INDUCTION OF CALLUS FROM NODAL EXPLANT OF ACACIA SENEGAL IN BORNO STATE OF NIGERIA

***Gadzama N.Mamadu, Kaldapa T. Jummai**

University of Maiduguri, Nigeria
Biotechnology Centre,
Maiduguri,
P. M. B. 1069. Maiduguri.

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Introduction

- *Acacia senegal* is a deciduous, ecologically and economically important tree that is native to semi-desert regions of sub-Sahara Africa from Sudan to Senegal (Khalafalla and Daffalla, 2008).
- It is highly adaptapted to drought and frost (NAS, 1983).
- It improves soil fertility through symbiosis with Rhizobium and mycorrhiza (Badji *et al.,* 1993; Singh and Pandey 1998).It controls desert encroachment, wind erosion and provides vegetative cover for the degraded soils in the Sahel of Africa
- It has huge foreign exchange potentials (Commodity Network Ltd, 2008) and contributes to the economic livelihood of the rural community
- Propagated by seeds which is limited by poor germination, seedlings death and by poor seed selection and storage
- Tissue culture technique offers an alternative method for the regeneration and re-afforestation of *acacia senegal*

Objectives

To measure the incidence of callus induction by evaluating the effects of

i. Various concentrations of the auxin 2, 4 dichlorophenoxyacetic acid(2,4-D) alone and in combination with kinetin in Murashige and Skoog (MS) medium

ii. The effects of full and half strength MS medium supplemented with 2,4-D and kinetin

Methodology

- Nodal explants were excised from 6 months old seedlings growing on the experimental site of the Biotechnology Centre, University of Maiduguri (Gadzama *et al.,* 2018).
- The explants were trimmed and sterilized by washing under running tap water for 30 minutes and then soaked in a mixture of 100 mg/l ascorbic and 150 mg/l citric acid solution for 10 minutes.
- The explants were then immersed in 70% ethanol for 30 seconds, washed in several changes of sterilized distilled water; and then immersed in 100 ml of 10% and 15% Clorox solution mixed with 2 drops of Tween 20 (surfactant) for 10 minutes each, with continuous agitation. Explants were rinsed several times with sterile distilled water under laminar airflow cabinet.
- Sterilized explants were cultured in cultureot bottles containing full and half strength Murashige and Skoog (1962) basal media supplemented with 2,4-dichlorophenoxyacetic acid (2,4-D) (1.0–2.5 mg/l) and Kinetin (KN) (0.5mg/l) following standard aseptic technique
- The cultures were incubated at (25 ± 2) ^{o}C under photoperiod of 16/8 light and dark hours daily with exposure to 1000 lux light intensity, provided by LED lamps for 6 weeks.

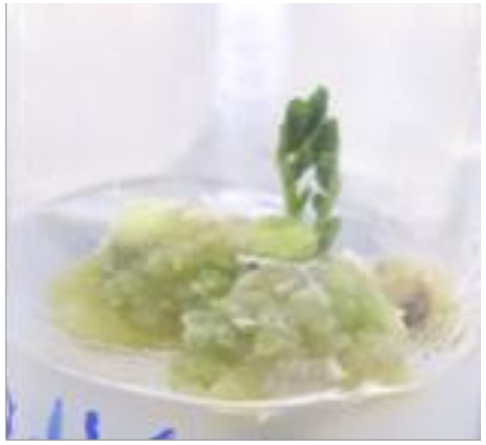
Experimental Setting

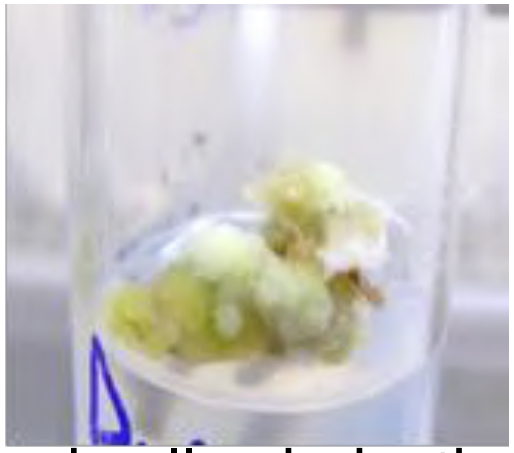
- Ten replications of inoculated explants were prepared for each treatment and the experiments were repeated thrice.
- Data for the on-set of callus induction(days), degree of callus induction and morphology were recorded and analyzed after 6 weeks of culture
- The percentage of callus induction in each treatment was calculated by the following formula:

- $$\text{Induction \%} = \frac{\text{Number of explants formed callus}}{\text{Total number of explants cultured}} \times 100\%$$

Results and Discussion

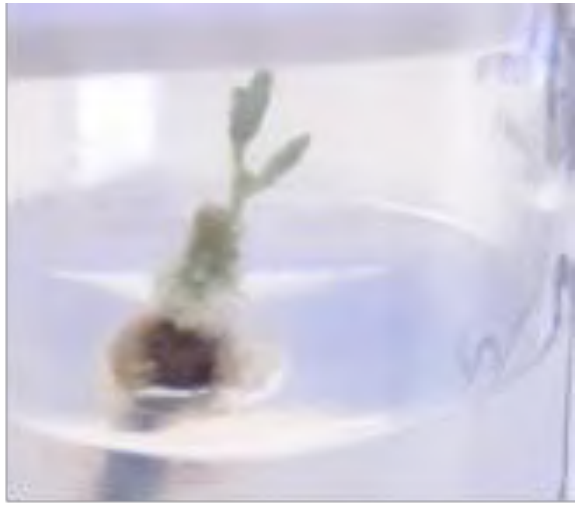
- Moderate incidence of callogenesis with 2,4-D supplementation





- Addition of kinetin enhanced callus induction, Calli morphology was friable and yellow white in color.

Results and Discussion



- Half strength MS medium delayed the on-set of callogenesis and the callus formed was weak

❖The findings gathered in this study provides useful information for calli formation on nodal explant of acacia senegal which is required for plant regeneration studies, somatic embryogenesis or it may be used as a starting point for cell suspension cultures or plant bioreactor studies in the species.

Conclusions & Recommendations

- Full strength MS medium has positive effects on callus induction
- Auxin supplementation is essential to achieve callus induction
- Addition of kinetin(0.5mg/l) to 2,4-D(2.0mg/l) in full strength MS medium enhanced calli proliferation
- **Recommendation:** Further experiments are needed for the optimization of callus induction and possible subsequent somatic embryogenesis for the tree crop.

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