Stationary liquid medium enhanced micro-propagation of plantain (*Musa* sp. AAB cv. ‘Agbagba’)

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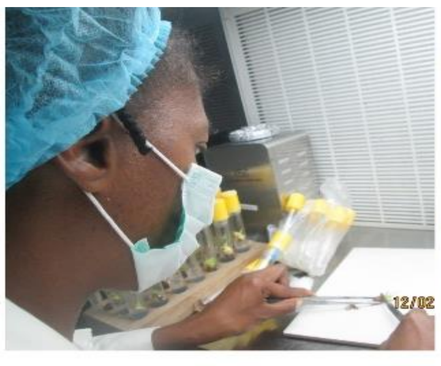
Introduction, context and objectives

- Plant proliferation step is very important part of a successful plant tissue culture system. It comprises the use of macro- and micronutrients, as well as vitamins, carbon source, and plant growth regulators (Akinyemi and Esuola, 2012; Akinyemi et al., 2018; Roels et al., 2005). These medium creates an enabling environment for plants growth as well as proliferation. However, tissue culture plantlets in vitro are costly due to some of the reagents that are used in the preparation of the media like the gelling agents such as phytagel, agar, gelrite, etc. (Costa et al., 2007).
- In this study, we report the stimulatory effects of stationary liquid medium as a promising alternative to agar solidified medium for in vitro growth and shoot proliferation of plantain (*Musa* sp. AAB cv. ‘Agbagba’).

Materials and Methods

Media: Liquid and Semi-Solid Murashige and Skoog (1962) MS + Hormones.

Sections of regenerated plantain shoot tips inoculated into the sterile liquid and semi-solid MS + 6-Benzylaminopurine (BAP) 4.5 mg L^{-1}, Indole-3-acetic acid (IAA) 0.18 mg L, $^{-1}$ and incubated in the growth room for 21 days.



Growth room: 26 °C ± 2 °C.

Rooted Plantain suckers on 1-Naphthaleneacetic acid (NAA) 1 mg L^{-1} were acclimatized in the Humidity Chamber.

Results

- The stationary liquid medium resulted in higher plantain growth parameters when compared to solid medium i.e. mean plant height 11.7 cm, mean number of new plantlets 8.7, mean number of leaves 15.7, mean number of nodes 8.4, mean leaf length 3.7 cm, mean root length 11.5 cm, and mean root numbers 14.5 when compared to the semi-solid medium which are mean plant height 7.2 cm, mean number of new plantlets 4.6, mean number of leaves 7.6, mean number of nodes 4.2, mean leaf length 2.7 cm, mean root length 5.2 cm, and mean root numbers 8.0 ($p<0.05$) [Figures 1 and 2].
- All the newly formed plantain plantlets were successfully hardened in the humidity growth chamber (Figure 3).

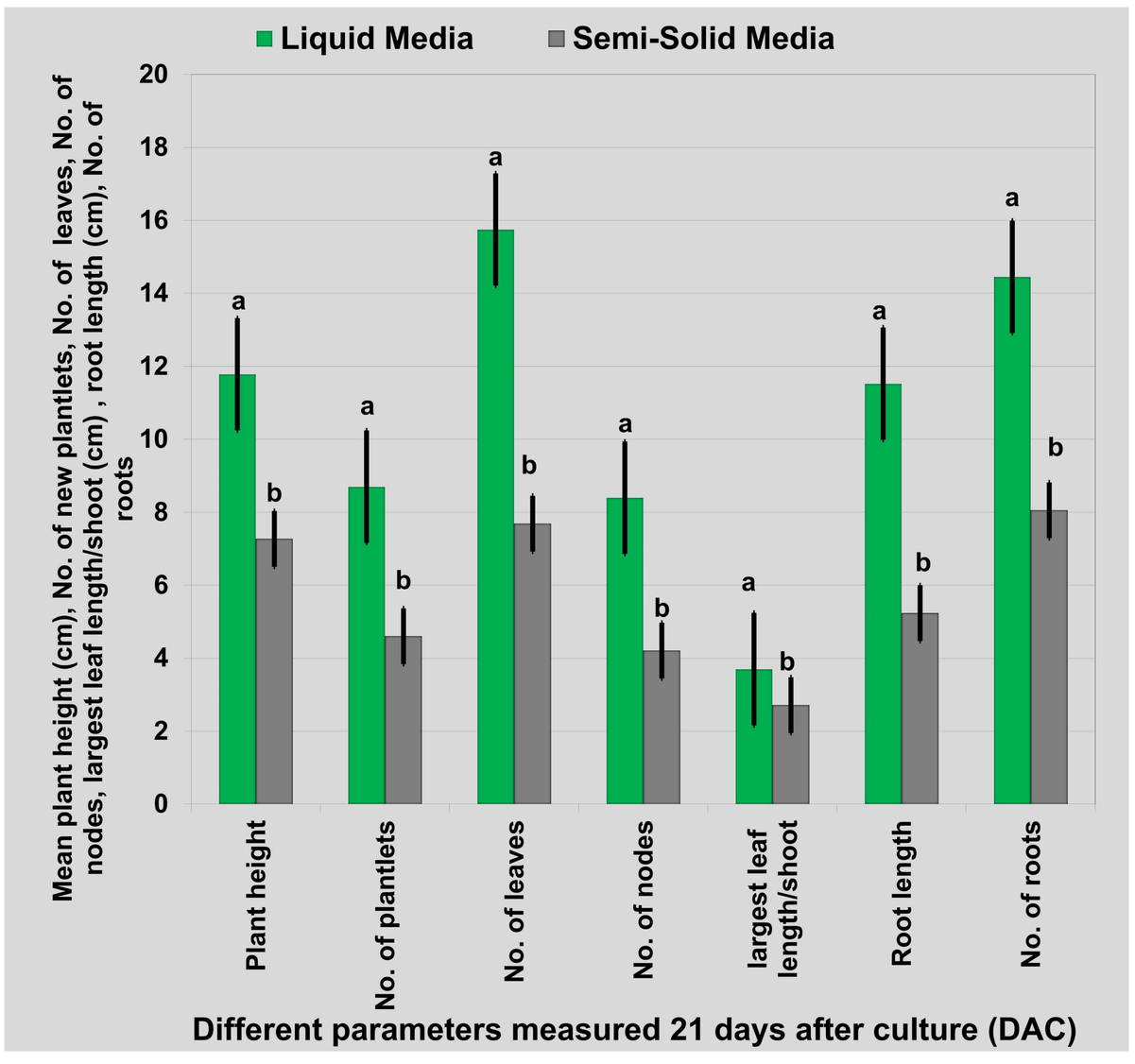


Fig. 1 Influence of the stationary liquid medium versus semi-solid medium on plantain growth parameters 21 days after culture (DAC).

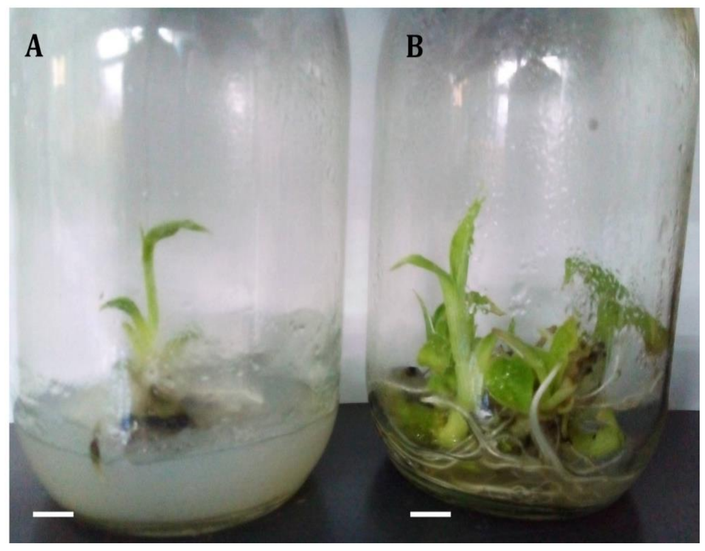


Fig. 2 Influence of the stationary liquid medium versus semi-solid medium (A) micro-propagated plantain plantlet in semi-solid medium 21 days after culture (DAC) (B) micro-propagated plantain plantlets in stationary liquid medium 21 days after culture (DAC). All scale bars = 1 cm.

Fig. 3 Acclimatized micro-propagated plantain plantlets in hardening chamber of the Biotechnology Research Unit, NIHORT, Ibadan, Nigeria ready for farmers use. All scale bar = 10 cm.

Conclusions and perspectives

- In this study, the use of stationary liquid medium enhances the plantain plantlets with high emergence of new shoots, plant heights and vigorous root system that could ensure high survival rate during acclimatization. In future work, different cultivars of *Musa* spp. will be studied to ascertain the benefits of stationary liquid method in these cultivars as well.

- **References**: Adegunwa et al. (2019) Food Agric. 5, 1631582. Akinyemi et al. (2018) Acta Hortic. 427-432. Akinyemi SOS and Esuola C O (2012) J. Hortic. Sci. Biotechnol. 87, 413-418. Carota et al. (2017) Acta Hort. 760(1)99-104. IITA (2000) Annual Report, Ibadan, 67. Murashige T and Skoog F (1962) Physiol. Plant. 15, 473-497. Roels et al. (2005). Plant Cell. Tissue Organ Cult. 82, 57-66.
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