

ABSTRACT

In the conventional oxidation pond method of aerobic secondary treatment of sewage, there are two operational stages; the first stage of non-changing environment when algae are allowed naturally to develop for photosynthetic oxygenation, and the second stage of changing environment when the inflow of settled sewage and outflow of purified effluent are allowed to operate at a particular rate of flow or detention period.

In this thesis an attempt has been made to make a detailed study of the first stage of the non-changing environment of lagooned sewage. Even in this first stage one can discern two distinct phases; bacterial phase I and algal phase II. During the bacterial phase I a viscous scum or slimy layer is formed which soon disintegrates. The structure and activity of the aerobic heterotrophic bacterial populations, the primary workers in the two phases are not known and therefore were studied under laboratory conditions in a glass aquarium on 0,4,7,14,21 and 28th day using a representative sample of Baroda settled sewage. Sewage agar was used as a non-selective medium for isolation of the bacterial strains. Changes taking place in the bacterial populations, in the soluble organic constituents, in the physico-chemical and biological conditions including algae and protozoa were also studied along with the viscous scum formed at the surface. The inter-relationships existing among them, the algal-bacterial symbiosis as well as the mechanisms of sewage purification in the oxidation pond method are discussed.
