

**Poplar salt, biogenic minerals found at the cut section of *Populus diversifolia* around desert area, Xinjiang, NW China
-Its formation mechanism and physiological features of salt tolerance-**

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Summary

Populus diversifolia is a halo-tolerant plant forming predominant vegetation on the flood lands in desert peripheries in Xinjiang, NW China. A white-colored, massive salt material named "poplar salt" is produced at the mechanically damaged parts as well as the cut section of branches. To investigate the formation mechanism of poplar salt, we chose 10 poplar trees at northern and southern banks of Tarim River and collected sap samples in April, June and August 1998 by using hole-drilling sap-tapping method. Tapping rate of poplar sap was very slow, and pH of the sap was quickly changed from neutral to basic after they were exposed to the atmosphere. In the case of leaf juice, of which pH was slightly acid, pH was not changed.

[Chemical composition of sap samples]

The results of chemical analysis of poplar sap show that dominant anions are carbonate and bicarbonate and dominant cations are sodium>potassium>magnesium>calcium. In the case of leaf juice, dominant anion is chlorine and dominant cation is potassium. Total cation concentration exceeds total anions.

[Capillary Electrophoresis]

Analysis results of capillary electrophoresis revealed that poplar sap contains only acetate as organic acid. On the contrary, leaf juice contains various organic acid such as formate, malate, citrate, succinate and acetate. Acetates of alkaline and alkaline earth elements possibly take important part in the formation of carbonate and bicarbonate of poplar salt.

[The origin of carbonate and hydrogen carbonate of poplar salt]

There are three possibilities about the origin of carbonate and hydrogen carbonate ions of poplar salt: 1. *Populus diversifolia* takes carbonate and hydrogen carbonate ions from groundwater and secretes them from its salt glands. 2. Some organic compounds decompose to carbonate or hydrogen carbonates. 3. When secreted sap is exposed to the air, organic acid is decomposed and the excess alkaline and alkaline earth elements absorb carbon dioxide from the atmosphere. Our experimental results support the third possibility as the most likely origin, and acetate is supposed to play important role to the formation of poplar salt.