

Micropropagation of *Hyphaene thebaica* (L.) Mart. Through Seed and Root Tip Cultures: A Strategy for Sustainable Crop Production

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INTRODUCTION & AIM

Hyphaene thebaica (L.) Mart., or doum palm, is an underutilized species of high cultural, nutritional, and medicinal value, mainly found in arid and semi-arid regions. Traditional seed propagation is limited by slow germination, long juvenile phases, and high genetic variability. This study aimed to develop, for the first time, a reproducible *in vitro* propagation protocol for *H. thebaica*, focusing on inducing callus and root formation from seed-derived radicles, offshoot apical meristems, root tips, and female inflorescence tissues, while overcoming challenges such as tissue browning and phenolic exudation.



Figure 1: (a) *Hyphaene thebaica* tree; (b) Fruit bearing seeds; (c) Shoot tip; (d) Female inflorescence.

METHOD

Explant types included seed-derived radicles, offshoot apical meristem, root tips, and female inflorescences. Cultures were established on MS and B5 media with combinations of 2,4-D, IBA, BAP, and 2iP. Sterile conditions were maintained throughout. Observations were recorded for callus induction, root formation, tissue browning, and contamination, with photographic documentation of successful cultures.

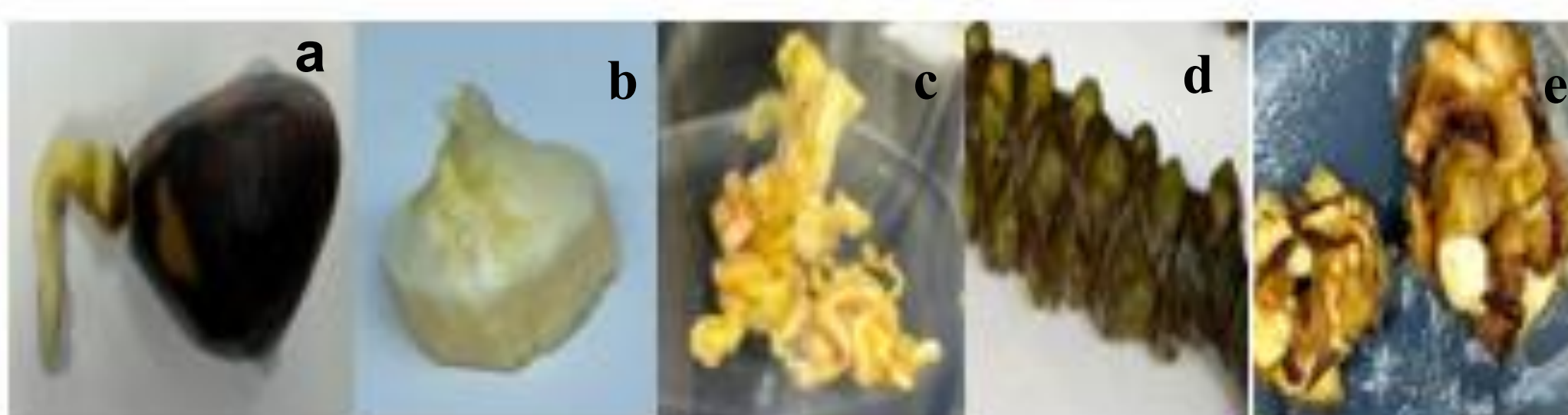
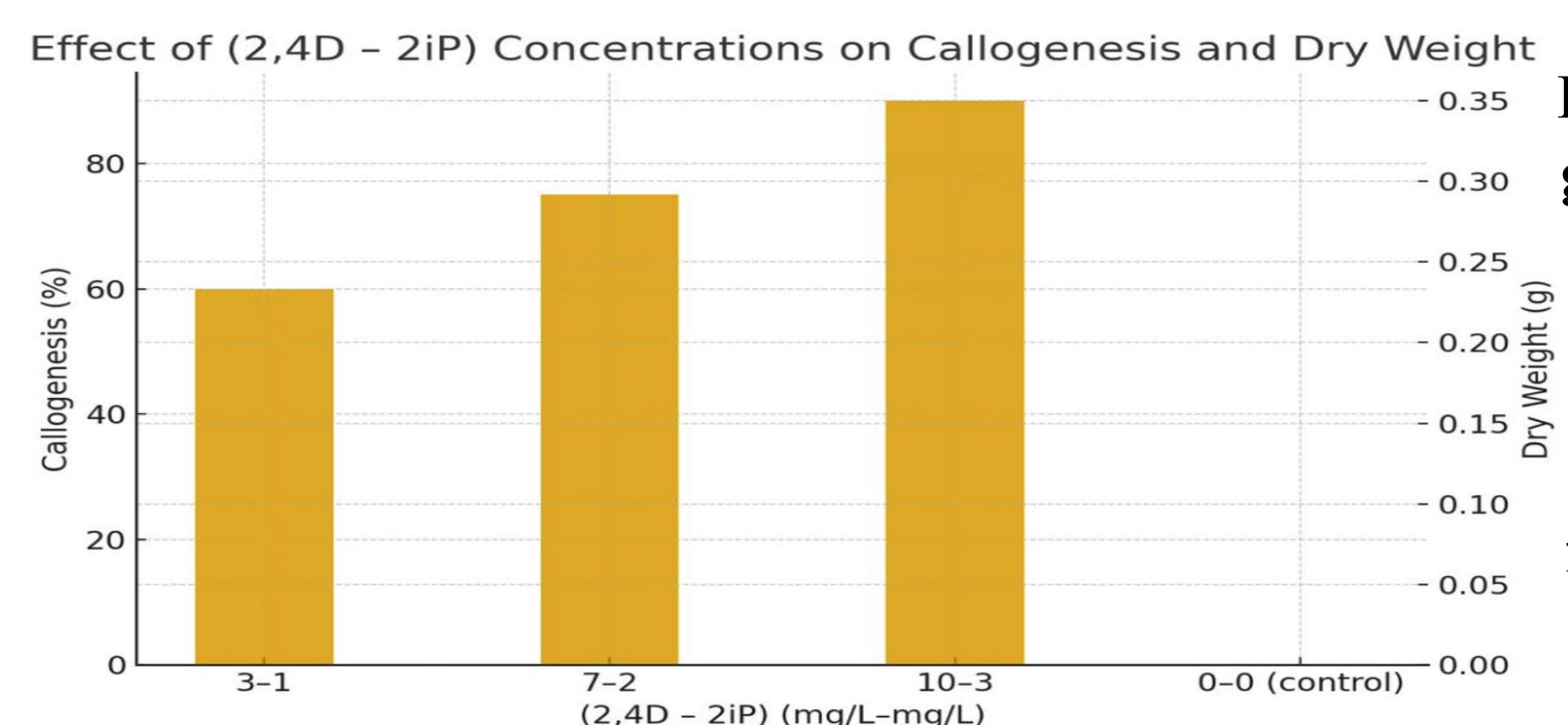
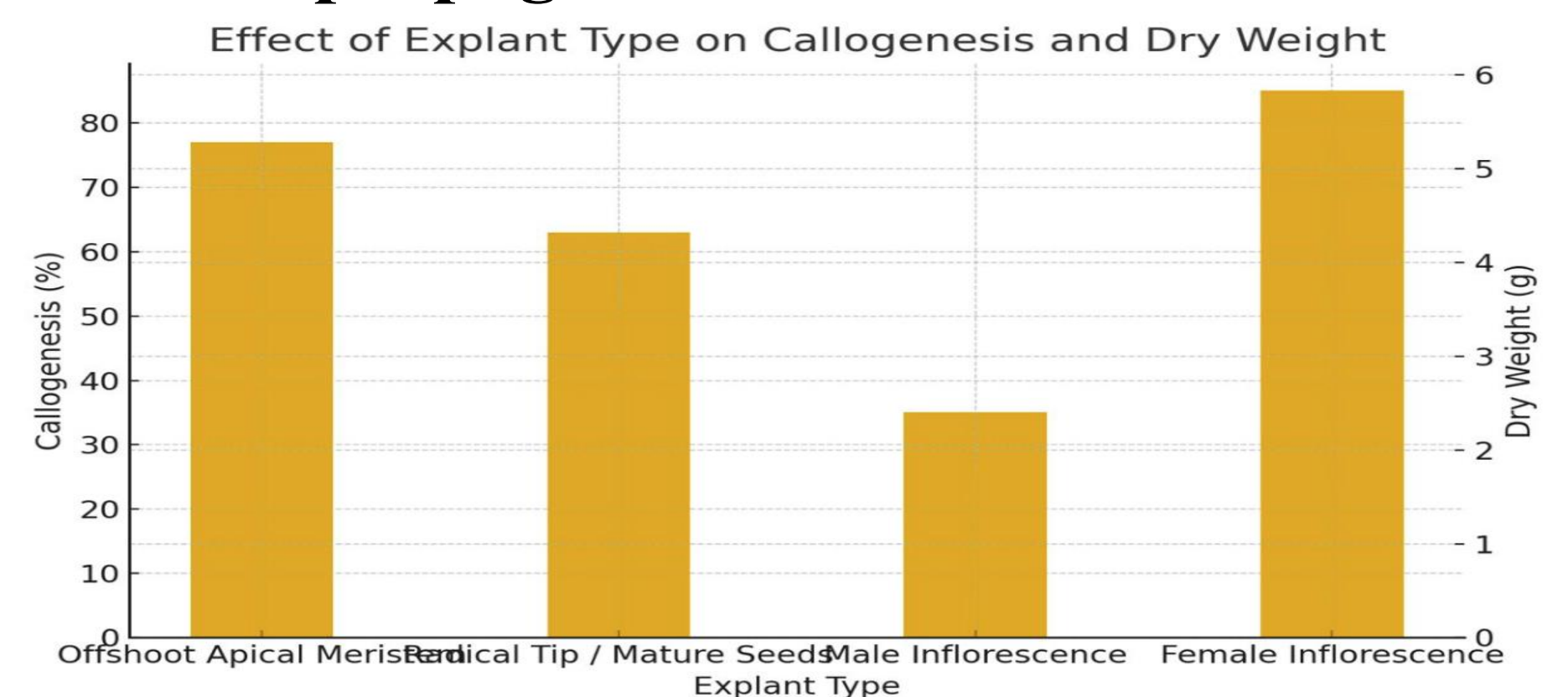


Figure 2: The material utilized for shoot and callus induction. (a) one month-old *H. thebaica* seedling. (b) *H. thebaica* offshoot apical meristem. (c) callus induction from apical meristem. (d, e) The female inflorescence.

RESULTS & DISCUSSION

Callus formation was successfully induced from female inflorescences and offshoot apical meristem, while seed-derived radicles developed roots for the first time demonstrating effective early-stage organogenesis. Phenolic exudation and tissue browning were minimized using activated charcoal and antioxidants. These findings provide the first experimental evidence for *in vitro* propagation potential of *H. thebaica* and establish a foundation for future micropropagation and conservation efforts.



Direct root generation from seed of *H. thebaica* for the first time.

CONCLUSION

This study established the first *in vitro* propagation protocol for *H. thebaica*. Female inflorescences and seed radicles showed the best response. While shoot regeneration remains limited, the results confirm the potential of tissue culture for conservation and large-scale propagation.

FUTURE WORK / REFERENCES

Further work will optimize shoot induction and assess genetic stability. Large-scale culture will be developed to support conservation and commercial applications.

Abu-Darwish D. et al. (2022). *Plants* 11(10):1326. (Scopus, Q2)

Abu-Darwish D. et al. (2024). *Jordan J. Pharm. Sci.* 17(3). (Scopus, Q3)