

The Influence of Media on the Seed Germination of Depulped and Undepulped Fruits of Bush Mango *Irvingia Wombolu*)

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ABSTRACT

Seed germination of depulped and undepulped fruits of bush mango, *Irvingia wombolu* (Vermeosen) were evaluated using six different media; Top forest soil (TS), sawdust (SD), Riversand (RS), 1:1 mixture of TS+SD, SD+RS and TS+RS, Undepulped fruits, despite slightly increased percentage germination in the mixed media, had very poor seed germination response in all the media. Seed germination of depulped fruits was higher in the mixed than in the single media. The TS+SD mixture with the least percentage porosity, 35.5% had the highest seed germination of 85%. This result suggests that, sowing depulped fruits of *I. wombolu* in 1:1 mixture of TS+SD can be relied upon for obtaining very high percentage seed germination, since the medium is capable of absorbing and retaining large quantity of water, which creates favourable environment for seed germination, particularly in the dry season.

Keywords: Influence, Media, Seed Germination, Depulped, Undepulped, *Irvingia wombolu*

INTRODUCTION

Ujoh (1987), and Okeem (1989) attributed the poor seed germination of the seeds of *Irvingia wombolu* to poor soil mixture. Generally, nurserymen simply sow the species fruits in top forest soil medium, and make use of the seedlings produced, without regard to the germination percentage establishment. This has led to short supply of seedlings for plantation, which has adversely affected the production of the species kernels for local and industrial utilization, cultivation of the species like other cash crops, and the conservation of the species. Okafor *et al.* (1997), Ejiofor and Okafor (1997) and Nzekwe (2002) pointed out that availability of large quantity of uniform seedlings is a veritable tool in plantation establishment.

Since the species has been reported to be nutritionally important (Ejiofor *et al.* 1987), high revenue generating (Anegbah *et al.*, 1996), and a potential industrial raw material (Ejiofor and Okafor, 1997). It becomes necessary that media capable of influencing high percentage germination response of the seeds be found. The aim of this study was, to assess the capability of different media in influencing high percentage germination of the seeds of *Irvingia wombolu* (vermeosen).

MATERIALS AND METHODS

The study was done at the fruit nursery of National Horticultural Research Institute (NIHORT) Mbato, Okigwe, Nigeria. The institute is situated at Lat. 5^o25'N, and Long. 7^o30'E. Media used were Top Forest soil (TS), Saw Dust (SD), River Sand (RS), 1:1; Mixture of TS+SD. SD+RS. and TS+RS

Saw dust (SD) of *ciba pentandra*, was collected from the timber market in Okigwe Urban, while the river sand (RS) was collected from Ibi, a big stream bordering NIHORT and Umulolo community in Okigwe. Top forest soil was collected from the secondary forest floor of NIHORT fruit nursery in Okigwe. The mixed media, TS+SD, SD+RS and TS+RS were made up by thoroughly mixing 50kg. of the component parts (TS, SD and RS). Each medium was subjected to porosity profile test adopted from Afolayan (2000).

A total of 1200 fruits of *Irvingia wombolu* were obtained from the trees in the plantation of the species at NIHORT, Mbato, Okigwe, in February, 2003. The fruits were split into two batches. The first batch of 600 fruits was used in the undepulped form, while the second batch of 600 fruits was depulped by scrapping off the mesocarp to the stone (seeds), using sharp knives.

Both fruit types, undepulped and depulped, were sown 1.5cm x 2cm. deep in polybags filled with the appropriate media under test. One fruit type was sown per polybag. Twenty-four polybags served as a replication. Each treatment was replicated four times, and the replications were displayed under partial shade in a completely randomized design in the nursery.

Water was applied at the rate of 150mls per polybag at an interval of two days. Seeds were considered germinated when they emerged 1cm-2cm above the medium. The study lasted for 48 days. Data collected were analysed using analysis of variance (ANOVA) to assess the variables (depulping, media and media, physical properties). The means were separated by Turkey's test using SAS software (1985).

RESULTS AND DISCUSSION

Depulped fruits germinated 12-15 days after sowing, irrespective of media, while undepulped fruits took 24-26days to germinate. Early germination of the seeds of the depulped fruits was anticipated, since the removal of the fruit mesocarp exposed the seeds early to suitable environments (water and oxygen) for seed germination. Nzekwe *et al* (2002) observed that the long periods taken by seeds of undepulped fruits to begin germination were expended on the decay of the fruit mesocarp.

The porosity profile of the media (Table 1) shows that TS, SD and RS in that order, recorded higher water loss than TS+SD, TS+RS. and SD+RS. The results suggest that SD, RS and TS have large pore spaces (macropores), while TS+SD, TS+RS and SD+RS have small pore spaces (micropores). Smith (1998) reported that the size of pore spaces in media, to a large extent, determines the retention capacity for plant available water. The union of the component parts of the mixed media increased the binding capacity of the media component parts, thus reducing the original macropores in the single media to micropores in their mixed form. The micropores may have accounted for the high retention of water absorbed by the mixed media.

The percentage seed germination responses of the two fruit types (Table: 1) show that seed germination was generally higher in the mixed than in the single media irrespective of fruit type. The results further show that undepulped fruit seeds had generally very poor percentage seed germination (5%-15% in single media and 15% - 25% in mixed media). Depulped fruits had relatively high percentage seed germination (25% - 45%) in the single media and very high percentage seed germination (50% - 85%) in the mixed media.

The poor percentage germination of the seeds of the undepulped fruits implies that the technique is unsuitable for raising large quantity of seedlings and therefore not suitable for routine nursery propagation of the species. High percentage seed germination responses of the depulped fruits in the mixed media may have been influenced by the physical properties of the media. As can be observed from table 1, since the percentage germination obtained corresponded with the porosity profiles of the media, TS+SD, which has the least water loss, 35.5%, gave the highest percentage seed germination, 85%, TS+RS with 40.5% water loss, gave 60% seed germination, while SD+RS, with 43% water loss, gave 50% seed germination. The mixed media may have provided good condition for seed germination by retaining large quantity of water particularly in the dry season (January-March) when *I. wombolu* fruits are usually available. Nwankwo (1984) reported that media with micropores usually absorb and retain large quantity of water, and make same gradually available to the seeds.

In this study, the mixed media, TS+SD, TS+RS and SD+RS, being able to absorb and retain large quantity of water, created water-vapour saturated atmosphere around the seeds. This created a favourable environment for the high percentage seed germination (85%) obtained by sowing depulped fruits of *I. wombolu* in 1:1 mixture of TS+SD. The technique is therefore recommended for routine nursery propagation of the species, as it can be relied upon for obtaining large quantity of uniform seedlings. The materials for the composition of the medium are cheap, easily available and can be applied by farmers, whose contributions in the cultivation of the species like other cash crops are quite paramount

Table 1: Percentage seed germination responses in the different media

Media	% Porosity	Seed Germination	
		Depulped fruits	Undepulped fruits
TS	45.5	45	15
SD	55.5	35	10
RS	60.5	25	5
TS+SD	35.5	85	25
TS+RS	40.5	60	20
SD+RS	43.5	50	15

Source: Extrapolated from the results

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