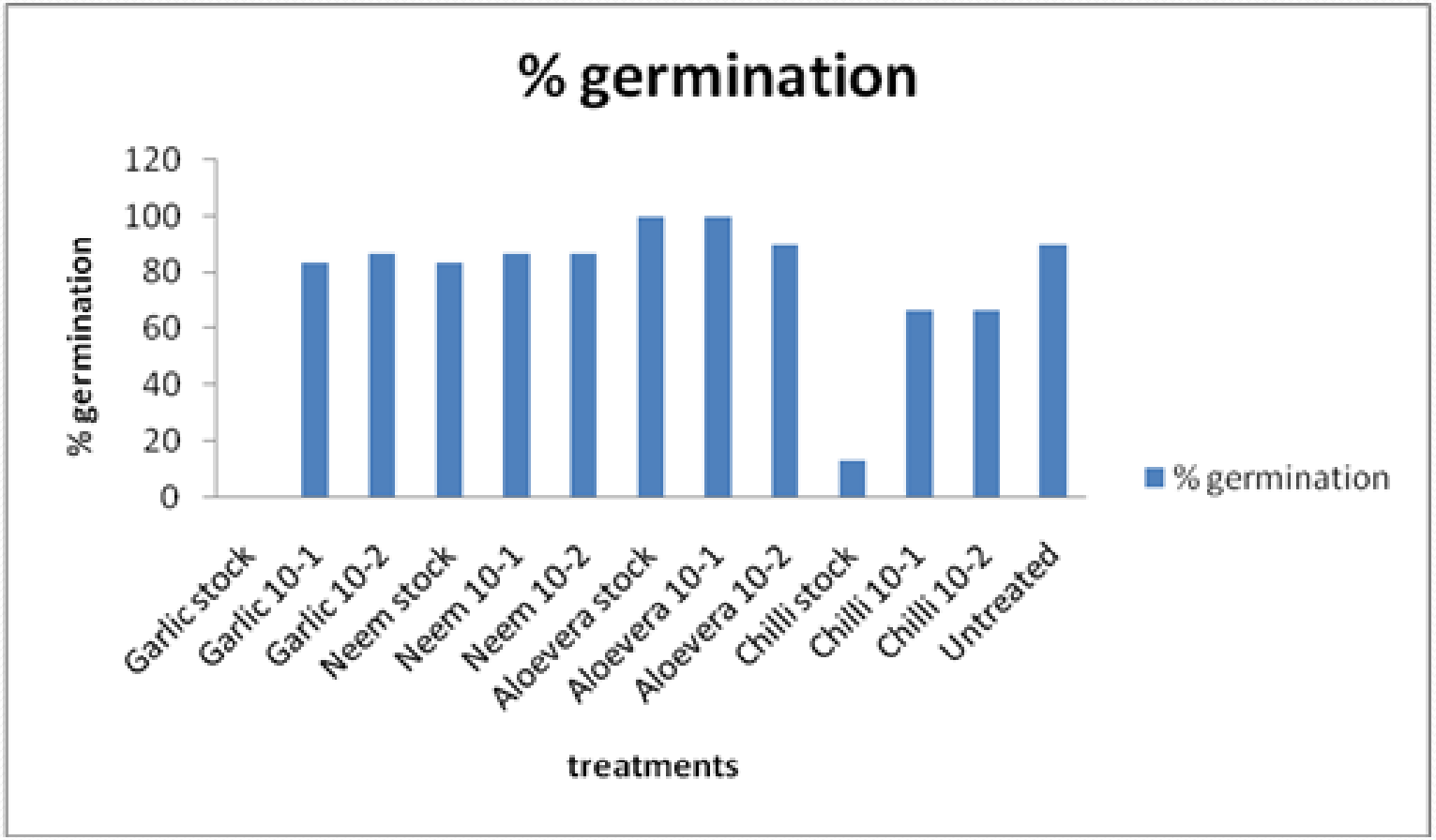
Budget

ITEM	UNIT COST	TOTAL
HOUSE HOLDS		
JIK	300ML	250
DETTOL	160ML	300
ETHANOL	150ML	1000
VINEGAR	750ML	250
PLANT EXTRACTS		
NEEM		
GARLIC		
ALOEVERA		
CHILLI		
BEANS(ROSE COCO)	1KG @100	100
PEAS	1KG@100	100

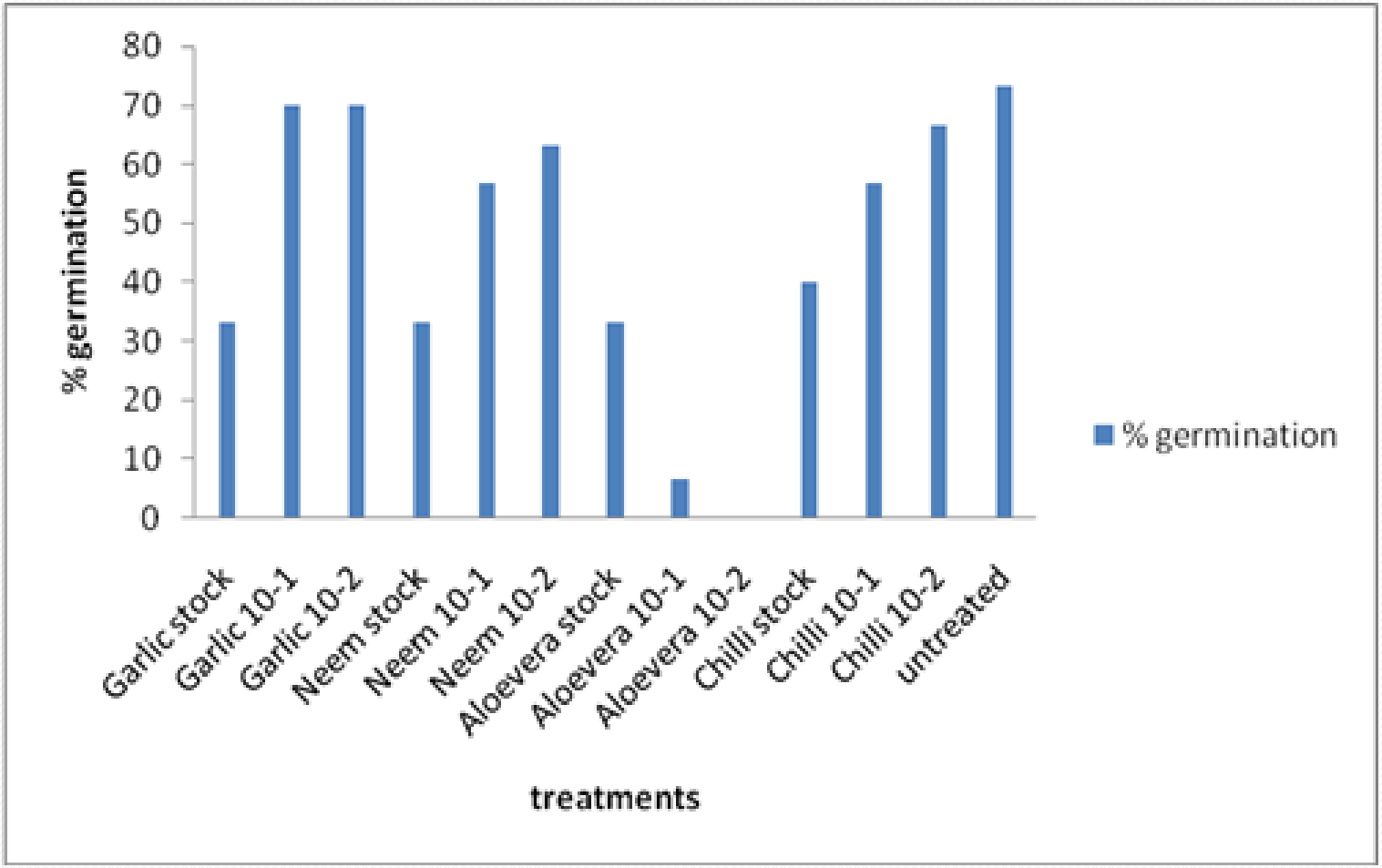
effectiveness of different plant extracts in seed treatment



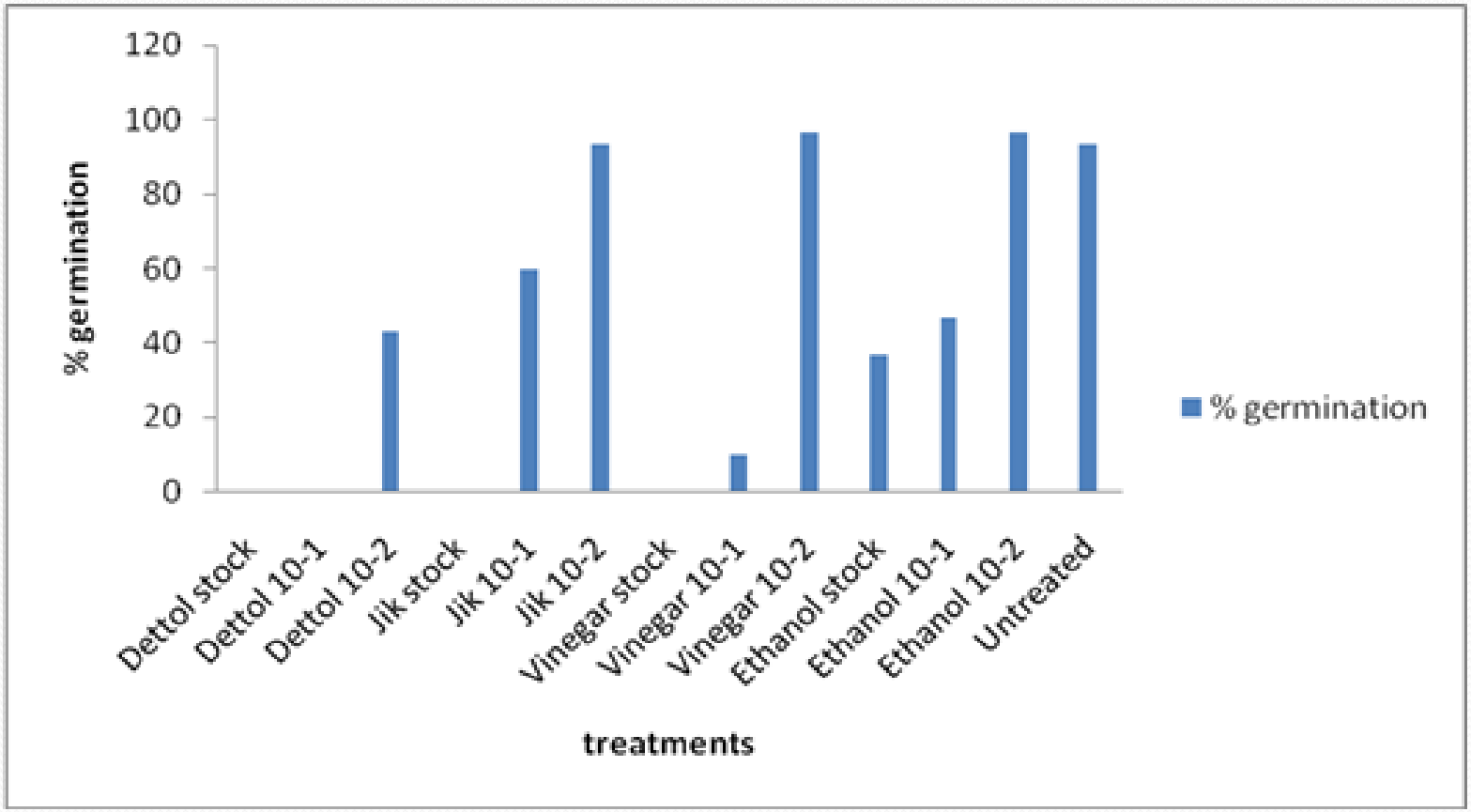
GREEN GRAM GERMINATION TEST DATA SEASON 1



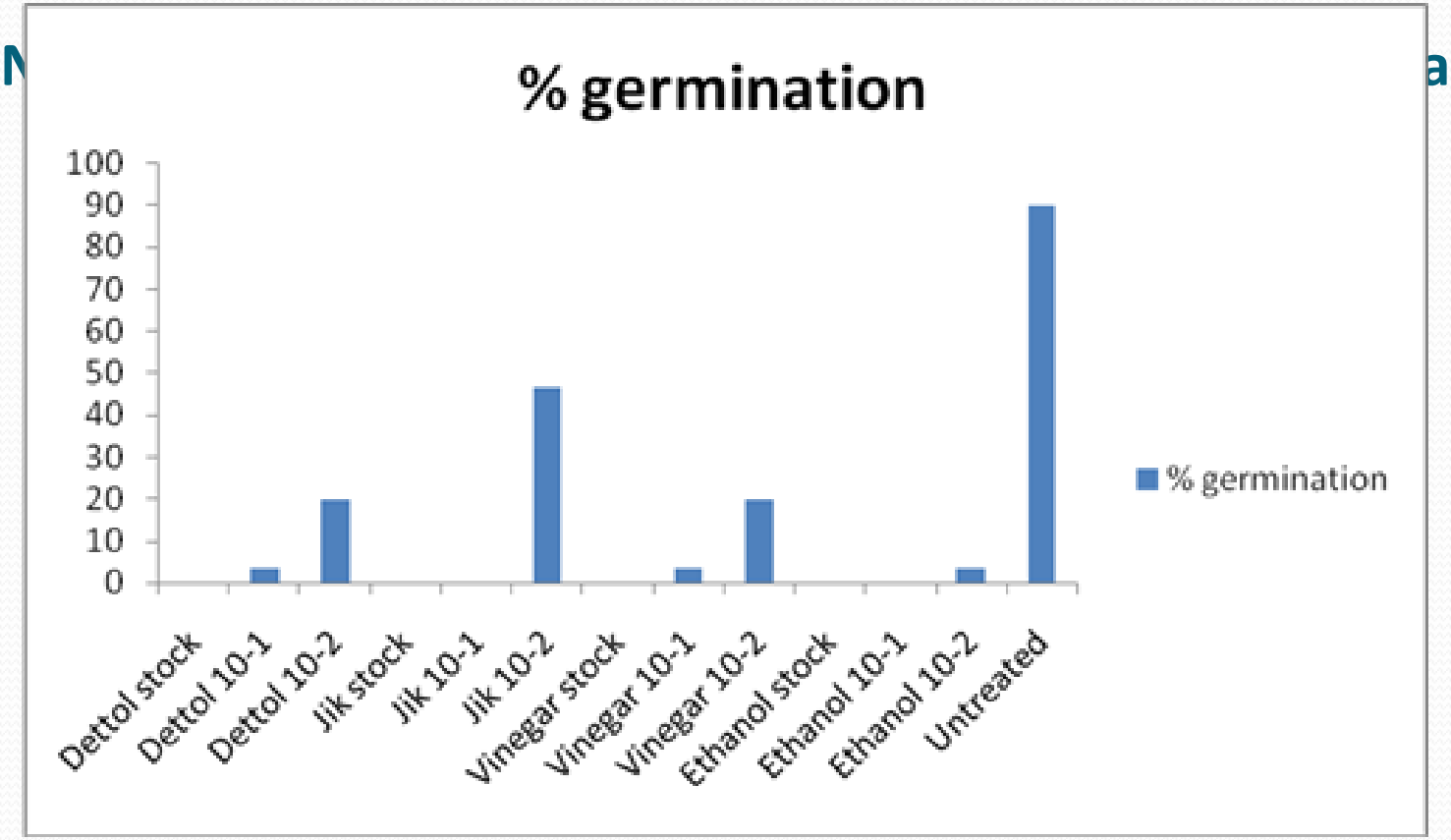
BEAN GERMINATION TEST DATA season 1



COWPEA GERMINATION TEST DATA SEASON 1

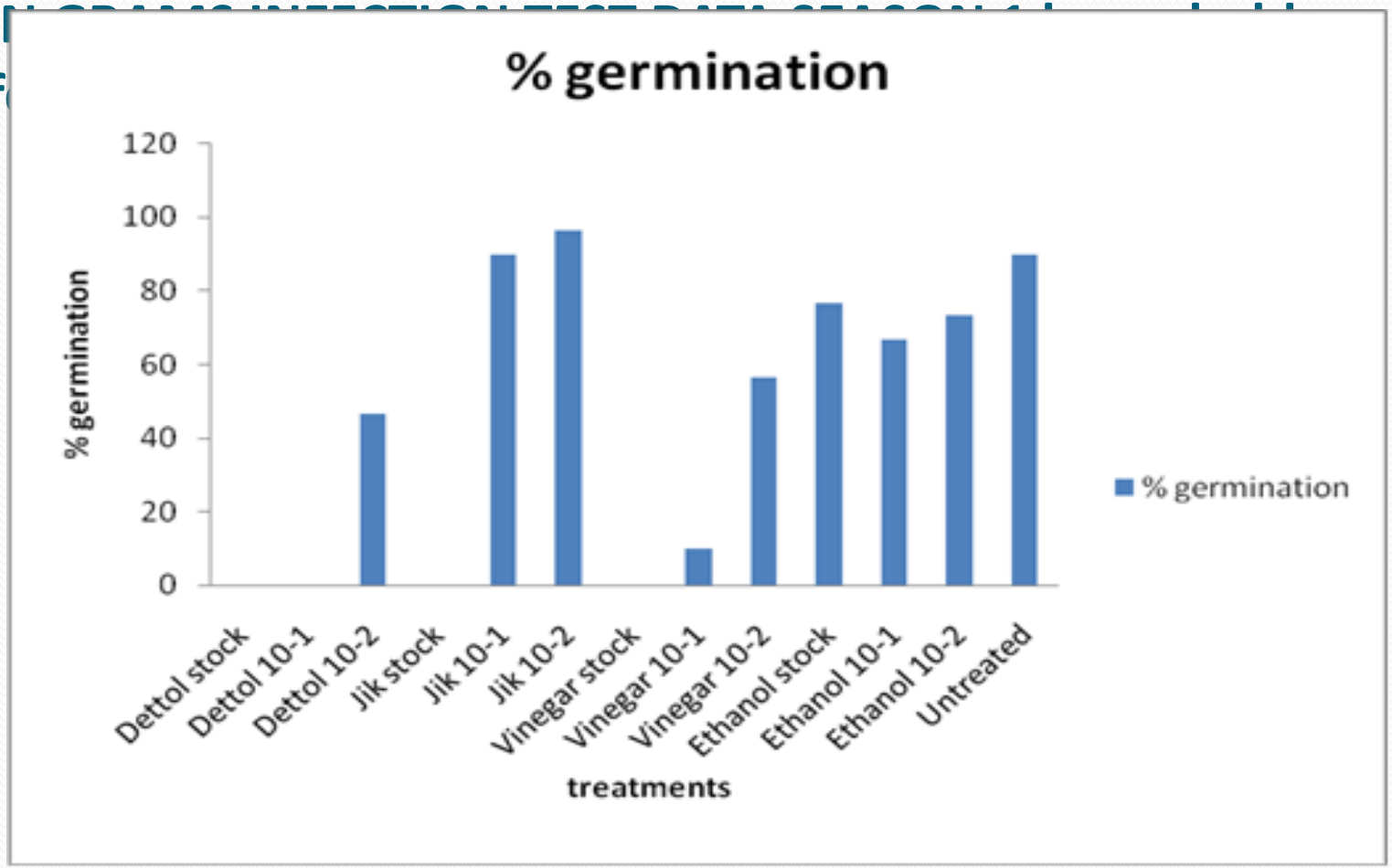


BEAN ants

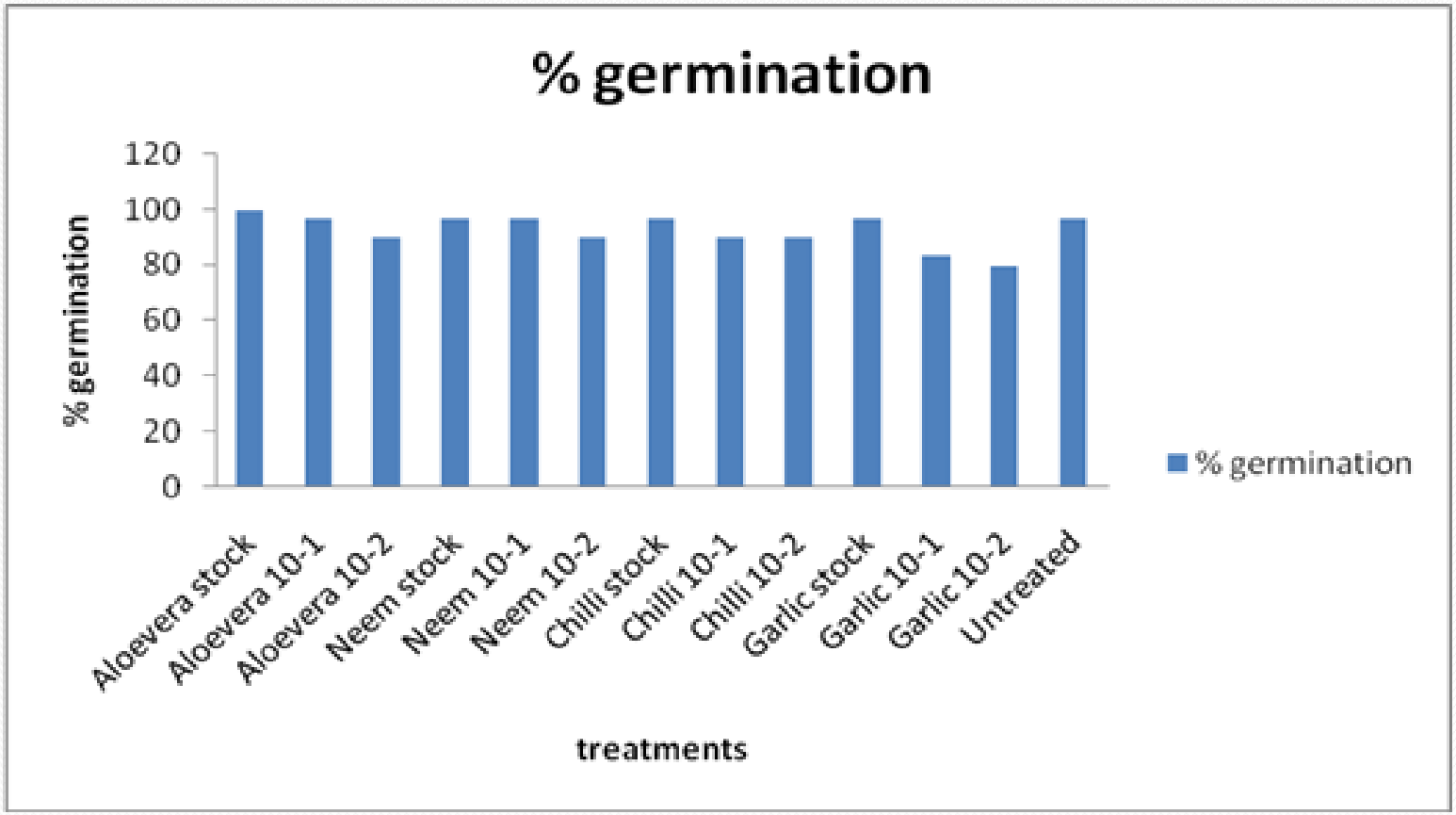

% germination
100
90
80
70
60
50
40
30
20
10
0
Dettol stock
Dettol 10-1
Dettol 10-2
Jik stock
Jik 10-1
Jik 10-2
Vinegar stock
Vinegar 10-1
Vinegar 10-2
Ethanol stock
Ethanol 10-1
Ethanol 10-2
Untreated
% germination

GREEN

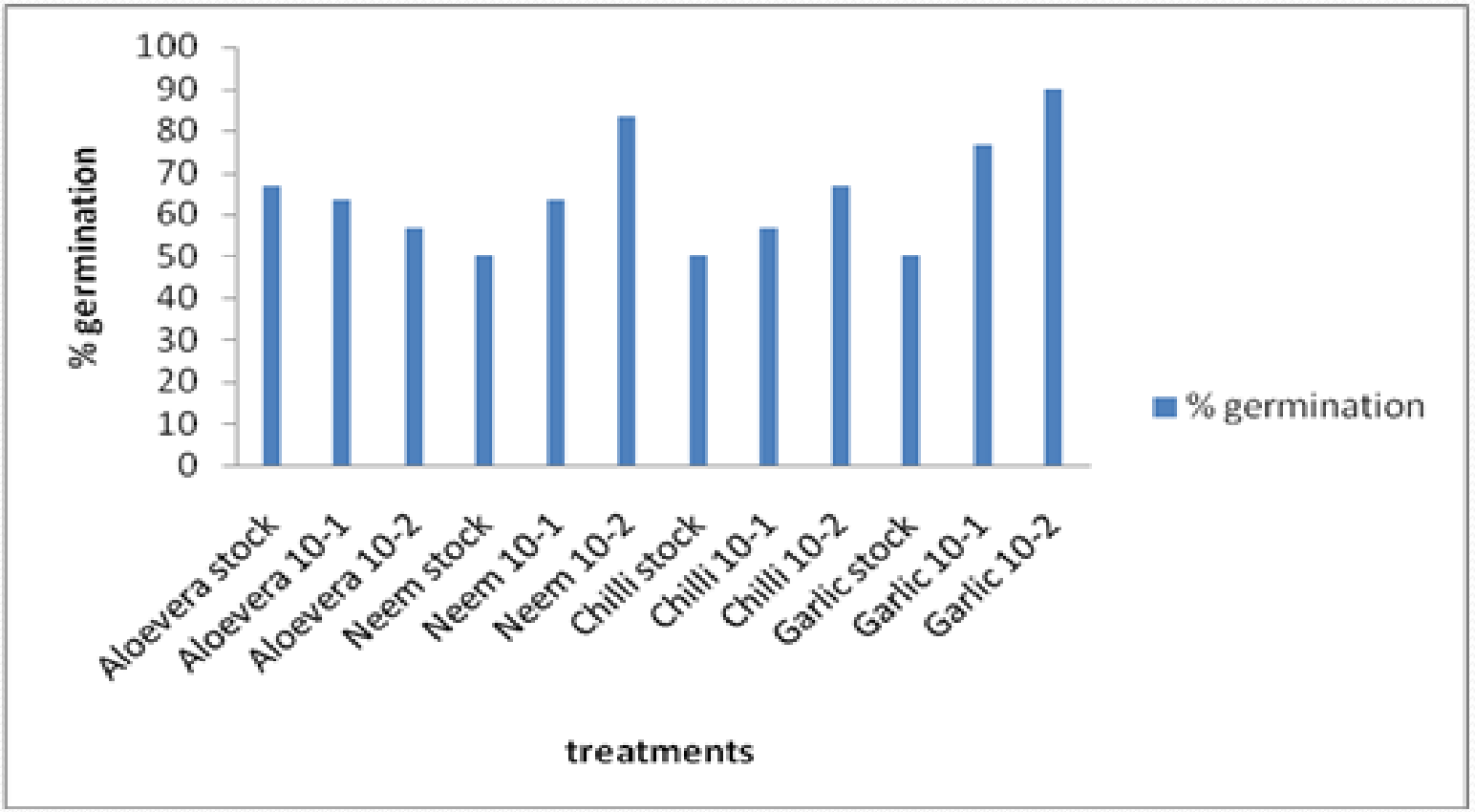
disinf



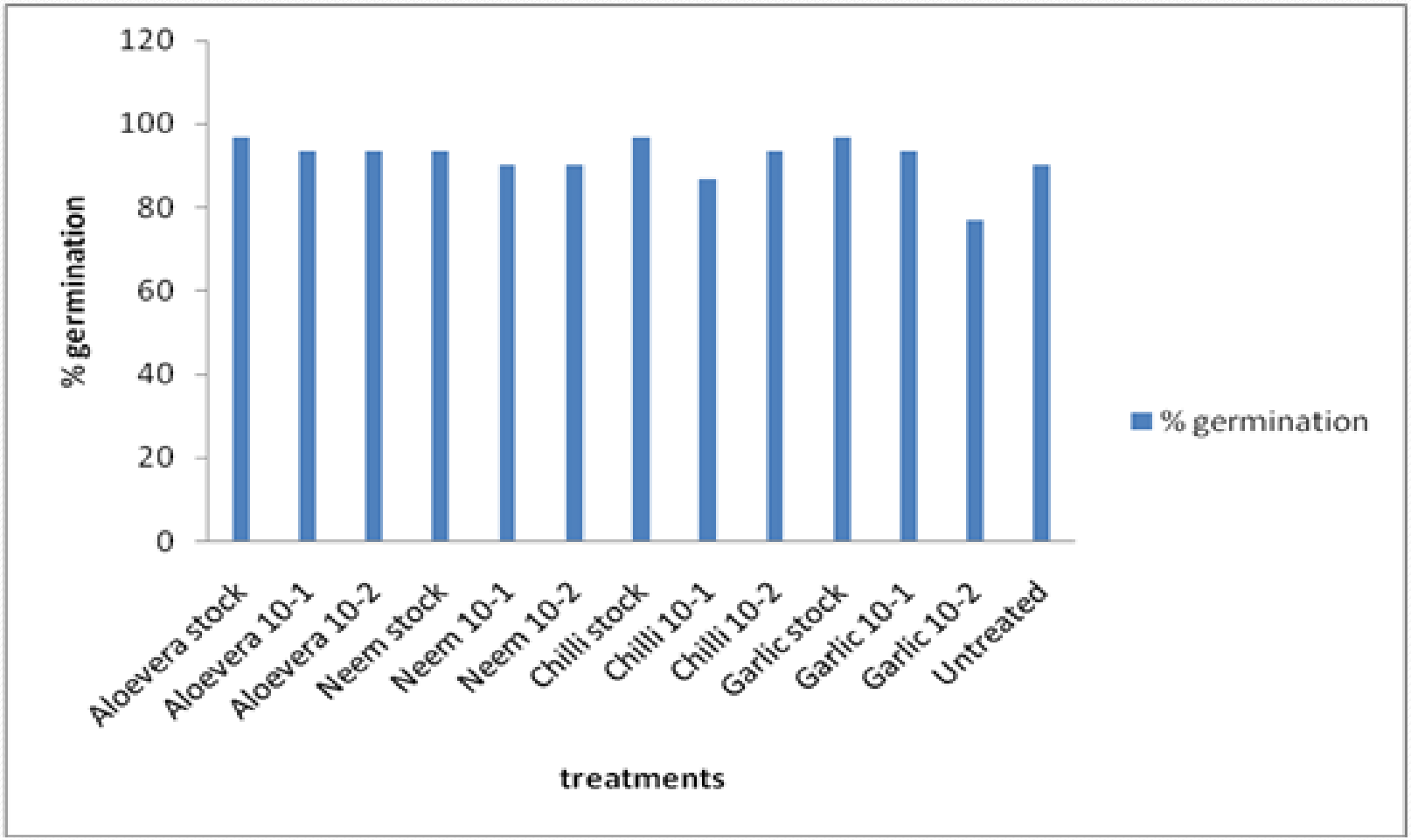
COWPEA GERMINATION TEST SEASON 2 DATA



BEAN GERMINATION TEST SEASON 2 DATA



SEASON 2 OF THE GERMINATION TEST (SEED TREATMENT)



4.3 TO DETERMINE THE GERINATION RATES OF SEEDS TREATED WITH DIFFERENT HOUSEHOLD DISINFECTANTS AND PLANT EXTACTS

PLATING DATA OF GREEN GRAMS FOR THE PLANT EXTRACTS

treatment	Percentage germination	Colonies observed	Colonies description
Garlic stock	100%	21 colonies	2 *penicilium*, 1 *fusarium* and bacteria growths
Garlic 10^{-1}	100%	19 colonies	2 *penicilium*, 1 *fusarium* and bacteria growths
Garlic 10^{-2}	100%	21 colonies	6 *penicilium* and *rhizobus*
Neem stock	95%	18 colonies	Bacteria growths
Neem 10^{-1}	95%	21 colonies	4 *penicilium* Bacteria growths
Neem 10^{-2}	91%	21 colonies	13 *penicilium*, 1 *fusarium* and *rhizobus*
Chilli stock	95%	19 colonies	7 *penicilium* and *rhizobus*
Chilli 10^{-1}	100%	19 colonies	3 *penicilium* and *rhizobus* growth
Chilli 10^{-2}	91%	21 colonies	*Rhizobus* growth and bacteria growth
Aloevera stock	76%	21 colonies	3 *penicilium*, 2 *fusarium* and *rhizobus* growths
Aloevera 10^{-1}	91%	21 colonies	6 *penicilium* and bacteria growths
Aloevera 10^{-2}	95%	19 colonies	3 *penicilium* and

PLATING DATA OF BEANS TREATED WITH PLANT EXTRACTS

Treatment	Percentage germination	Colonies observed	Colonies description
Aloevera stock	76%	21 colonies	13 *fusarium*, *pythium*, *rhizoctonia* and bacteria growth
Aloevera 10^{-1}	86%	21 colonies	3 *fusarium*, *rhizoctonia*, *trichodema* and bacteria growth
Aloevera 10^{-2}	81%	21 colonies	6 *fusarium*, 3 *penicilium* and bacteria growth
Garlic stock	81%	19 colonies	1 *pythium*, 2 *fusarium*, 6 *penicilium*, *rhizobus* and bacteria growth
Garlic 10^{-1}	48%	21 colonies	2 *pythium* and bacteria growth
Garlic 10^{-2}	38%	21 colonies	3 *pythium* and *rhizoctonia*
Neem stock	48%	21 colonies	bacteria growth
Neem 10^{-1}	86%	19 colonies	4 *pythium* and bacteria growth
Neem 10^{-2}	76%	21 colonies	3 *pythium* and *penicilium*
Chilli stock	76%	No colonies	*trichodema*
Chilli 10^{-1}	62%	21 colonies	*Rhizobus*, *rhizoctonia* and bacteria growth
Chilli 10^{-2}	48%	21 colonies	4 *pythium*, 2 *fusarium*, *rhizoctonia* and bacteria growth

PLATING DATA FOR COWPEAS TREATED WITH PLANT EXTRACTS

Treatment	Percentage germination	Colonies observed	Colonies description
Neem stock	43%	21 colonies	Bacteria growth
Neem 10^{-1}	86%	17 colonies	*Rhizoctonia* and bacteria growth
Neem 10^{-2}	100%	21 colonies	*Rhizobus*
Garlic stock	100%	21 colonies	*Pythium*, *rhizoctonia*, 6 *penicilium* and bacteria growth
Garlic 10^{-1}	100%	21 colonies	*Pythium*, *rhizoctonia*, *rhizobus* and bacteria growth
Garlic 10^{-2}	90%	20 colonies	*Pythium*, *rhizobus* and bacteria growth
Aloevera stock	81%	21 colonies	*Rhizobus*, *rhizoctonia*, and bacteria growth
Aloevera 10^{-1}	100%	21 colonies	4 *fusarium* and 4 *penicilium*
Aloevera 10^{-2}	100%	21 colonies	*Pythium*, *rhizoctonia*, 2 *penicilium*
Chilli stock	43%	21 colonies	*Rhizobus* bacteria growth
Chilli 10^{-1}	72%	14 colonies	*rhizoctonia*, *rhizobus* and bacteria growth
Chilli 10^{-2}	100%	21 colonies	*Rhizobus*, *Pythium*, and 4 *penicilium* and bacteria growth
Sterile control	14%	No colonies	No growths

PLATING DATA FOR GREEN GRAMS TREATED WITH HOUSEHOLD DISINFECTANTS

Treatment	Percentage germination	Colonies observed	Colonies description
Jik stock	0%	No colonies observed	No growths
Jik 10^{-1}	91%	2 colonies of bacteria	Bacteria growths
Jik 10^{-2}	100%	1 colony of bacteria	Bacteria growth
Ethanol stock	62%	21 colonies of bacteria	Bacteria growths
Ethanol 10^{-1}	29%	19 colonies	*Rhizobus*
Ethanol 10^{-2}	86%	13 colonies	*Rhizobus*, 4 *penicilium* and bacteria growth
Dettol stock	0%	No colonies observed	No colonies observed
Dettol 10^{-1}	10%	No colonies observed	No colonies observed
Dettol 10^{-2}	90%	6 colonies	*Pythium*, 4 *penicilium*
Vinegar stock	0%	No colonies observed	No colonies observed
Vinegar 10^{-1}	1%	21 colonies	2 *aspergillus* flavor, 2 bacteria bacillus
Vinegar 10^{-2}	91%	19 colonies	*Aspergillus naija*, *penicilium*, *rhizobus* and *fusarium*
Sterile control	100%	No colonies observed	No colonies observed
Normal control	75%	12 colonies	rhizoctonia, *rhizobus* and bacteria growth

PLATING DATA FOR THE BEAN SEED TREATED WITH HOUSEHOLD DISINFECTANTS

Treatment	Percentage germination	Colonies observed	Colonies description
Jik stock	10%	No colonies observed	No colonies observed
Jik 10^{-1}	81%	2 colonies	*fusarium*
Jik 10^{-2}	91%	20 colonies	*Trichodema*, a*spergillus* and bacillus
Dettol stock	0%	No colonies observed	No colonies observed
Dettol 10^{-1}	67%	3 colonies	Bacillus bacteria
Dettol 10^{-2}	100%	12 colonies	Rhizoctonia
Ethanol stock	0%	No colonies observed	No colonies observed
Ethanol 10^{-1}	5%	17 colonies	Bacteria bacillus and 4 *penicilium*
Ethanol 10^{-2}	100%	15 colonies	*Trichodema*, *fusarium* and bacteria
Vinegar stock	0%	No colonies observed	No colonies observed
Vinegar 10^{-1}	91%	5 colonies	4 *penicilium*
Vinegar 10^{-2}	100%	9 colonies	*Penicilium* and *rhizoctonia*
Sterile control	100%	No colonies observed	No colonies observed
Normal control	100%	5 colonies	*Penicilium*, Rhizoctonia and bacteria growth

PLATING DATA FOR COWPEA TREATED WITH HOUSEHOLD DISINFECTANTS

Treatment	Percentage germination	Colonies observed	Colonies description
Jik stock	0%	No colonies observed	No colonies observed
Jik 10^{-1}	100%	No colonies observed	No colonies observed
Jik 10^{-2}	91%	15 colonies	*Aspergillus*, *bacillus* bacteria
Dettol stock	0%	No colonies observed	No colonies observed
Dettol 10^{-1}	5%	2 colonies	Bacteria
Dettol 10^{-2}	100%	10 colonies	*Rhizobus*, *penicilium* and *trichodema*
Ethanol stock	0%	21 colonies	Bacillus bacteria
Ethanol 10^{-1}	0%	5 colonies	4 *penicilium* and *rhizobus*
Ethanol 10^{-2}	91%	5 colonies	3 *penicilium*, *aspergillus* (yellow)
Vinegar stock	0%	No colonies observed	No colonies observed
Vinegar 10^{-1}	10%	15 colonies	*Penicilium*, 5 *aspergillus* and *bacillus*
Vinegar 10^{-2}	100%	6 colonies	*Trichodema*, *fusarium*, *rhizobus* and bacteria
Sterile control	95%	5 colonies	bacteria
Normal control	100%	19 colonies	*Penicilium*, *aspergillus*, *rhizobus* and bacteria

DISCUSSION

The purpose of any seed treatment is to improve seed performance in one or more of the following ways: 1) eradicate seed borne pathogens or protect from soil borne pathogens, 2) optimize ease of handling and accuracy of planting (reduce gaps in stand or the need for thinning of seedlings, particularly when mechanical planters are used), and 3) improve germination rates. Seed treatment is important because once the seed is protected the plant is safe and assuring of good product quality. Treating seeds with the household disinfectants and plant extracts is efficient , cheap and available .

CONCLUSION AND RECOMMENDATION

Household disinfectants mainly jik was able to protect the seed from pests, diseases and microorganisms more than plant extracts.

I would like to encourage the farmers to use the plant extracts and household disinfectants because its not harmful to their health, cheap and available.

More research to be done on seed treatment.

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