THESIS TITLE : FEASIBILITY STUDY OF UTILISING INDUSTRIAL WASTEWATER FOR AGRICULTURE USING ELECTRICAL CONDUCTIVITY (EC) AND pH AS THE INDICATING PARAMETERS

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ABSTRACT

A series of study was conducted to investigate the feasibility regarding agricultural use of untreated industrial wastewater after which its EC (Electrical Conductivity) and pH were pre-adjusted below 1 mS/cm for EC and 7.0 for pH before use. Two sources of untreated industrial wastewater were used for the study, the first from KhonKaen Tapioca factory and the second from Thai Nam Thip Beverage factory. The whole experiment comprised 3 sub-projects; i e 1. Effect on the plants; (1.1 Effect on seed germination and seedling establishment, 1.2. Effect on plant growth (pot experiment), 1.3 Effect on plant growth (field trial); 2.Effect on soil chemical properties and 3. Effect on soil microbial activity.

The results obtained indicated that seed germination dropped significantly in the treatment which adjusted and unadjusted untreated wastewater were used compared with normal water. The plant seedlings supplied with raw untreated wastewater were severely affected. However, the seedling survival was clearly improved when the wastewater whose EC and pH were pre-adjusted was used eventhough the plant establishment was significantly poorer than normal water. The results of the pot experiment and field trial followed the same trend i e the survival and growth

performance of the plants tested were severely affected when raw untreated wastewater was used . Such the affected was clearly reduced when the adjusted untreated wastewater was supplied to the plants. Regardless of the treatments imposed, the plants showed positive response to the application of 15-15-15 mixed chemical fertilizer. Plants height, fresh and dry weights were doubled compared with those grown without addition of the chemical fertilizer. The results also indicated that EC and pH of the soils supplied with raw and pre- adjusted untreated wastewater increased significantly compared with the soils receiving normal water. The increase of soil nitrogen was observed in the treatment which the untreated wastewater from the tapioca factory was used while the soils nitrogen in other treatments decreased compared with the soils supplied with normal water. The same observation was also recorded for soil potassium. It was also revealed that soil microbial activities measured from the amount of CO_2 evolved were significantly increased in the treatment supplied with both raw and pre-adjusted untreated wastewater from the tapioca factory. Such the activity decreased in the soils receiving raw and pre-adjusted untreated wastewater from Thai Nam Thip Beverage factory compared with normal water. Maximum microbial activities were recorded in the first week followed by a marked decline in the second and third week.