**A Three-Stage, Completely Sustainable Process Addressing Industrial Water Waste Treatment Management**

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**Abstract:** A detailed study regarding the optimization of a complete system for the purification of water waste is presented. Three main concerns are addressed: the nature of the absorbing material, the efficiency dependence on scale and the management of the final waste of the assembly. These three points have to be optimized in the best acceptable way from an environmental point of view.

The absorbance of methylene blue on continuous flow columns of different sizes and absorbent materials was compared. Pine spruce, sea weed, lentil spruce and coffee residues were utilized as absorbents. The column length varied from 15 to 35 cm and flow rates varied from 0,5 to 40 ml/min. The most efficient absorbent is coffee residues, an abundant urban waste. Subsequently, the wet filling material, comprised of the absorbent and the absorbed dye, was buried in dry soil, promoting soil bacterial and fungal growth. The absorbance of CO2 was determined.

The use of natural vegetative material as absorbents of chemical dyes in industrial water waste is an environmentally friendly solution. In combination with the utilization of the final solid waste as fertilizer, is an optimum solution, promoting sustainability within an industrial ecology framework.

Key – words: water waste treatment, absorbance, bioavailability, industrial ecology