

The purpose of this laboratory investigation was to experimentally determine the  $K_{sp}$  value of cream of tartar (KHT), and to find the  $K_a$  value of the Hydrogen Tartrate anion (HT). with the purpose of delivering these results to a group entrepreneurs seeking a method of baking without using an oven. By titrating a NaOH solution of known concentration into a saturated solution of KHT and observing changes in pH, it was possible to determine the value of  $K_{sp}$  for KHT. This value was found to be  $1.14 \times 10^{-3}$ . From the same data, the value of  $K_a$  for HT could be found, and was calculated at several points along the titration curve generated for this investigation. The average of these calculated values was found to be  $9.57 \times 10^{-5}$ .

The values found for  $K_{sp}$  and  $K_a$  for KHT and HT respectively during the course of this investigation were quite low at standard temperature and pressure. Potassium Hydrogen Tartrate is fairly insoluble under standard conditions, and its associated anion Hydrogen Tartrate undergoes little dissociation when dissolved in water. This means that the leavening effect observed in baked goods containing cream of tartar that are exposed to heat during baking would be much less pronounced at room temperature. The  $CO_2$  producing reactions that result in this leavening effect will no doubt still occur, though at a much slower rate. It is unclear whether the added time requirements for a heat-free pastry production process would outweigh the savings in baking costs, but it may be wise to consider alternative leavening agents that have greater reactivity at room temperature.

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