CHAPTER -3

OBJECTIVES

The dissolving pulp industry, spread throughout the world, is the principal source of the wood-hydrolysate effluent, rich in hemicelluloses. The wood-hydrolysate, which is generated at the rate of 5-6 m$^3$ per ton of pulp, is the major source of pollution in the industry. About 90% of the COD load in the pulp mill comes from the wood-hydrolysate itself in which a large amount of energy is embedded. The two diverse goals, i.e. reduction of pollution load and generation of energy can only be achieved by anaerobic treatment of the effluent in an efficient way. In view of the above, the objectives of the present study are focussed on the understanding of the theoretical aspects of the biphasic biomethanation of wood-hydrolysate effluent, so as to develop a practicable technology for the treatment of the said effluent. These are:

i) Study of the acidogenesis of the hemicelluloses present in the wood-hydrolysate effluent in upflow reactor

ii) Study of the inhibitory effect of the substances, for instance lignin, present in the wood-hydrolysate, and products like low molecular weight volatile fatty acids - acetic, propionic and butyric acids- on acid producing reaction (acidogenesis)

iii) Study of the effect of volatile fatty acids and lignin, or lignin derivatives on methanogenesis.
iv) Study of the effect of COD loading on acidogenic and methanogenic phase reactions.

v) Maximization of the COD reduction vis-a-vis methane generation using biphasic reactor configuration and compare the performance with mono-phasic reactors.