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## Enhancement of Callus Growth and Hyoscyamine Alkaloid Production in *Hyoscyamus muticus* by Nanotechnology, Biotic Elicitor and Precursor

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**Abstract:** This study aimed to determinate the optimal condition for mass production and hyoscyamine alkaloid content in *invitro* callus cultures of *Hyoscyamus muticus* under different treatments of nanomaterial compound (Lithovit 0.25, 0.5, 0.75 and 1 g/l), biotic elicitor (Yeast extract 0.25, 0.5, 0.75 and 1 g/l) and precursor (Phenylalanine 10, 50, 100 and 200 mg/l). Data show that efficient use of the tested substances to stimulate the callus growth revealed, five levels of different examined substance to achieve the highest significant results due to yeast extract (0.25g/l-7.09 g/explant) and (0.75g/l -7.95 g/explant), (lithovit, 0.25g/l - 6.95 g/explant) and phenylalanine (10 mg/l - 6.95 g/ explant) and (50 mg/l - 7.16 g/ explant) in callus fresh weight. Three of significant results in callus dry weight agreed with callus fresh weight as follows, yeast extract (0.75 mg/l. – 0.18 g/ explant), lithovit (0.25 g/l – 0.2 g/ explant) and phenylalanine (50 mg/l- 0.18 g/ explant), while yeast extract (1.0 g/l.) achieved highest significant value (0.18 g/explant) without agreement with callus fresh weight. The highest value of hyoscyamine alkaloid content (3.01 mg/g dry weight) was recorded with phenylalanine at 200 mg/l.

**Key words:** *Hyoscyamus muticus*, lithovit, phenylalanine, yeast extract and callus.

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