C-Dots, possessing a tunable structure, can be tailored for diverse applications through core modification and surface functionalization using carefully chosen precursors. Plant-based sources, rich in phytochemicals, are commonly used, imparting inherited functional groups and heteroatoms (Pansari et al. 2023; Zeng et al. 2021). Flowers, abundant in flavonoids, polyphenols, terpenoids, and various other compounds (Abbas et al. 2021; Deepthi et al. 2023), are ideal precursors, yielding self-doped, self-passivated C-Dots containing heteroatoms (N, P, S) and surface groups (amino, carboxy, hydroxy). Further modification is possible via covalent (amide coupling, silylation, esterification, etc.) or non-covalent (π-interactions, complexation, electrostatic interactions, etc.) methods (Yan et al. 2018; John et al. 2021; Park et al. 2016). Covalent modification particularly allows linking C-Dots to other nanoparticles, metal ions, or biomolecules, expanding their applications. This study focuses on designing .C-Dots with specific recognition groups and investigating their optical properties