

A SURVEY ON EFFLUENT TREATMENT SYSTEMS OF RUBBER FACTORIES IN VIETNAM

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The effluent treatment process used in rubber processing industries in Vietnam comprises pond, aerated lagoon, DAF, UASB, chemical precipitation, SBR, septic tank, conventional activated sludge and trickling filter. The treated effluent was found to have COD, BOD and ammoniacal nitrogen on an average of 876, 322 and 50 mg/l respectively. These effluent qualities do not comply with Vietnam industrial wastewater standards. Besides, malodour and ground water contamination are the other principal drawbacks. Improvements in the system are therefore, imperative.

Key words: Effluent treatment, Rubber effluent, Water pollution.

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INTRODUCTION

With a total rubber growing area of about 350000 ha during 2000, Vietnam has plan for further expansion to 700000 ha by 2010. The processing of rubber from such a large area will produce about 30 million m³ of effluent annually. Effluent treatment systems have been installed at rubber processing factories in Vietnam since early 1990s. The existing state of effluent treatment technology available for rubber factories in the country, however, has to be improved for which advanced technologies are necessary (Kroiss, 1994). This study, based on a survey of 27 rubber processing factories, attempts to provide a detailed account of the prevailing conditions in the rubber factories in Vietnam, in order to evolve a more efficient method for rubber effluent treatment.

EXPERIMENTAL

Of the 38 rubber processing factories in the country, only 27 factories have installed effluent treatment systems. Four visits were made to these 27 factories during February, May, August and November 2000. Data regarding (i) system design parameters, (ii) system operational procedures and (iii) public concerns of system operation were collected

using questionnaires. Effluent samples were collected from each factories and analysed for (i) raw effluent characteristics, (ii) effluent characteristics after each stage in the system and (iii) operational features of the system.

Composite samples were taken from the effluents, before and after being treated, at different stages in the systems and analysed for chemical oxygen demand (COD), biochemical oxygen demand (BOD), total Kjeldahl nitrogen (TKN), ammoniacal nitrogen (AN), total suspended solids (TSS) and pH for evaluation of effluent characteristics. Spot samples were taken from the effluents being treated in reactors and analysed *in situ* for dissolved oxygen (DO), mixed liquor suspended solids (MLSS), mixed liquor volatile suspended solids (MLVSS), sludge volume index (SVI) and pH for the evaluation of operational features, according to types of treatment. Sample collection, preservation and analysis were conducted following standard methods (APHA, 1992).

RESULTS AND DISCUSSION

Characteristics of rubber effluents

General characteristics of the rubber effluents in Vietnam are summarised in