

Chapter VIII

*A Comparison on the Sorption Ability
of PJBAC, GDAC, PJBAC-CFC
and GDAC- CFC*

A Comparison on the Sorption Ability of PJBAC, GDAC, PJBAC-CFC and GDAC-CFC

The prepared activated carbons from *Prosopis juliflora* bark and goat dung, their derived magnetic nanocomposites being employed in the adsorption process of DB2, RR152 and Cu(II) ions were compared in an insightful manner.

Table 8.1 exhibits the required dose and isothermal constants which favour the better sorbent in the process of sequestering the chosen species. A marginally decreased dosages of PJBAC was found to be satisfactory than GDAC, as evident from the calculated adsorption capacities. This fact is supported by isothermal constants q_m and K . Also, desorption efficiency of PJBAC is recorded as 93.2% (DB2), 85.1 (RR152), 90.4 [Cu(II)]. This is observed to be obviously on the higher side than that for GDAC: 85.4 (DB2), 73.8 (RR152), 83.9 [Cu(II)]. Also, DB2-PJBAC system is more favoured than GDAC systems at a lesser dose. The higher adsorption capacity of PJBAC compared to GDAC may be due to its greater surface area and higher porosity. (Tables 4.1 and 5.1)

Among the synthesized magnetic nanocomposites, PJBAC-CFC is efficient in the uptake of DB2. The factor of high saturation magnetisation values for this composite suffices its sorption. (Table 6.1) Besides this, the comparison amidst the carbon precursors and their corresponding magnetic composites reveal the better capacity of the latter, ascribed to the nano size and magnetic properties.

A comparison of PJBAC is made with few related results reported by other researchers and are listed in table 8.2. The adsorption capacity values (mg/g) imply the marked sorptive ability of PJBAC against other studied carbons.

Table 8.1 Parametric Evidence for Sorption Efficiency

S. No	Dye/ Metal ion	PJBAC				GDAC			
		Dose (mg)	q _e	q _m	K	Dose	q _e	q _m	K
1	DB2	100	49.2	55.1	10.864	150	30.6	46.6	8.356
2	RR152	150	23.6	25.45	4.005	250	17.7	22.3	3.707
3	Cu(II)	60	17.1	16.83	16.44	80	16.4	14.2	8.035

Table 8.2 Comparison - Sorption Capacities

S.No	Sorption System	q _e (mg/g)
1	DB2-PJBAC	49.2
2	RR152-PJBAC	30.6
3	Red industrial dye- Babool tree bark ¹⁸⁵	18.18
4	Methylene blue -Bush cane bark ¹⁸⁶	23.49
5	Methylene blue-Poplar tree activated carbon ¹⁸⁷	18.04
6	Congo red-Poplar tree activated carbon ¹⁸⁷	15.59