

ABSTRACT

The glycoalkaloid content of various Solanum species of North Bengal under different edaphic and climatic conditions have been worked out. The dry berries were Soxhleted with petroleum ether for defatting and glycoalkaloid was isolated from the methanolic extract and identified by the comparison with the authentic sample. Solasodine was estimated gravimetrically after acid hydrolysis of crude glycoalkaloid obtained from fruits. The percentage of total alkaloid and solasodine was found to be maximum in the fruits of S. khasianum as compared to other species of Solanum. The foot hills of Darjeeling district and Terai region of Jalpaiguri district was observed to be suitable place for S. khasianum, to get the appreciable amount of total alkaloid and solasodine. The soil conditions and meteorological parameters of five districts of North Bengal was considered during the investigation.

Solasodine was estimated after the establishment of a new method which involves the colour development of glycoalkaloid in presence of resorcinol and concentrated H_2SO_4 and measured at 510 nm. An attempt has been made to obtain the optimum sowing time suitable for the growth, development, fruit yield and total glycoalkaloid content in the fruit of S. khasianum. The relational impact of temperature, rainfall,

humidity of different sowing months were also considered. The sowing month October was found to be optimum with the temperature condition (min. 20.5°C; max. 30.5°C), humidity (77%) and rainfall (161.5 mm), for the growth, yield of fruits, and glycoalkaloid content of S. khasianum in the ecological condition of North Bengal.

As the S. khasianum plants are tall, spreading and thorny, it was subjected to select a suitable spacing for growing the plants, so that maximum fruits can be obtained. Spacings of 50 cm x 50 cm, 70 cm x 70 cm, 90 cm x 90 cm, 100 cm x 100 cm, 110 cm x 110 cm and 120 cm x 120 cm were considered in the experiment. The optimum spacing distance of 100 cm x 100 cm was found to be suitable for the growth and maximum yield of fruits in S. khasianum in the ecological condition of North Bengal.

A field experiment was conducted to study the response of S. khasianum to rates of nitrogens phosphorus and potassium at three levels 0, 40 and 80 kg/ha respectively applied either singly or, in combinations. The responses of the fertilizers in connection with the growth of the plant, yield of fruits, total alkaloid and solasonine content in the fruit were observed. Soil samples of the experimental plot were analysed. The analysis of soil sample indicates that the soil is acidic, medium low in available nitrogen and phosphorus content and low in pota-

ssium. The plant height (cm), spreading (cm), total number of days taken to initiate fruit formation, total number of fruits per plant, fresh weight of the fruits per plant, dry weight of the fruits per plant, the percentage of total alkaloid and percentage of solasonine content in the fruit of S. khasianum were considered in the experiment. The plant height was found to be maximum (124.8 cm) in the combination of $N_{40}P_{40}$ doses. The significant effect on plant height was observed when N and K were applied singly. The NP, PK and NK combinations also showed significant value for the height of the plant. The spreading was observed to be maximum (163.4 cm) in $N_{40}P_{40}$ combinations. The significant value for spreading was noted by N, K, NP, PK and NK. The total number of days taken to initiate fruit formation of S. khasianum was found to be minimum in $N_{80}P_{40}$ (166 days) combinations. The significant value for total number of days taken to initiate fruit formation was observed by N, P, NP and PK. The total number of fruits per plant was noted to be maximum in $N_{80}K_0$ (461) doses. The effect of N, P, NP, PK and NK on the total number of fruits per plant was found to be significant. The fresh weight (kg) and dry weight (kg) of the fruits per plant was found to be maximum (25.6 kg; 0.62 kg respectively) in $N_{40}P_0$ doses. The significant effect of N, P, NP and NK on the fresh weight of the fruits per plant was observed. The dry weight of fruits per plant was found to be significant by the

effect of N, P, K, NP, PK and NK. The percentage of total alkaloid was maximum (5.6%) in N₈₀P₄₀ combinations. The significant effect of N, P and K (at 5% level) was observed on the percentage of total alkaloid content in the fruit. No significant effect of various combinations of NP, PK and NK was observed, on the percentage of total alkaloid content of the fruit. The solasonine content in the fruit was maximum (5.2%) in P₄₀K₈₀ doses. The significant effect of N, P (at 5% level) and K on the solasonine content of the fruit was observed. The significant effect of PK and NP (at 5% level) combinations on the solasonine content of the fruit was noted.

The effect of nitrogen on the growth performance of S. khasianum was found to be promising than the single treatments of phosphorus and potassium. Again, the effect of nitrogen in combination with phosphorus and potassium on the growth of S. khasianum was found to be better in comparison to other treatment combinations. The total alkaloid and solasonine content of the fruit of S. khasianum also increases by the application of nitrogen and phosphorus either singly or, in combinations. Potassium also showed certain effect on the solasonine content of the fruit when combined with phosphorus.