

## Influence of Pre-treatment on Germination Indices of *Jatropha- curcas*.

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**Abstract:** This research investigated the influence of pretreatment on germination indices of *Jatropha curcas* seeds. The seeds were tested for viability for 24hrs, before being planted. The treatment options include coconut water, Hot water, cold water, Hydrogen peroxide, methylated spirit and bleach. A randomized complete block design (RCBD) was used where each treatment were replicated three times. Indices used to evaluate pre-treatment options include, period of inception, duration of germination and percentage germination. Data were collected on four (4) and eight (8) days respectively. Results showed that treatments with coconut water, recorded highest performance in all the parameter tested; followed by Bleach, Hot water hydrogen peroxide and cold water treatment.

[Daniel, N. and Offor. U.S. **Influence of Pre-treatment on Germination Indices of *Jatropha- curcas***. *Academ Arena* 2015;7(9):30-32]. (ISSN 1553-992X). <http://www.sciencepub.net/academia>. 6

**Key word:** Germination, *Jatropha curcas*, Seed viability and pre-treatment.

### Introduction

The success of seed germination and the establishment of a normal seedling are determining factors for the production of plant species, which are of both economic and ecological importance. (Numez-Melendez, 1982, Stevens and Ulloa 2001). Studies has recorded that more than 25,000 publication have so far been made on seed germination, reflecting both the agronomic interest and complexity of the topic in plant sciences. (Bewley and Black, 1994). As referenced, germination is considered to be most critical stage in plant's life cycle due to its high vulnerability to injury, diseases and water/environmental stress. To increase the performance of commercial seed lots, the seed industry practices invigoration treatments referred to as seed priming which have proved successful at invigorating the performance of low vigor seeds (Howard, 1998). Seed vigor is a complex seed property that determines its potential for rapid uniform emergence and development under a wide range of field conditions. The span of seeds is an important component of seed vigor, which depends on the seeds physiological and genetic conservation potential and on conditions encountered during storage.

*Jatropha curcas* belong to the tribe *Jatrophaeae*, from the family Euphorbiaceae and the plant is being considered as a major energy plant due to attribute of having high oil content found in the seed. (Swankar, 2003). For *Jatropha* cultivation, cutting and sowing are major propagation methods. One major advantage of propagation by cutting is that it provides the ability of offering elite accessions (Adekloa and Akpan 2000), however large scale plantations are only possible through sowing.

The rapid decline of seed vigor is discouraging and a problem confronting *Jatropha curcas* industry and this had led focus on how to alleviate the loss of seed vigor and improve its germination.

The plant as a multi-purpose specie where extracts from leaves, bark roots, seeds and latex present different and important medicinal properties for treatment of man and animals. As a drought tolerant crop, it grow on marginal and poor soil while the oil can be combusted as fuel without being refined. The by product consist of press-cake which serves as a good source of organic fertilizer. Disease such is cancer, piles, Snakebite, paralysis, dropsy etc are all curable with *Jatropha* products. The importance/economic value of *Jatropha curcas* makes it a valuable crop for research.

### Materials and Method

The research was carried out at the teaching and research farm, Ignatius Ajuru University of Education, Ndele Campus, in the department of Agricultural science. The experimental treatments consist of hot water, cold water, coconut water, bleach, hydrogen peroxide and methylated spirit.

The seeds of *Jatropha curcas* were first tested for viability by soaking in water for twenty four (24) hours, with this, seeds that floats are being discarded. The experimental design used was a randomized complete block design (RCBD) with six treatment replicated three times.

The experiment was carried out for four weeks (one month). The *Jatropha* seeds were planted in a total of fifty four (54) pots and seven (7) seeds were planted in each pot according to the treatment options.

### Data Collection

Data were collected on germination indices as stated below:

a. Germination period (GP) = Period of germination inception to the end of germination

b. Germination time (GT) = time to germinate after sowing

c. Germination percentage = 
$$\frac{\text{No of seed germinated}}{\text{number of seeds sown}} \times \frac{100}{1}$$

### Results and Discussion

From data generated, the first germination were noted three (3) days after sowing in treatments with cold water, and coconut water, then followed by other treatment, four days after planting.

Form physiological observation, starting from the first day of germination, *Jatropha curcas* seeds had features showing that pre-treatment actually affected the sprouting of the seeds. Seeds treated with cold water appear more greenish. This feature was also replicated in treatment with coconut water, with light greenish colour. Seeds treated with Bleach and Hot water showed very pale looking at the initial state but survives up to the end of the study while seeds treated with methylated spirit did not germinate at all.

The result on the inception of germination which occurs more in treatments with coconut water and bleach has previously been supported by other works. The coconuts water may have attribute in its constituent such as promotory hormones that necessitate its initial seed germination, while bleach may contain auxin qualities that promote early emergence. Fairless 2007, reported Significant influence of certain hormones associated with most plant product in breaking seed and root dominance and killing pathogen that may inhibit seed emergence. Similar results were also confirmed by Swankar (2003).

The results on effects of pre-treatment on the duration of germination of *Jatropha curcas*, showed that germination persisted up to the 8<sup>th</sup> days after planting in all the treatments in exception of treatments with cold water that lasted up to the thirteenth (13<sup>th</sup>) days after planting. From observation, treatments options differs on duration of germination at four and eight days after planting. Treatments with coconut water showed better germination abilities followed by bleach consistently. Factors that necessitated seeds early inception must have also accounted on the duration of germination (Adekola and Akpan, 2000).

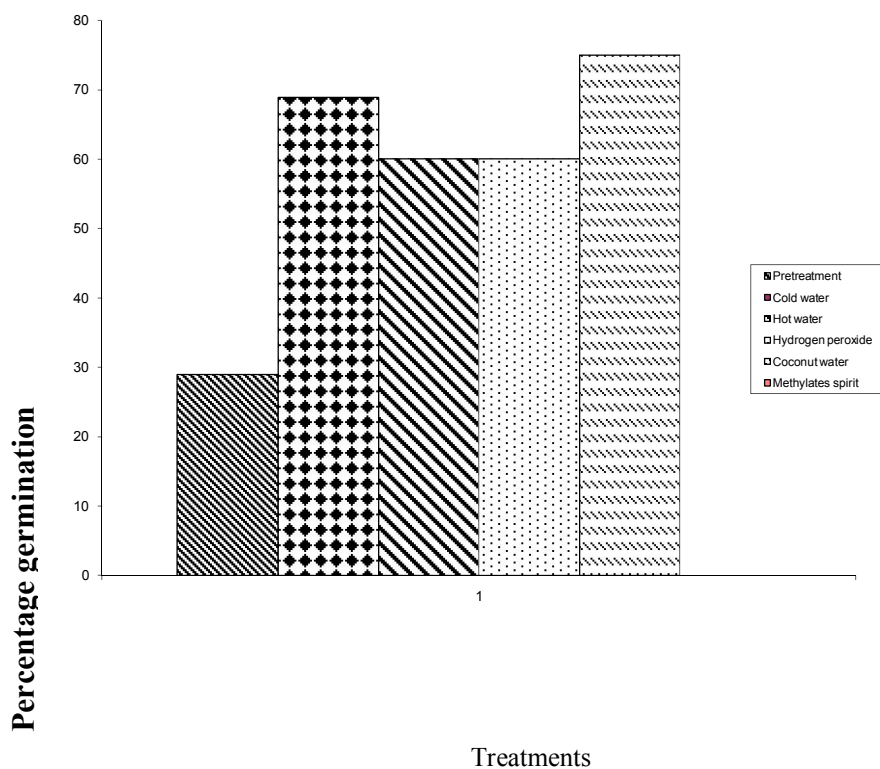


Fig 1: Effect of pre-treatments on germination percentage of *Jatropha Curcas* seeds

The results on germination percentage as showed in Figure 1 indicates that coconut water treatments recorded the highest percentage germination (75.5%) followed by Bleach (68.9%), hot water and Hydrogen peroxide (60%), cold water (28%) while seed treated with methylated spirit did not germinate.

The fact that all the seeds used for the study were first subjected to viability test (Soaking in water) showed that methylated spirit is seen as a bad chemical for pre-treatment of *Jatropha* seeds and this is in line with the report of Stevens *et al* (2001) which states that certain chemicals has the ability of discouraging seed emergence in plants. Both coconut water, Hydrogen peroxide, cold and hot water, promoted seed emergency. This is expected as Pratt and Henry (2002), had in their various works attested to great promotory response of seed emergence of plants under various treatments.

In this study, it is postulated that for *Jatropha curcas* cultivation, pre-treatment of seeds with coconut and bleach are best treatment options.

#### References

1. Adebola. O. and Akpan E.: Edible proveness of *Jatropha curcas* from Quintna Roo-state of mexico and effect of roasting on anti nutrient and toxic factors in seeds. Institute for animal production in the tropics and sub-tropics. University of Hohenhein D. 70593, stuggart. Germany. 2003
2. Bewley, J.D. and Black, M.: seeds physiology of development and germination (2<sup>nd</sup> edition). New york, plenum press. (1994):445.
3. Fairless D: Chemical Composition and insecticide properties of the underutilized *Jatropha curcas* seed oil. Afri. J. Biotechnology 2007: 5:901-906
4. Howard, R.A.: Flora of the Lesser Antilles, Leeward and Windward Islands. Dicotyledoneae, part 1, vol. 4. Arnold Arboretum, Harward University, Jamaica plani, MA. 1988: 673.
5. Nunez-Melendez, E.: Plantas medicinales de pureto Rico. Editorial de la Universidad de pureto Rico, Rio piedras, PR. 1982. 498P.
6. Pratt. Z. and Henry C.: Bioforum, Biology methods forum-Botany and plant Biology. 2002: [htt:www:protocol](http://www.protocol).
7. Stevens, W.S., C. Ulloa U.,A.pool, and O.M. Montie, eds., Flora de Nicaragua. Monographs in systematic Botany vol.85, N0.2.Missouri Botanical Garden press, st.Louis, Mo. 2001: 945-1,910.
8. Swanker C.: Use of *Jatropha curcas* oil as raw materials and fuel. Integrated approach to create income and supply energy for rural development 2003.

9/17/2015