

## Kinetin reversal of salinity effect on growth and nodulation in mungbean (*Vigna radiata* L. Wilczek)

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### SUMMARY

The effect of pre-soaking seed treatment with kinetin was investigated on growth and nodulation in mungbean grown under saline condition. A progressive decrease in plant height, leaflet number, dry matter partitioning and leaf area were observed with increase in each level of salinity, created by NaCl salt, at different growth stages. The detrimental effect of salinity on these parameters was partially overcome when seeds were pre-treated with kinetin. Salinity level of 8 ds/m delayed the flowering by about 8 days as compared to control. Drastic reduction in number and fresh weight of nodules were also observed due to salinity, however, kinetin successfully reduced the stress effect up to a considerable extent by enhancing the number and fresh weight of nodules.

Key words: Salinity, Kinetin, Growth, Nodulation

Soil salinization has become one of the major problem in Indian agriculture. About 12 million hectares of land have been affected by saline and alkaline conditions in India. High accumulation of salts in the root zone depresses the plant growth as a result of high osmotic pressure between the soil and seed phases. These effects are further multiplied by the presence of some toxic ions in the root environment (Richards, 1954). Mungbean ranks high among the various leguminous crops in terms of total production and international trade. Cultivation of pulses in general and mungbean in particular in saline soil is a risk prone agriculture.

Growth regulators (GA, IAA, NAA) have been successfully used in overcoming deleterious growth effects resulting from salinity or sodicity in a number of crops (Kahane *et al.*, 1968, Balki and Padole, 1982, Bastianpillai *et al.*, 1982). However, in view of cost effective amelioration methods it is now warranted that more and more well planned experiments are conducted on salt sensitive crops like pulses using different growth regulators. The present investigation on the effect of kinetin on growth and nodulation under saline conditions is sincere efforts in the right earnest.

### MATERIALS AND METHODS

The experiment was conducted in pot culture under CRD (factorial) with three levels of salinity viz. 0, 4 and 8 ds/m and three kinetin levels viz. 0, 50 and 100 ppm and their combinations consisting of nine treatments, replicated three times. Earthen pots of uniform size (25 x 20 cm) were filled with 8 kg of dry soil having pH 8.13 and E.Ce 0.14 ds/m. 2 g of NaCl salt was dissolved in one litre of water for preparing a solution of 4 ds/m. Other salinity level (8 ds/m) was multiple of this quantity. Each pot was irrigated with 2 litres of required solution (calculated on the basis of saturation of the dry soil which was 25% ) to maintain 4 and 8 ds/m salinity. Seeds of mungbean *var.* Pant moong-2

were pre-soaked in the solution of different concentration of kinetin viz., 0, 50, 100 ppm. After allowing a sufficient time for soaking (4.5 hrs) seeds were removed from solution and were dried under shade for a period of about 40 hrs. The sowing was done when soil in the pots was worth pulverizing. Selected ten bold seeds were sown according to layout plan in each pot. Thinning was done after 15 days of sowing and only four uniform plants were maintained in each pot.

Observations were recorded on plant height, leaflet number, leaf area, dry matter partitioning and nodulation at different successive stages of growth.

### RESULTS AND DISCUSSION

With increase in salinity level, a progressive decrease in plant height, no. of leaves and leaf area (Table 1,2,3) was observed at all the three stages of growth. The maximum per cent decrease in these characters was observed at higher level of salinity (8 ds/m) in comparison to control. The detrimental effect of salinity on plant height, no. of leaves and leaf area was partially overcome when seeds were pretreated with kinetin solution. Thus, these growth characters under kinetin treatments were significantly higher than control and salt treated plants. Kinetin increased growth up to 50 ppm under all the treatments, while results at 100 ppm were at par. The reduction in growth of leaf and plant under salt stress condition may be attributed mainly to the reduced rate of cell division and cell enlargement due to osmotic effect as reported in early studies by Singh *et al.* (1990) and Tewari (1991). The beneficial effect of hormone may be the result of increased water absorption and altered metabolism leading to increased activity of hydrolytic enzymes. Similar observations have also been reported by Darra and Saxena (1973).

Increase in salinity levels resulted in a progressive and significant reduction in dry weight of leaf, stem and root (table 4,5,6 & fig.1) at different successive stages of

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