28th Conference Asic 2021
From 28 June to 1 July 2021

# Adapting Temporary Immersion Tissue Culture System to Enhance Mass Production of Coffea arabica Hybrid Ruiru 11 in Kenya

S1-P-40

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## Introduction

This poster reports the results of a study undertaken to optimise Temporary Immersion System tissue culture protocols for commercial production cultivar Ruiru 11. The study was undertaken at the Coffee Research Institute, Ruiru, Kenya .

## Materials/Methods

Leaf explants from Ruiru 11 Codes 71 and 93 were used. Calli induction parameters were assessed in 1/2 strength Murashige and Skoog, supplemented with 2,4-D, IBA, BAP, and KIN at various combinations and strengths, and laid out in a completely randomized design. The study was conducted using RITA® bioreactors.

**Figure 1: Embryogenic calli induced in leaf explants**

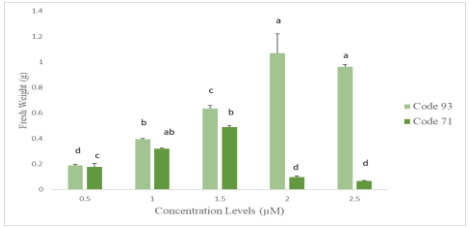


**Figure 2: Effect of 2,4-D on callus induction in Code 71 and Code 93 *P=0.05*.**

## Results/Discussion

- 2,4-D used singly (0.33µM) gave highest callus induction rate of 88% in Code 71 and 97% for Code 93 (2,4-D 0.53µM), with linear response to increasing concentration in Code 93.
- Callus proliferation occurred at inoculation density between 0.0005 g / cm3 and 0.0035 g / cm3, no proliferation observed below or above this range.
- Ideal inoculation densities was 0.0005 g / cm3 in both codes Code 71 (76.333 ± 6.7 embryos induced) and Code 93 (94.222 ± 5.679 embryos induced).
- Response to treatment for all the parameters studied showed high genotype dependence.

## Conclusion/Perspectives

Efficiency in induction and proliferation of calli in Ruiru 11 is genotype and PGR specific. Thus, optimising TIS protocols requires knowledge of the response patterns of the constituent to facilitate clustering of Codes with similar response patterns. Similar clusters could the be propagated separately before reconstituting to ensure genetic fidelity of the seedlings released to the farmers.

**References:**

Etienne, H., Breton, D., Breitler, J. C., Bertrand, B., Déchamp, E., Awada, R.,& Courtel, P. (2018). Coffee somatic embryogenesis: How did research, experience gained and innovations promote the commercial propagation of elite clones from the two cultivated species? *Frontiers in Plant Science*, *9*.