

THE EFFECT OF PRE-TREATMENTS ON GERMINATION OF SEEDS OF *Aframomum melegueta* (ALLIGATOR PEPPER) IN SOUTHERN NIGERIA

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ABSTRACT

*The seeds of *Aframomum melegueta* are difficult to germinate due to seed dormancy. This has made this medicinally important species unpopular. Experimentation was carried out in the Eastern Research station of Forestry Research Institute of Nigeria Nursery at Umuahia, to test the influence of 3 pre-germination seed treatments of the seeds of *Aframomum melegueta*. Simple Complete Randomized Design experiment with 4 replicates was used. The hot water treatment showed a significant influence on the germination percentage and significantly different from potash solution and un-boiled water which are statistically the same with the control.*

Key words: *Effect, Pre-treatments, Germination, Seeds, *Aframomum melegueta**

INTRODUCTION

The tropical forests are the richest of all the world biota with hundreds of species sometimes found in a single hectare (Akinyemi et al., 2005). High forest covers about 170,000km² in the south of Nigeria, stretching from the border with the Republic of Benin to the Cameroun Mountains (Okafor, ISHS Acta Horticulturae 123). The original high forest vegetation has been considerably modified by human activities including burning, grazing, clearing, slashing and tillage for farming resulting in oil palm bush, tree crop plantations and derived savanna within the forest zone. These processes had led to the threatening of the habitat and neglect of some important indigenous species and hence the need for proper ex situ propagation technique to facilitate their conservation.

Common means of regeneration and propagation include seed-based clonal and micropropagation methods. Idu (2009), Idu et al. (2002) proposed that seed based multiplication is the most effective, realistic and convenient means for most species. One of those important indigenous species which is rare but need urgent attention for its conservation is; *Aframomum melegueta* (*k. schum*) (family ZINGIBERACEAE). It has many common names: Guinea grains, Guinea pepper, Alligator pepper and Grains of paradise. It is a rhizomatous herbaceous plant of tufted leafy stems to 1.5m high with pink or white inflorescences at the base; of forest shade in Guinea to south Nigeria and Fernando Po, and on into Central tropical Africa (Burkill, 1985).

Aframomum melegueta is useful in many ways. They are used as ornamental plants, spices and flavouring (Burkill, 1985). It is used medicinally in many ways which include stimulant, antidotes, pain-killer etc (Etukudo, 2000). It also posses insecticidal properties and is capable of repelling insects when seeds are ground and applied on things like grains. This species is of great socio-cultural importance as it is utilized traditionally for many purposes such as in local herbs and medicine where it acts as the major constituents.

The cultivation of this species is difficult and cannot be sustained through natural regeneration due to seed dormancy caused by hard seed coats (Kozlowski, 1971). It is however, convenient and most effective to

multiply this species through seed-based means, but the seeds are tiny and require good nursery techniques (Idu, 2009). The seeds of *Aframomum melegueta* takes up to 31 days or more to germinate but were exposed to various seed pre-treatments to improve germination. The treatments used can easily be accessed by the local farmers.

MATERIALS AND METHODS

Seeds of *Aframomum melegueta* were collected from a reliable source in Okwuta village of Umuahia-North local government area of Abia State. The seeds were processed and prepared for the experiment in the nursery of Eastern Research Station Umuahia during the month of July. The experimental design used was simple CRD with 4 treatments (control inclusive) replicated 4 times. Each replicate contains 20 per-treated seeds. The treatments were hot-water treatment, potash solution, un-boiled water and control.

The hot-water used was brought to boiling at 100% and the potash solution has concentration of 40g/dm³. The seeds were soaked overnight in the different treatments, the seeds washed and planted in the seed boxes kept under the nursery shade for germination. The hot-water treatment was allowed to cool gradually while the seeds are soaked. A knapsack sprayer was used to sprinkle water over the germination boxes; data were collected over 40 days' interval and were analyzed.

RESULTS AND DISCUSSION

Table 1 shows that the seeds subjected to hot water soaking prior to planting had a significant influence on their mean germination percentage. Though the seeds soaked in un-boiled water gave a slight higher mean germination percentage than the control; they are statistically the same as shown by the Duncan mean separation of the different germination percentage means. The pre-treatment with potash solution has no influence on the germination percentage of the seeds as its mean germination percentage is the same with that of control and the seeds soaked in un-boiled water ($p > 0.05$).

Table 1: Germination % of *Aframomum melegueta* (20 seeds each) seeds treated differently for 40 days

Seed Treatment type	Number of samples	Mean germination %	Standard Deviation
Soaked in Potash	4	16.25b	12.46423
Soaked in hot water	4	39.38a	17.81602
Soaked in ordinary water	4	20.63b	12.93873
No treatment	4	16.25b	8.34523
Total	16	23.13	15.95103

*means with different superscripts are significantly different ($p < 0.05$).

Source: Field experiment, 2009

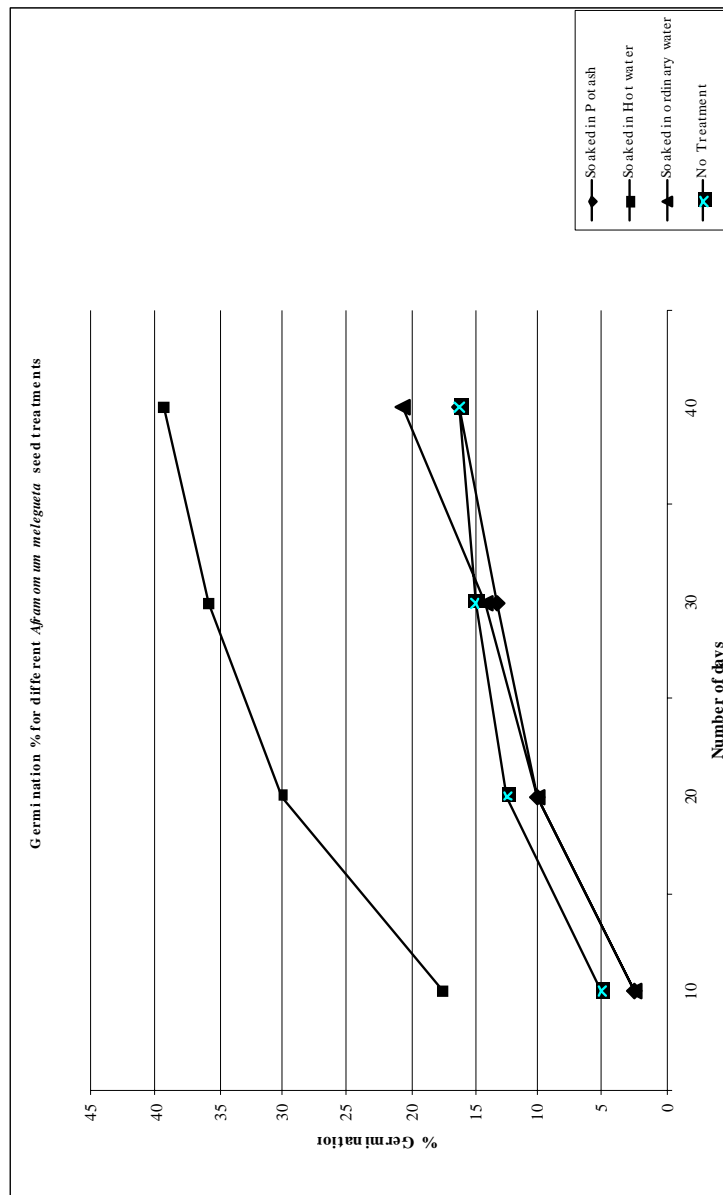
The trend of influence of the different treatments could further be deduced from the germination percentage graph in fig 1. The germination percentage of the seeds treated with hot water within the first 10 ten-days is higher than that of the control and the seeds treated with potash solution. This means greater germination energy (Idu, 2009), there is increase in biochemical activities within the seed induced by the hot water treatment (Kozlowski, 1971). The graph also revealed that there is a rapid and steady increase of the germination percentage with the number of days.

CONCLUSION

Aframomum melegueta could also be multiplied through the rhizomes but could be more convenient and faster using the seeds. This study tried to employ the common pre-treatments which could also be affordable by the rural dwellers to break the dormancy associated the seeds of Alligator pepper.

It should be noted that from this study, the use of hot water treatment for the germination of this species has a significant effect on the germination percentage and potentials on the seeds. Further investigations along this line are also encouraged to boost the potentials of some of this indigenous species for the uplifting of our economy.

Fig 1: The effect of treatments on the germination percentage of *Afromomum melegueta*



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