P R E F A C E

The work recorded in this thesis includes the studies on (1) recovery of mixed salt, a fraction containing 18 - 20 per cent potassium chloride by solar evaporation of sea bittern, (2) utilisation of mixed salt to obtain potassium chloride and potash alum and (3) recovery of potassium chemicals (e.g potassium nitrate) directly from sea water and bitterns by using hexanitrodiphenylamine (dipicrylamine) as selective precipitating agent. Laboratory studies are extended to field scale trials successfully in harvesting mixed salt in solar salt works. The pilot plant studies are carried out to collect the required data and to find out the economic feasibility of the developed processes for manufacture of (a) potassium chloride along with magnesium sulphate and sodium sulphate and (b) potash alum and are described along with laboratory results, in each chapter.

The entire investigation presented in this thesis is my original contribution to the advancement of knowledge and the work is based on the discovery of the following new facts by me:

(1) Details of harvesting mixed salt fraction rich in potassium chloride from solar evaporation of sea bitterns are worked out for the first time. Recycling of magnesium chloride (36° Be' bitterns) and addition of dye to precipitate mixed salt at earlier densities and accelerate the rate of evaporation and methods to control quality of mixed salt are the new facts in the by-product recovery of solar salt technology from sea. Studies on storage

of mixed salt and high density bitterns are also reported for the first time.

2) The hot extraction of mixed salt by using 36° Be byproduct bitterns to obtain potassium chloride in presence of large amounts of magnesium sulphate is a new process which makes it possible to obtain potassium chloride from mixed salt without desulphatation or addition of any other chemicals along with byproducts namely epsom salt and sodium sulphate.

3) New potash alum process from mixed salt is simple and suitable for small scale salt works. The entire potassium of the mixed salt is converted to potassium sulphate at the expense of magnesium sulphate which is also present in the mixed salt and is recovered as a valuable chemical potash alum.

4) Details of the manufacture of potassium nitrate from sea water (or bitterns) by using selective precipitating agent are reported. Thus a cheap marine source of potassium is utilised for the first time to recover valuable chemicals. The application of known solubility data on oceanic salts are made and where such data are not available, solubility studies are carried out and utilised for the development of the above processes.

The sources on which this work is based are referred to in the text and also clearly indicated in the bibliography.

The results and discussions are entirely original and based on research carried out by me as presented in this thesis.

I declare that for the thesis which I am submitting no degree or diploma or distinction has been conferred on me before either in this or in any other university.

I am grateful to Dr.K. Seshadri without whose guidance and help it would not have been possible to carry out this work. I am thankful to my colleagues who assisted me in carrying out the large scale experiments.

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