

**EXOGENOUS CHEMICAL APPLICATION
TO REGULATE SEX EXPRESSION IN
GYNOECIOUS BITTER GOURD**

(Momordica charantia L.)



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ABSTRACT

Globally, bitter melon (*Momordica charantia* L.) cultivation largely depends on F1 hybrid seeds to ensure high yield and uniformity. The gynodioecious sex form, which produces only female flowers, plays a vital role in hybrid seed production; however, its commercial application is constrained by the lack of cost-effective methods for maintaining gynodioecious lines, as self-pollination is not possible. Bitter melon is a monoecious vine exhibiting a protandrous flowering pattern, where male flowers appear earlier than female flowers, leading to an imbalanced sex ratio and low productivity. Developing gynodioecious varieties is considered the most effective strategy to increase yield, but seed production in these lines poses a significant challenge. Sex expression in bitter melon is influenced by genetic and environmental factors, including nutrient levels and phytohormones such as ethylene and gibberellic acid (GA3). While ethylene promotes femaleness, GA3 favors maleness. Silver nitrate (AgNO₃), an ethylene inhibitor, has been used to manipulate sex expression. This study evaluated the effects of AgNO₃ and GA3 on the induction of hermaphrodite and female flowers in gynodioecious bitter melon. The experiment was conducted in a polytunnel at Onesh Agri (Pvt) Ltd, Giriulla, Sri Lanka, using the gynodioecious line BG 043. Eleven treatments, including combinations of AgNO₃ and GA3, were tested under a Completely Randomized Design (CRD) with three replications. Reproductive traits were monitored throughout flowering. Results revealed that AgNO₃, especially at 600 ppm & 1200 ppm, was most effective in inducing hermaphrodite flowers with consistent flowering patterns, while GA3 promoted female flowers without sex reversion. The earliest appearance of hermaphrodite flowers occurred approximately 12 days after spraying. These findings confirm that silver nitrate can be effectively used for sex modification in breeding programs. Future studies should extend observations to seed development to assess the viability of hermaphrodite-induced flowers and evaluate the potential of adopting this technique in commercial hybrid breeding.

Keywords: Bitter melon, gynodioecious lines, hermaphrodite induction, sex expression, silver nitrate

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