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TREATMENT OF DAIRY SOILED WATER USING A WOODCHIP FILTER

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ABSTRACT Agricultural activities are main sources of nutrient inputs to European waters and, as a result, land spreading of dairy soiled water (DSW) is highly regulated by the EU Nitrates Directive (91/676/EEC) and the Water Framework Directive (2000/60/EC). Therefore smart, economical, low maintenance and green technologies for treating DSW merit investigation. This study on treating DSW investigated the performances of woodchip filters at three filter depths (0.5 m, 1.0 m and 1.5 m) - each with three replicates – and at two substrate loading rates. The filters comprised de-barked Sitka Spruce (*Picea sitchensis)* woodchips in 300 mm diameter columns. Dried DSW was reconstituted to 1 % (S1) and 3 % solids (S3) suspended solids (SS) concentrations and each DSW was applied to one set of 9 woodchip filters. The filters were loaded 3 times daily with 0.67 l of reconstituted DSW at a top surface hydraulic loading rate of 28 l/m^2/d for 277 days (S1) and 197 days (S3). Average DSW influent concentrations were 12,167 mg chemical oxygen demand (COD)/l, 10,000mg SS/l and 235 mg total nitrogen (TN)/l for S1 and 34,418 mg COD/l, 30,000 mg SS/l and 542 mg TN/l for S3. Average SS, COD and TN removals of 99%, 95 % and 88 %, respectively, were achieved by the filters at both DSW loading rates, indicating that a filter depth of 0.5 m-1.0 m might be adequate for the high DSW loading rate. Pilot scale filters using on-site DSW are currently being investigated with early results proving positive.

Keywords: Dairy, soiled water, woodchip filter, filtration, nitrogen removal

APPENDIX A

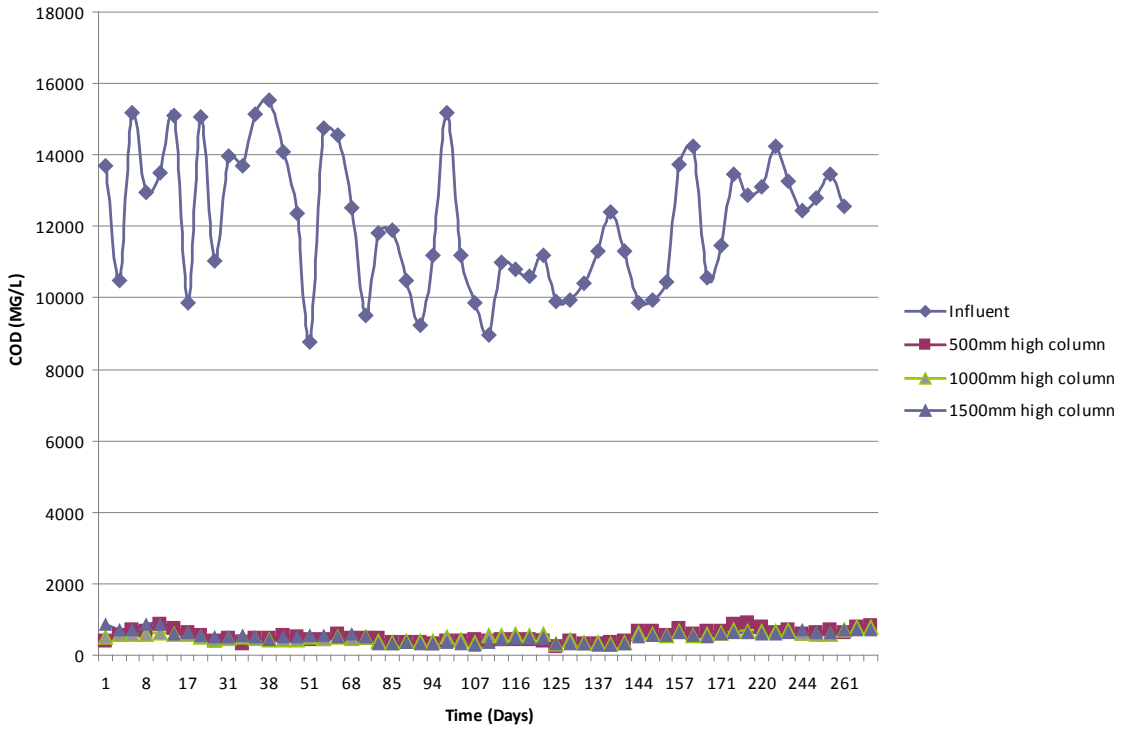

Figure 1. COD concentration over 277 days for S1

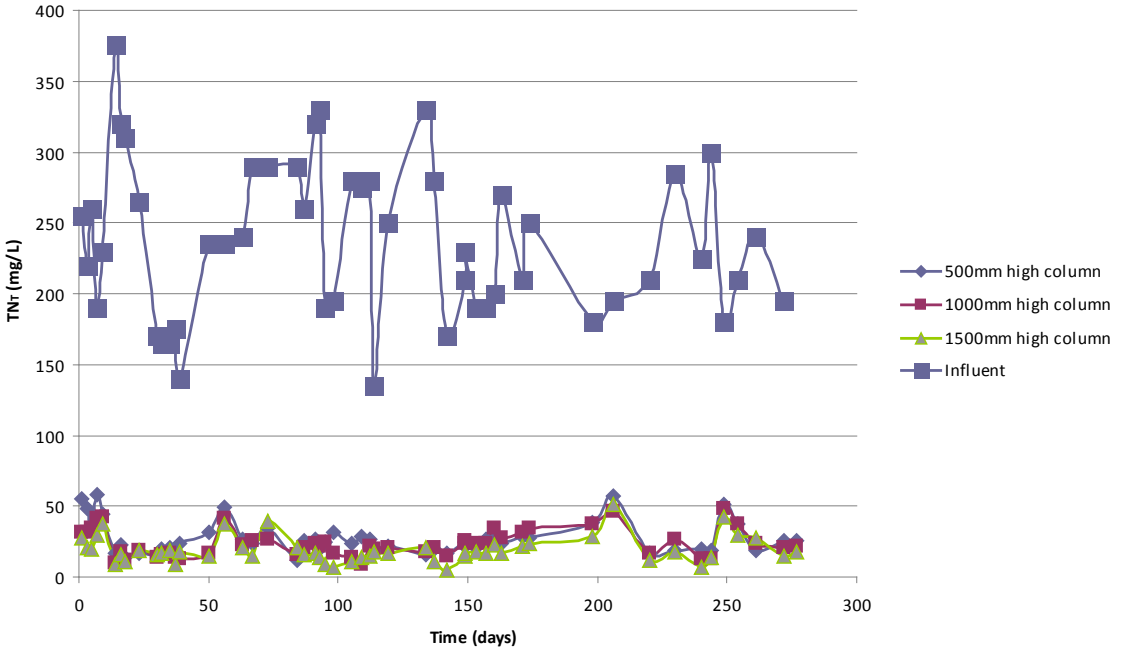

Figure 2. TN concentration over 277 days for S1