Tissue Culture of the Hawaiian Papaya

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The purpose of this study was to create a more efficient method of papaya production through the clonal propagation of hermaphroditic Hawaiian papaya. The current labor-intensive practice involves planting 15 seeds per hole, subsequent culling to 3 plants, and a final culling at flowering, when the economically desirable hermaphrodite can be visually identified. A four-part experiment was carried out to assess the effectiveness of varied concentrations of the cytokinin thiadazuron (TDZ) on different types of plant tissue. The first part compared two disinfestation treatments consisting of 5.5 hours (standard) and 1.5 hours (modified) in solutions of 3% sucrose, 10% bleach, and 5% bleach prior to plating on Murashige and Skoogs (MS) medium containing 1.0 mg/L TDZ. The standard treatment resulted in less response (35%) but also less contamination (4%). Subsequent tests used the standard pre-treatment. In the second part, ‘Sunrise’ leaves were disinfested and placed in MS media containing 0, 0.25, 0.5, or 1.0 mg/L TDZ. The 1.0 mg/L TDZ treatment had up to 18% less callus eleven weeks after initiation, but had the highest percentage of quality rated callus (23%). In the third part, cotyledons and hypocotyls of ‘Sunrise’ seedlings germinated in vitro were placed in MS media containing 1.0, 1.5, or 2.0 mg/L TDZ. These tissues exhibited positive response with no observable differences between treatments. In the fourth part, shoots, petioles, and leaves of glasshouse grown ‘Rainbow’ papaya were disinfested and placed in MS media containing 1.0, 1.5, or 2.0 mg/L TDZ. These tissues exhibited positive response with no observable differences between treatments. All levels of TDZ were effective in inducing callus formation on all tested tissues. No shoot formation was observed.