Tropentag, September 19-21, 2012, Göttingen - Kassel/Witzenhausen

"Resilience of agricultural systems against crises"

Enhancing Germination of *Aframomum melegueta* K. Schum. through *ex-vitro* and *in-vitro* Propagation Techniques

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Abstract

In spite of the huge economic importance of *Aframomum melegueta* K. Schum. in the herbal and pharmaceutical industries, its production is limited by the lack of planting materials and long juvenile phase. Thus, production has not kept pace with demand; hence, an *ex-vitro* study of breaking of seed dormancy was undertaken to improve germination. Seeds were immersed in 25 % H_2SO_4 for 1 hour and the percentage germination compared with cold stratification in a fridge for 7 or 14 days at 4±1°C, and a control. 25 % H_2SO_4 treated seeds had the highest germination percentage (60.7 %) compared to cold stratification or control treatments. To further improve germination, an in-vitro study was conducted. Seeds scarified with 25 %, 50 % or 75 % H_2SO_4 for 1hour, together with controls were soaked in 0 - 25 mg l^{-1} GA3 for 1day prior to inoculation on Lloyds and McCown medium. 25 % H_2SO_4 scarified seeds alone significantly enhanced percentage germination (100 %). But, plantlets of GA3 treated seeds were taller than the 25 % H_2SO_4 scarified seeds without GA3. Subsequently, the seeds were scarified with 25 % H_2SO_4 and cultured on Lloyds and McCown medium fortified with 0 - 100 mg l^{-1} GA3 in an attempt to optimise germination and growth. Although, at 60 mg l^{-1} GA3 percentage germination equalled germination in the control, the plantlets grew less vigorously. Thus, GA3 was found to have no influence on growth. Additionally, dormancy was identified to be caused by the hydrophobic waxy seed coat, but not dormancy stimulating hormone. Scarification with 25 % H_2SO_4 for one hour can be used to improve germination.

Keywords: *Aframomum melegueta*, Lloyds and McCown medium

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