

## Breaking Carbon Bonds of the Colors Existing in the Industrial Wastewaters and Color Reduction by Plant-Based Coagulants

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**Abstract:** Colored effluents destroy aquatic lives because of existing non-biodegradable aromatic hydrocarbons which lead to serious threats for human and environment. Using chemical coagulants for industrial wastewater treatment is one of the conventional methods which, secondary pollution caused by residual sludge, limited removal of dissolved organic carbon in wastewater, high volume of sludge and bad effect on human health has faced a challenge applying this type of coagulants. Therefore, the purpose of this research is the production of coagulants using available and local plants, including *Spinacia oleracea* and *Hibiscus cannabinus* as eco-friendly coagulants which are able to remove these hard to treatment pollutants by breaking carbon bonds in aromatic rings as the main components of the colors' chemical compounds existing in industrial wastewaters. The plant extracts of *Spinacia oleracea* and *Hibiscus cannabinus* were obtained through maceration method (soaking and shaking the plant seeds in water at a given time) and 5 doses of 50, 100, 200, 500, and 1000 mg/L of plant coagulants were prepared. In this research, the coagulants were used to treat the real-colored industrial wastewater. In the optimum treatment conditions of 100 mg/L coagulant dose and pH 7, high color reduction (>74%) were obtained by both plant extracts (plant coagulants). FT-IR spectra were performed on the plant extracts to identify the existing carbon destruction agents in active extracts. It should be mentioned that the only applied solvent for extracting the natural coagulant seeds was distilled water, and none of the other solvents such as NaCl and NaOH were used.

**Keywords:** Carbon bonds, Plant coagulant, Color reduction, Aromatic hydrocarbons, Colored effluents.