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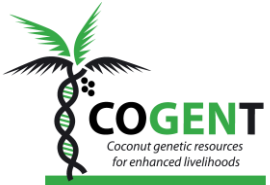


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Viability of Heat Treated Microspores of *Cocos nucifera* L. for Induction of Microspore Embryogenesis

S.P.N.C. Jayarathna, H.G.M.R. Suraweera, N.K.L.S. Piyatissa, P.I.P. Perera, V.R.M. Vidhanaarachchi

Overview

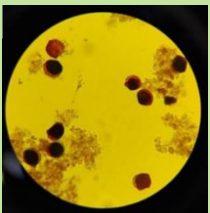
- Tall coconut (*Cocos nucifera* L.) palm is an allogamous and highly heterozygous crop which is a major obstacle for conventional breeding.
- Microspore embryogenesis enables the development of homozygous lines.
- Microspore viability after applying heat treatment is an important factor to induce embryogenesis.

Objectives

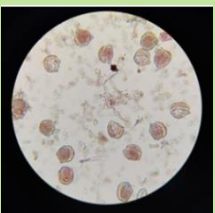
- To evaluate the coconut microspore viability after heat treatment (at 38 °C) of different incubation periods
- To determine the effect of heat treatment on induction of microspore embryogenesis

Observations

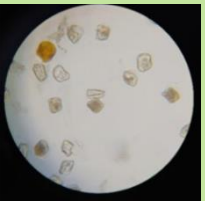
Evaluation of microspore viability



I₂KI staining

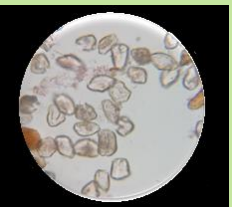


Acetocarmine staining

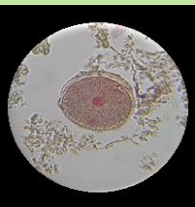


TTC staining

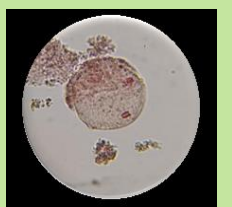
Effect of heat treatment for embryogenesis



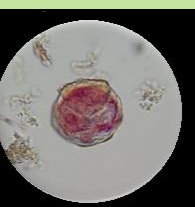
Non-viable microspores



Uni-nuclear microspore



Binuclear microspore



Tetra-nuclear microspore

Methodology

Evaluation of Microspore viability after heat treatment

Anthers (three weeks before splitting stage of two palms)



Heat treatment for 1 to 10 days

Staining with Iodine potassium iodide, acetocarmine and 2, 3, 5-triphenyltetrazolium chloride

Counting stained microspores as viable

Effect of heat treatment for microspore embryogenesis

Anthers (three weeks before splitting stage)



Heat treatment for 1, 3, 6 and 9 days (either prior or post inoculation in Y3)



Determining nuclear status and the callus formation (after 7 and 14 days of culture initiation)



Conclusions/Research Contributions to the Congress

- A significant difference in viability was observed among the two palms after applying the heat treatment.
- Iodine potassium iodide solution displayed a better distinguishability over the other stains.
- The highest frequency of binuclear (58.5%) and tetra nuclear (7.2%) microspores were recorded in the samples heat treated after culturing the microspores.
- The most effective heat treatment was 38 °C for 3 days after inoculation in Y3 medium.
- The results of the study are important for further improvement of microspore embryogenesis protocol.

