# 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 torelance-

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## Summary

*Populus diversifolia* is a halo-tolerant plant forming a 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. We made chemical and mineralogical approach to the poplar salts from Luntai in Tarim Basin and from Kuitun in Zhungar Basin.

[Chemical composition]

The results of chemical analysis show that dominant anions are carbonate and bicarbonate in both samples but dominant cations are quite different . In poplar salt from Luntai, sodium and potassium are dominant cations and most salts are soluble. On the contrary, poplar salt from Kuitun contains calcium as dominant cation, then followed by potassium and magnesium and sodium. This means main salt minerals are not easily soluble.

[Mineralogical study]

X-ray diffraction analysis and elemental analysis by EPMA suggest the existence of following evaporite minerals. trona [$Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$]、sylvite [KCl]、baylissite [$K_2CO_3 \cdot MgCO_3 \cdot 4H_2O$]、eitelite [$Na_2CO_3 \cdot MgCO_3$]、calcite [$CaCO_3$] in poplar salt from Luntai and gaylussite [$Na_2CO_3 \cdot CaCO_3 \cdot 5H_2O$]、monohydrocalcite [$CaCO_3 \cdot H_2O$]、calcite [$CaCO_3$]、$KHCO_3 \cdot MgCO_3 \cdot 4H_2O$、dypingite [$4MgCO_3 \cdot Mg(OH)_2 \cdot 5H_2O$]、lansfordite [$MgCO_3 \cdot 5H_2O$]、nahcolite [$NaHCO_3$]、natrite [$Na_2CO_3$]、thermonatrite [$Na_2CO_3 \cdot H_2O$]、sylvite in poplar salt from Kuitun.

[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, but the second one cannot be totally excluded.