

Application of Some Plant Based Alcoholic Extracts for Evaluation of Germination Capacity of Cowpea Seeds

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DOI: 10.62823/IJEMMASSS/7.2(III).7815

ABSTRACT

The Research paper mainly describes the concepts of Biocontrol measures to control *Callosobruchus maculatus* (Fab.) in stored cowpea seeds. Cowpea is an important legume crop growing across the world mainly in typically, chemical fertilizers are used to handle this issue but they are expensive and have deleterious implications on the ecosystem. Cowpea serving multiple roles for many low-income farmers. However, its productivity remains low and discrepancies exist in selection and acceptability criteria. In stored grain insects cause serious loss of stored pulses and degrade the nutritional value of pulses. Some plant products are active against specific target insects. The pulse beetle *Callosobruchus maculatus* is an obnoxious pest of several pulses and cereals which constitute the major portion of human diet. Pulses are the most important source of protein. The present study is aimed at the search of some Eco-Friendly pesticides. Alcoholic extracts of Neem seed kernel, Mustard seed, Black pepper seed, Annona seed and Groundnut seed were not found to impair the germination capacity of cowpea seeds at the dosages of 0.06% (N.S.K.E.) 0.16% (M.S.E.) 0.18% (B.P.S.E.) 0.20% (A.S.E.) and 0.22% (G.S.E.) The dosages of plant-based toxicants (Alcoholic Extracts) were found effective to give minimum 100% mortality of *Callosobruchus maculatus*.

Keywords: Cowpea, Seed, Neem Seed Kernel, Mustard Seed, Black Pepper Seed, Annona Seed, Groundnut Seed, Extracts, Germination.

Introduction

The investigation was conducted to observe the effect of different plant product treatment with alcohol extracts on germination of cowpea seeds. Cowpea is a food and animal feed crop grown in the semi-arid tropics. The huge losses of between 20 and 50% have been reported on stored cowpea due to attack by cowpea weevil, *Callosobruchus maculatus*. Natural plant products are promoted as biopesticides to control *Callosobruchus maculatus*. In agriculture field, the pest control is undergoing a quick revolution at ground level. The botanicals have additional advantages over synthetic insecticides, since these are safe for non-targeted animals. Pulse beetle consumes, destroys and damages all kinds of growing crops and their valuable vegetation. Generally, the most extensively used method to control stored product pest is chemical pesticides. Chemical pesticides act as contact poison, fumigant and antifeedant. Plant product extracts used as biopesticides to control *Callosobruchus maculatus*. The Alcoholic plant products are more effective and less toxic in comparison to the chemical pesticides. The experiments were conducted to observe the effect of different plant product treatments as Alcoholic extracts on germination of cowpea seeds. All plant product extracts were selected at minimum 100% mortality of *Callosobruchus maculatus*. Thus the present study is aimed to show that there is no negative effect on germination capacity of cowpea seeds when treated with different plant material extracts in ethyl alcohol. Germination effect of five plant product extracts in alcohol represented above 95% germination of cowpea seeds. Biorational control using plant derivatives against agriculturally important insect pests.



Cowpea seeds



Malecallosobruchus maculatus



Femalecallosobruchus maculatus

Materials and Method

Cowpea seeds were treated with five plant product extracts. Each plant seed extracts was prepared in Ethyl alcohol. Extraction was done by Soxhlet apparatus for 08 hours over a heating mantle at 70 Degree Celsius temperature in Ethyl Alcohol. 100 Cowpea seeds was collected randomly from each petri dish lined with blotting paper. Four petri dishes were prepared for each plant extract for germination effect. Petri dishes were kept at room temperature for 6-7 days to allow sufficient time for all the seeds to germination. Among different plant product extracts all treatments showed above 95%

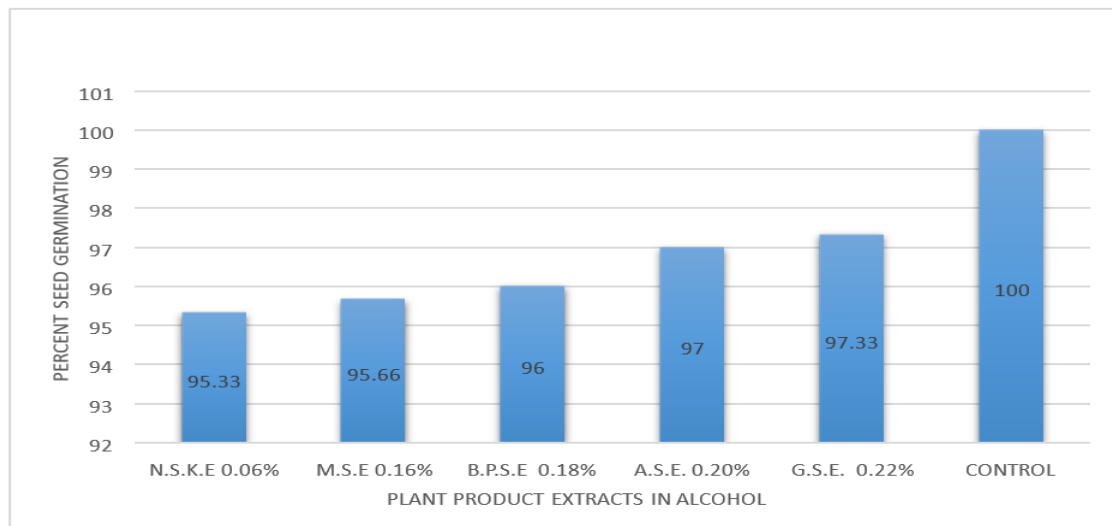
germination percentage. In this investigation 0.06% N.S.K.E., 0.16% M.S.E., 0.18% B.P.S.E., 0.20% A.S.E., and 0.22% G.S.E. were used to treat cowpea seeds to observe for their germination capacity.



Plant Seeds



Soxhlet Apparatus



Graph: Percent Germination of Cowpea seeds after treatment with plant based alcoholic extracts.

N.S.K.E.: Neem seed kernel extract

M.S.E.: Mustard seed extract

B.P.S.E.: Black pepper seed extract

A.S.E.: Annona seed extract

G.S.E.: Groundnut seed extract

Table: Percent Germination Capacity of Cowpea Seeds after Treatment of Different Plant Productalcoholic Extracts.

S.NO	Name of plant Product	% Concentration	Number of seeds sown	Number of seeds Germinated	Percent seed Germinated
1.	N.S.K.E.	0.06	100	95.33	95.33
2.	M.S.E.	0.16	100	95.66	95.66
3.	B.P.S.E.	0.18	100	96.00	96.00
4.	A.S.E.	0.20	100	97.00	97.00
5.	G.S.E.	0.22	100	97.33	97.33
6.	CONTROL		100	100.00	100.00

N.S.K.E.: Neem seed kernel extract

M.S.E.: Mustard seed extract

B.P.S.E.: Black pepper seed extract

A.S.E.: Annona seed extract

G.S.E.: Groundnut seed extract

Result and Discussion

- Neem seed kernel extract in alcohol (0.06%) resulted in 95.33% germination capacity of cowpea seeds.
- Mustard seed extract in alcohol (0.16%) was found effective to show 95.66% germination.
- With Black pepper seed extract in alcohol (0.18%) the germination capacity of cowpea seed was found 96.00%.
- Annona seed extract in alcohol (0.20%) was found effective 97.00% for cowpea seed sprouting.
- Groundnut seed extract in alcohol (0.22%) showed germination capacity of cowpea seed upto 97.33%.
- Control experiments were also conducted to see the germination capacity of cowpea seeds which was found 100%.
- Hence the percentage of germination with effect of different alcoholic extracts was calculated with simple percentage formula.
- The results shown that maximum germination in groundnut seed extract and minimum germination was recorded in Neem seed kernel extract.

Conclusion

The research paper conclusion on the application of plant-based alcoholic extracts for evaluating cowpea seed germination generally indicates that certain plant extracts can positively impact germination and seedling vigor. Specifically, extracts from plant like *Azadirachta indica* have shown promising result in promoting higher germination percentage anti improving seedling quality. The germination experiments show that there is no adverse effect of all the alcoholic plant extracts, in the capacity of sprouting of the cowpea seeds. All plant product extracts in alcohol have been found beneficial and alternative to control pulse beetle and to discourage the use of chemical pesticides. Hence they can be used for treatment of cowpea seeds without causing any negative effect on germination.

References

1. Binumol M, Santhoshima PP (2018). Allelopathic Effect of Invasive Weed, *Chromolaena odorata* on Seed Germination and Seedling Growth of Cowpea. *International Journal of Science and Research* 8(8): 2149-2153.
2. Gupta, H.C. and Ahmed, S.M. (1988). Evaluation of some non-edible oils grain protectants in wheat and their subsequent effect on germination. *Indian Journal of Entomology*. 50 (2): 147-150.
3. Gupta, H.C.; Bareth, S.S. and Sharma, S.K. (1991). Bioefficacy of edible and non-edible oils against pulse beetle, *Callosobruchus chinensis*(L.) on storage pulses and their effect on germination. *Agric. Bio. Res.* 7(2): 101-107.

4. Gupta, H.C.; Verma, J.P.; Bareth, S.S. and Mathur, B. N.(1992). Evaluation of some non edible oils as grain protectant in wheat and their subsequent effect on germination. *FoodTechnology Abst.*27: 34-35.
5. Friedman J (1995). Allelopathy, autotoxicity and germination: 599-628. In: Kigel J and Galili G (eds), Seed development and germination. Marcel Dekker, Inc., New York.
6. Jadhar BB, Gayanar DG (1992). Allelopathic effects of *Acacia auriculiformis* on germination of rice and cowpea. *Indonesia Journal of Plant Physiology* 1:86-89.
7. Kayode J, Adanlawo IG (1997). Allelopathic effects of aqueous extracts of *Euphorbia heterophylla* on radicle and plumule growth of cowpea (*Vigna unguiculata*) Walp. *Bioscience Research Communications* 10:23-26.
8. Kumar, U. and Shrivastava, S. (2012). " A Comprehensive study of Evaluation of some IPM modules against a Major Insect Pest of Soyabean ,*Spodopteralitura* (Fb) , and incidence of Pest Complex on Soyabean ". A Ph.D. Thesis awarded through University of Kota, Kota. P.P 114: 67-68;76-77; 88;89.
9. Meena, M. and Shrivastava, S. (2013). Evaluation of Relative Toxicity, Bioefficacy and Antifeedent Effect of some Plant Products and Oils Against Pulse Beetle *Callosobruchus maculatus*(Fab) in stored Cowpea. A Ph. D. thesis awarded, through University of Kota. P.P. 63-67.
10. Muranaka S, Shono M, Myoda T, Takeuchi J (2016), "Genetic diversity of physical, nutritional and functional properties of cowpea grain and relationships among the traits". *Plant Genetic Resources* 14: 67-76.
11. Ramzan, M. and Chachal, B. S.(1985). Effect of three levels of infestation of *Sitophilusoryzae* L.,*Trogoderma granarium*Everts and *Tribolium castaneum* Herbst. as the kernel damage and losses of germination of wheat seed. *JournalofRes. Punjab, Agri. Univ.* 22 (4): 695- 699.
12. Singh, S. and Sharma, G. (2003). Efficacy of different oils as grain protectant against *Callosobruchus chinensis*, in green gram and their effect on seed germination. *IndianJ. Entomology*. 65 (4): 500-505.
13. Singh, Y. P. and Mall, N.P. (1991). Effect of various grain protectants on germination and damage of wheat grain by *Sitophilusoryzae* (L.). *BulletinofGrainTechnology*. 29: 50-54.
14. Sharma, P.K. and Shrivastava, S. (2012). Evaluation of some Integrated Pest Management Technologies and Efficacy of Endosulphan against Major insect pest of Chickpea, the Pod borer, *Helicoverpaarmigera* and analysis of abundance of other insect pest complex of Chickpea. The Ph.D. Thesis awarded through University of Kota, Kota. P. P. 199 : 64;116;145, 158; 166
15. Sharma, S. and Shrivastava, S. (2014). Evaluation of some integrated Pest management Techniques against Major insect Pests of Soyabean, *Spodopteralitura* and Chickpea, *Helicoverpaarmigera*". A major project of Department of Science and Technology. P. P. 112;63 and 92.

