

## 8.0 SUMMARY

Chidambaranar District ( $8^{\circ}50'N$  -  $78^{\circ}08'E$ ), one of the districts lying in the south east coastal region of India, has about 5753.6 ha of salt pan, starting from Kayalpattinam in the southern side to Melmanthi in the northern end of the district in a stretch of about 65 km length. These salt works vary in their ecological, geological and hydrobiological characteristics. In addition to the variation due to the above said characteristics several chemical industries in and around Tuticorin area also pollute the environment. The variation and the fluctuation of ecological, geological and hydro-biological characteristics have great influence on salt and *Artemia* production in terms of quantity and quality. The population of *Artemia* has been reported in several salt pans of chidambaranar district. But the quality of cyst produced from the salt pan differs from location to location, and in some cases the cysts were not hatching eventhough they were processed properly. Eventhough the environment is conducive for *Artemia* production, the population of *Artemia* is not distributed in all places. More over the salt produced in the salt works of chidambaranar district has been reported poor in their quality even as early as 1920. As *Artemia* has

been reported to improve the salt quality, the present study was undertaken on the ecological aspects of the salt pans of this district in order to explore the possibilities of utilizing the suitable area of salt pans of chidambaranar district for production of *Artemia* and high quality salt. The findings of the present study are summarized hereunder :

- 1) In chidambaranar district there are 11 licensed salt works with the total area of 3467.2 ha. Among the salt works Kayalpattinam has the vast area of 964 ha followed by Veppalodai, Melmanthi, Urani extension, Urani, Seventhakulam, Karappad, Levinchipuram, Arasaradi, Vaipar and Vembar in that order.
- 2) In addition to the licensed salt works 2286.4 ha of non-licensed area are also available in this district with 12 stations ranging from 6.4 to 1000 ha. The present research study has been restricted to the eleven licensed salt works only due to the following reasons :
  - (i). The private non-licensed salt works did not permit to do the salt and *Artemia* production research in their farms.
  - (ii). Moreover, the non-licensed areas are also lying only in and around the licensed salt works and hence the

general scope of the study has not been much affected.

- 3) Of the 11 licensed salt works only five are using sea water. They include Veppalodai, Vaipar, Melmanthi, Vembar and Kayalpattinam salt works. In Veppalodai and Kayalpattinam, in addition to sea water, the salt works use underground water with the maximum salinity of 160 ppt and 90 ppt respectively. Levingipuram salt works use 72 – 100 ppt, Seventhakulam salt works use 78 ppt salinity, Karapad salt works receive the salinity between 50-100 ppt, Urani salt works use 50-70 ppt, Urani extension receive 100 ppt and Arasaradi salt works use 50 ppt of underground water for salt production purpose.
- 4) In these salt works the depth of the reservoirs is maintained between 20 and 105cm. The condenser depth is maintained between 8 and 15cm; and the crystalliser ponds are maintained between 3 and 8cm.
- 5) The physicochemical parameters such as temperature, humidity and salinity of the ponds were studied starting from October 1996 to September 1998. The physicochemical parameters especially the temperature and salinity of the reservoir, condenser, and crystallisers were found changing with the season in the different salt works.
- 6) The proportion of the reservoir, the condenser and crystalliser used for salt production in proportion to salinity of water intake

varied. Most of the salt works are not using the proportion of the area according to the standard brine density.

- 7) The salt produced in the salt works fluctuated between 0.48 and 41.7 ton/ha/month. The lowest average production recorded was 2.63 ton/ha/month in Vembar salt works and the highest average salt production was 36.0 ton/ha/month in Veppalodai salt work.
- 8) Among the salt works Veppalodai salt works receiving the sea water produced the salt with the highest quality (97.3%). When the underground water was used along with the sea water, the quality was reduced to 96.73%. Among the salt works Urani salt works produced very low quality of salt (93.46% NaCl).
- 9) The results on the quantity of salt produced reveal that the salt production was not only depending on the initial brine used but also the salt production pattern followed such as lay out of the salt pan, retention time of the brine in different condenser ponds and timely scrapping of salts to eliminate the impurities without affecting the salt formation
- 10) The poor quality of the salt was due to the poor quality of the brine, which were rich in other salts such as Magnesium and Calcium. The brine water supplied contains sodium chloride ranging between 74.24 and 79.86%. Salt pans, which receive sea brine, could produce salt with higher sodium chloride content.

- 11) *Artemia* population was recorded in five salt works viz. Karapad, Vaipar, Veppalodai, Melmanthi and Kayalpattinam.
- 12) In all these five salt works only the parthenogenetic *Artemia* population was observed. Mean diameter of the cysts, collected in these salt works ranged between 264 and 288  $\mu\text{m}$ ; hatchability of the cyst ranged between 12 and 48%.
- 13) *Artemia franciscana* was inoculated by Delphin Aqua salt Company in 0.1ha pond fertilized with organic and inorganic manure. In addition to the manure, rice bran was supplemented at the rate of 40 kg/ha/month once in 10 days. Increase in salinity (130ppt) and reduction in oxygen content (1.5mg/l) induced cyst production. About 4.2 kg/ha/month cyst was produced during the culture period by this private enterprise. The cysts produced were measured about 221 $\mu\text{m}$ , with 32 % hatchability.
- 14) The results obtained were discussed with an aim towards an integral approach in salt and *Artemia* production and emphasis has been given for improving the quality and quantity of sodium chloride by biological management.