Histological analysis of embryogenic structures derived from unfertilized ovary explants of coconut (*Cocos nucifera* L)

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Vegetative propagation of superior palms is a promising technique for increasing production and homogeneity in coconut lands. Tissue culture remains the only approach to achieve this objective. Various explants of coconut have been used for *in vitro* culture with limited success. Therefore, studies were undertaken to find another explant that can be used for clonal propagation of coconut and the results revealed the suitability of unfertilized ovary as a source of explant. The present study aims at understanding the cellular changes that occur during callus and somatic embryo induction in unfertilized ovary explants of coconut.

The calli and embryogenic structures obtained from unfertilized ovaries (excised from immature female flowers of coconut) cultured *in vitro* were used for histological analysis. The results revealed that meristematic cells were formed by the division of the provascular cells of the carpels. These cells were arranged in a cambium-like zone and the fragmentation of this zone gave rise to proembryos of multicellular origin. Alternately, protodermal cells of the cambium-like zone produced highly embryogenic cells that formed proembryos of unicellular origin. However, further development of these embryos was not observed whereas the proembryos of multicellular origin gave rise to fully-developed somatic embryos. Many of the somatic embryos analyzed were complete with both shoot and root poles (bipolar). Upon germination, they gave rise to normal shoots. However, some abnormal shoot development (fused shoots) was also observed.

In conclusion, the present study revealed that under the culture conditions used, complete somatic embryos that could give rise to normal plants can be induced in unfertilized ovary-derived callus. It also confirmed that plant regeneration occurred through somatic embryogenesis. However, the protocol needs to be improved to increase the frequency of callogenesis and somatic embryogenesis.

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