CHAPTER - 2

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In the following review of literature, priority has been given to mention recent works as compared to older references, which are available in the books and research publications mentioned in the review.

The work of Oswald (1963) proved that wastewater stabilization pond for treatment of domestic wastewater as one of the most inexpensive methods for treating/removing nutrients from domestic wastewater in small communities. Dinges (1978) has worked on the use of macrophytes for treating wastewater to remove nutrients. The study of Bastin and Hammer (1993) in dynamics; cycling and storage of nutrients established the basis for studies in wetlands, where transformations from effluents in to various kinds of biomass takes place. Brix (1993) defined an effluent treatment system based on aquatic macrophytes as natural process, where the plants play the principal role in the removal and long-term storage of residues from anthropogenic origin.

Reddy and D' Angelo (1997) stated that understanding of the functioning of these “natural systems” with respect to the reduction of pollutants has greatly increased in the last few years. Earlier to that few researches have been made on nutrient removal through aquatic macrophytes from water by Indian investigators like Kaul et al. (1980), Reddy and Debusk (1984, 1985), Tripathi et al. (1991), Saha and Jana (2002) and Gendy et al. (2005).

Wastewater treatment potential of some aquatic macrophyte was studied in India by Jain et al. (1978), Chapekar et al. (1983), Rathia et al. (1992), Chandra et al. (1993), Rai et al. (1995), while abroad similar investigations have been carried out by workers like Boyd (1970,1976), Stewart (1970), Rogers and Davis (1971), Culley and Epps (1973), Harvey and Fox (1973), Peterson et al. (1974), Sutton and Orens (1975), Wolverton et al. (1975), Cornwell et al.


Aquatic plants used to remove nutrients from sewage has been investigated by Sutton and Orens (1975), Wolverton et al. (1975), Mitchell (1978), Finlayson et al. (1982), Chapecar et al. (1983), Goel et al. (1985), Debusk and Reddy (1987), Wu et al. (1993) and Rai et al. (1995), while the similar studies have been made on domestic wastewater by workers like Witt (1963), Clough et al. (1987), Debusk et al. (2001) and Gendy et al. (2005).


Phytoaccumulation and bioremediation studies have been done by workers like Raskin et al (1994), McCutcheon et al. (1995), and Zayed (1998).
Phytoremediation study for removal of heavy metal was done by workers like Pinto et al. (1987), Dushenkov et al. (1995), Raskin and Ensley (2000). Boyd (1970) reported that the lagoons with floating aquatic plants such as water hyacinth and duckweed have been used for nutrient removal since the seventies and Huub and Siemen (1998) reported that currently it is largely in use for the treatment of municipal wastewater in Asia.


Similarly, treatment of dairy wastewater with *Lemna* was done by Culley et al. (1981). Treatment of raw and diluted domestic sewage have been investigated by workers like Sillicom et al. (1993), Mandi (1994). Economic use of harvested duckweed has variable results as found by Edward et al. (1992).

BOD and COD removal through duckweed system was studied by Oron et al. (1987), Zirschky and Reed (1988), Boniardi et al. (1994), Mandi (1994), Alaerts et al. (1996) and Korner et al. (1998).

have investigated the treatment potential and improvement of wastewater quality by water hyacinth.

Water hyacinth was used for the treatment of textile industry wastewater by Trivedy and Gudekar (1987). Direct influence of temperature on the absorption capacity and on productivity of *Eichhornia crassipes* and *Salvinia auriculata* was studied by Cary and Weerts (1983b, 1984), and Fisher and Reddy (1987).

*Hydrilla verticillata* was used by Sinha *et al.* (1993) for the uptake of Cr and Mn from wastewater, while Sinha and Chandra (1990) had investigated removal of Cu and Cd from water by using *Bacopa monnieri*. Sewage treatment by using *Salvinia molesta*, a pteridophytic aquatic plant was investigated by Finalayson *et al.* (1982) and Abbasi and Nipaney (1985).

Comparative study on nutrient removal through aquatic plants have been made by workers like Petrucio and Esteves (2000), Maria *et al.* (2002), Saha and Jana, (2002) and Sooknah *et al.* (2004).


Nutrient removal through water lettuce (*Pistia stratiotes*) was investigated by Aoi and Hayashi (1996) and Sooknah *et al.* (2004), while Room (1986) investigated the uptake of nitrogen by *Salvinia molesta* from wastewater.

Some of the workers have investigated the removal of heavy metals by using algal system like Cain *et al.* (1980), Rai and Chandra (1989, 1992). While
bacterial system for treatment was studied by Iza et al. (1991), Krippenberg et al. (1993), Veenstra et al. (1995). Influence of nitrogen and phosphorus supply rates on growth and nutrient storage by water hyacinth was investigated by workers like Reddy et al. (1989, 1990).
