SUMMARY AND CONCLUSION

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In this study an attempt has been made to prepare a low- cost adsorbent from the pods of Leucaene leucocephala and it is employed for the removal of Crystal Violet dye from an aqueous solution and also from a dyeing industrial effluent. The efficiency of Crystal Violet dye removal by the low- cost adsorbent prepared and used in this study was compared with that of the commercial activated carbon. The present study revealed the following:

- ✓ The activated carbon derived from the pods of Leucaene leucocephala can be used as an efficient adsorbent for the removal of Crystal Violet dye from an aqueous solution and as well as from a dyeing industrial effluent.

- ✓ The percentage removal of Crystal Violet dye increased from 42.61 to 72.07 with the adsorbent ALL and from 59.64 to 94.48 with the adsorbent CAC in 180 minutes of contact time, when the initial concentration of Crystal Violet dye solution used was varied from 300 to 150 mg/L.

- ✓ An increase in the percentage removal of Crystal Violet dye from 39.86 to 47.54 with the adsorbent ALL and from 47.11 to 55.74 with the adsorbent CAC in 180 minutes of contact time, when the initial concentration of Crystal Violet dye solution (obtained from a dyeing industrial effluent) was varied from 200 to 100 mg/L.

- ✓ Removal of Crystal Violet dye increases with increase in pH. It was found that the percentage removal of Crystal Violet dye increased from 37.80 to 46.45 with the adsorbent ALL and from 65.77 to 71.14 with the adsorbent CAC for the variation of pH from 5.0 to 9.0 at 32^0 C in 180 minutes of contact time using 200 mg of the adsorbent ALL and 50 mg of the adsorbent CAC respectively.

- ✓ The percentage removal of Crystal Violet dye increased from 46.45 to 53.70, when the adsorbent ALL dosage was varied from 200 to 500 mg. Similarly the percentage removal of Crystal Violet dye increased from 71.14 to 97.87 with the adsorbent, CAC when its dosage was varied from 50 to 125 mg in 180 minutes of agitation time at 32^0 C and at pH 9.0 ± 0.02 using 300 mg/L of the Crystal Violet dye solution.

- ✓ The percentage removal of Crystal Violet dye increased from 45.79 to 55.01 with the adsorbent ALL and from 69.80 to 78.73 with the adsorbent CAC as the temperature was varied from 295 to 315 K using 200 mg of the adsorbent ALL and 50 mg of the adsorbent CAC respectively at pH 9.0 ± 0.02 when the initial concentration of Crystal Violet dye solution used was 300 mg/L.

- ✓ The adsorption kinetics of Crystal Violet dye onto the adsorbents ALL and CAC followed the first order Lagergren rate equation.

- ✓ The Elovich plots of 'ln t' Vs 'q_t' (amount of CV dye adsorbed at time't') gives a linear relationship. The higher Correlation coefficient (r) shows the successfulness of the Elovich model used in this study.

- ✓ The Intraparticle diffusion plots of '$t^{1/2}$' Vs 'q_t' are straight lines, but not passing through the origin and this indicate some degree of boundary layer control and further shows that the intraparticle diffusion is not the only rate- limiting step for the adsorption of Crystal Violet dye with both the adsorbents used in this study.

- ✓ The linear plots of Langmuir adsorption isotherm (l/Ce Vs m/x) obtained in this study shows that the adsorption of Crystal Violet dye using activated carbon prepared from the pods of Leucaene leucocephala and Commercial Activated Carbon followed Langmuir adsorption isotherm. The favourable R_L values showed the feasibility of the adsorption process at all initial concentrations of aqueous solution of Crystal Violet dye and dyeing industrial effluent containing Crystal Violet dye throughout the adsorption study of 180 minutes.

- ✓ Freundlich adsorption isotherms obtained by plotting log Ce Vs log x/m were linear, shows that the adsorption of Crystal Violet dye using activated carbon prepared from the pods of Leucaene leucocephala and Commercial Activated Carbon followed Freundlich adsorption isotherm.

- ✓ The favourable values of 1/n (less than one) showed the feasibility of the adsorption of Crystal Violet dye from aqueous solution and also from a dyeing industrial effluent throughout the adsorption study of 180 minutes.

- ✓ The percentage removal of Crystal Violet dye was 42.61 and 59.64 with 200 mg of the adsorbent ALL and 50 mg of the adsorbent CAC respectively when the initial concentration of Crystal Violet dye solution used was 300 mg/L in 180 minutes of contact time at 32^0 C. The higher removal of Crystal Violet dye with the Commercial Activated Carbon (CAC) may be due to the higher surface area of the Commercial Activated Carbon compare to that of the low- cost adsorbent prepared from the pods of Leucaene leucocephala and used in this study.

- ✓ Nearly 50% of the Crystal Violet dye from industrial effluent is removed in 180 minutes of contact time at 32^0 C and at pH 9.0 ± 0.02 with 600 mg of the low- cost adsorbent ALL, when the concentration of the dye solution used was 100 mg/L. Hence low- cost adsorbent prepared from the pods of Leucaene leucocephala and used in this study was found to be an efficient adsorbent for the removal of Crystal Violet dye from an aqueous solution and also from a dyeing industrial effluent.