

Development of medium scale waste water treatment plant for parboiled rice

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Rice processing industry is the largest agro-based industry in the country turning more value of product than any other industry. Mainly two types of rice called raw and parboiled; famous among the local community. The rice milled from pre-treated paddy is known as parboiled rice. Parboiling is a hydro-thermal treatment followed by drying before milling for the production of parboiled grains. Nearly 70 percent of the paddy produced in Sri Lanka at present is parboiled. Two dominant wastages are released to environment in parboiled rice milling namely, soak water and paddy husks. For one metric ton of paddy, approximately 1.3 m³ of soaked water and 0.2 tons of paddy husk are released to environment and soaked water is discharged to the environment without being treated. Due to this, bad odour is prevailed in the vicinities of the mills. In addition, paddy husk and ash dumps are washed away with rain to the waterways. To minimize bad smell, millers are advised to change soaking water every 10-12 hours. Even though soaking water is changed every 12 hours time COD and BOD₅ levels of releasing water are higher than the values set by CEA. Therefore, sustainability of this industry relies addressing the waste streams in a productive manner. Therefore in this research cleaner production principle is adapted to minimize the waste generated by attacking the point of generation. Industrial Ecology concept is adapted by using by product (waste) of the process, paddy husk as a fuel initially to operate the boiler and later ash of the husk as filtering media of wastewater. In addition, steam generated by burning paddy husk will be partly used to rotate biological rotating disk which facilitate aerobic reaction. Treatment process consists of two stages and in the first stage, BOD value is reduced by aerobic digestion with the help of rotating biological contractors (RBC) and in the second stage pre-treated wastewater sent through a carbon filter in order to reduce COD. Result shows that treatment process gives promising results of the COD and BOD₅ from 98 ml/l and 1676 ml/l up to 24ml/l and 241ml/l , respectively. Therefore treated water can be re-used for soaking purposes again.