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Short Communication

In vitro propagation of *Irvingia gabonensis*

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An experiment was conducted on the *in vitro* culture of *Irvingia gabonensis*, a fruit tree grown in agroforestry system in West and Central Africa to explore its potential for micropropagation. Embryos excised from kernel of ripe fruits were cultured on MS medium (Murashige and Skoog, 1962) supplemented with different growth regulator at different concentration. The best result was obtained on ¼ MS supplemented with 0.2 mg/l kinetin. Full-grown plantlets were obtained and work is in progress on mass propagation.

Key words: embryo, plantlets, *in vitro* culture, *Irvingia gabonensis*, dika nut, bush mango.

INTRODUCTION

The natural forest of West and Central Africa are rich in natural resources and has tremendous biodiversity (FAO, 1983), particularly trees that provide food, fuel, fiber, medicines as well as including construction and building materials (Ayuk et al., 1999). *Irvingia gabonensis* and *Irvingia wombulu* commonly called bush mango/wild mango, or dika nut, is an edible Africa indigenous fruit tree that produces edible fruits and seeds (Atangana et al., 2001, 2002; Harris, 1996). Irvingia belongs to the family Irvingiacea; the fruit of *I. gabonenses* has a sweet mesocarp and it is eaten fresh, while that of *I. wombulu* is sour and is consumed locally. The edible kernels from both are used for culinary purposes and are traded enough to be quoted in the weekly commodity list in Nigeria. Nigerians distinguished between kernels from *I. gabonensis* and *I. wombulu,* referring to the former as 'ugiri' in Ibo or "apon" in Yoruba (Ladipo et al., 1996) and the later as "Ogbono" (Okafor, 1975). In Nigeria, the kernels are used as a condiment and are highly valued for their food thickening properties (Ndjouenekeu et al., 1996) in preparing "ogbono" or draw soup.

The kernels of *I. gabonensis* are widely marketed in Cameroon (Ndoye et al., 1997) and form an important diet, providing carbohydrate, oil, and protein, to enhance health and nutrition. The fruits are eaten fresh and recently the juice from fruit has been recommended for wine production (Akubor, 1996). *I. gabonensis* has been used wholly or as supplement in the treatment of type II diabetics and in reducing obesity (Omoruyi et al., 1994; Judith et al., 2005). Ofoefule et al. (1997) reported that dika fat, a vegetable oil obtained from the kernel are also used in the formulation of sustained released frusimide granules and a highly gross energy is obtained from it compared to other tropical seeds, this is as a result of its high fat content. Leakey (1999) had also reported on the nutritional value of *I. gabonenses* fruit and kernel.

As the demand for fruits and other non wood forest products is increasing in the highly populated farming area of Nigeria, the supply of fruit from forest is threatened by increasing deforestation and unsustainable farming practices. The present study is to develop a protocol for *in vitro* propagation of *I. gabonensis* and subsequent mass propagation to produce seedlings for farmers, and to improve food security and income generation. Currently, *I. gabonensis* is propagated vegetatively by stem due to the recalcitrant nature of the seeds. However, experience shows that conventional/traditional methods of vegetative propagation give a low propagation rate. Micro-propagation has proved to be an alternative for the multiplication of selected genotype and chemo type of several medicinal and aromatics plant (Bajaj et al., 1998). This paper reports the *in vitro* propagation through embryo, obtained from kernel of ripe fruit of *I. gabonensis* to produce valuable germplasm.

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Table 1. Response of *I. gabonenses* embryo on MS basal media supplemented with cytokinins and auxin.

Media	Observation
½ MS only	The embryo increased in size with formation of root but shoot initiation was absent.
¼ MS only	There was increase in the size of the embryo with rooting, but shoot was absent.
¼MS + BAP (0.2 mg)	Embryo increased in size forming a torpedo/cotyledonary shape. When transferred into a kinetin supplemented media, shooting and rooting was observed.
¼MS + KIN (0.2 mg)	Shooting and rooting were observed, and full grown plantlets were obtained.
¼ MS +0.2 mg KIN +0.1 mg NAA	Rooting was observed, but shoot formation absent.
¼ MS + 0.1 mg NAA	Formation of multiple roots observed, but shoot was absent.

BAP, Benzyl amino purine; KIN, kinetin; NAA. naphthalene acetic acid; MS, Murashige and Skoog (1962)

Figure 1. *In vitro* culture of *Irvingia gabonensis* on ¼ MS (Murashige and Skoog, 1962) supplemented with 0.2 mg/l kinetin.

MATERIALS AND METHODS

Ripe fruits were collected from the live gene bank of *I. gabonenses* in National Center for Genetic Resources and Biotechnology Moor plantation in Ibadan, Oyo State, Nigeria. The fruits were collected during the fruiting season on the on set of raining season. The mesocarp was peeled off to expose the endocarp. The seeds coats were broken to obtain the kernels. The explants (kernels) were washed with 70% ethanol solution for 5 min; subsequently surface sterilized in 10% sodium hypochlorite solution for 20 min and rinsed in sterile distilled water. The explants were culture/inoculated on the culture media.

MS medium (Murashige and Skoog, 1962) was used. The media contains $^{1}/_{4}$ MS, 30 g sucrose, 0.1 mg inositol and vitamin, pH were adjusted to 5.7 prior to the addition of 0.7% agar and autoclave at 121°C for 15 min, the culture were incubated at 25 ± 2°C with 16 h-day light. The effect of MS basal media supplemented with cytokinins and auxin was tested, and the effect of different concentrations was evaluated.

RESULTS AND DISCUSSION

This study show the *I. gabonenses* embryo response on MS basal media supplemented with kinetin and benzyl amino purine (Table 1). The result of the experiment indicates that there is possibility for adopting *in vitro* propagation for conservation and mass propagation of *I. gabonensis*. ¼ MS + 0.2 mg kinetin proved very successful for the *in vitro* culture to obtain a full-grown plantlet (Figure 1), which was confirmed by the production of shoot and root by the embryo initially cultured on ¼ MS + 0.2 mg benzyl amino purine. The addition of 0.1 mg naphthalene acetic acid with 0.2 mg kinetin inhibits the initiation of shoot. MS only was not enough for the growth of the embryo; this could be as a result of the recalcitrant nature of the seeds.

In the modern age of science, plant tissue culture is an indispensable part of biotechnology. In this paper, propagation of *I. gabonensis* has been demonstrated and can be used as an important alternative to conventional propagation and breeding. The response of *I. gabonensis* to various growth regulators ias reported and a protocol for *in vitro* culture was established. Further work is to be carried out to develop a protocol for mass propagation and to evaluate the effect of genetic diversity in response to *in vitro* propagation

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