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Bio-chemical studies for adoptability of phalsa plants in salt affected soils

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Abstract **:** In sodic and saline soils, total nitrogen, phosphorus and potassium contents decreased with increasing sodicity and salinity levels in the leaves of phalsa seedlings and calcium and magnesium contents showed a decreasing trend with the increase in sodicity levels. Maximum status of these nutrients were observed in the plants grown in normal soil conditions. In saline soil, Ca and Mg showed reverse trend and their contents increased with increasing salinity levels in the seedlings. Na contents in the leaves increased with increasing sodicity levels. Minimum Na content was observed in normal. However, Na content decreased with increasing salinity levels. Chloride showed a reverse trend of Na, it decreased with increasing sodicity levels and increased with increasing salinity levels. Invariably, seedling plants contained slightly higher status of leaf nutrients. Total chlorophyll content in the leaves of seedlings decreased with increasing sodicity and salinity levels. Minimum chlorophyll content was observed in the plant at 32.00 ESP and 7.5 mmhos/cm salinity levels with maximum value in normal soil. Free proline and total free amino acids status in the leaves of phalsa seedlings increased with increasing sodicity and salinity levels. These chemical constituents also showed slightly higher content in the seedlings in comparison to budded plants.

Key words **:** Sodic and salime soils, Ca, Mg, Total chlorophyll, Total free amino acids

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Phalsa (*Grewia subinaequalis*) is an important minor fruit crop of India. It is native of Central America but has naturalized very much in India. Phalsa is a very popular fruit in our country and is commercially grown particularly in states of Uttar Pradesh, Bihar, Madhya Pradesh and Maharastra. It is a hardy fruit crop and can withstand diversity of soil and climatic conditions, where many of other fruit crops can not be grown successfully.

Because of the high nutritive and medicinal values, early bearing, wider adoptability under varying agro-climatic conditions, phalsa is the suitable fruit crop for a country like India. Therefore, there is scope of development and extension of area under phalsa cultivation, particularly for the utilization of the wastelands.

In arid and semi-arid regions of the world, sodicity and salinity are the major problems, may be one of the reasons for the decline of phalsa plants in later stage of its life. In the world, nearly one third of irrigated area is affected by these salts. In India, about 7 million hectares of land is affected by sodicity/salinity and it is increasing every year at a rapid rate. Apart from coastal area, the worst affected area are the Indo-Gangetic plains of U.P., Haryana, Punjab and Rajasthan. Total area of salt affected soils in Uttar Pradesh alone is about 1.295 million hectares. At present these areas are either barren or partly utilized for cultivation of rice.

The reclamation cost of such soils is high and it is very difficult to reclaim such soils for fruit cultivation because it is a long term process. The present reclamation process is confined to the upper horizons of the soils, while most of the fruit crops have deeper root system. Hence, the present process of reclamation may not hold good for the cultivation of fruit crops. Under these circumstances, there is only possibility to do careful selection of salt tolerant, hardy fruit crops and standardization of agro-techniques for their cultivation in the salt affected soils. However, no systematic information is available on the extent of the tolerance limit of