

## CARBON DOTS DERIVED FROM AICAO (ARTEMISIA ARGYI) AND HONEY INDUCE CANCER CELL DEATH BY TARGETING MET KINASE

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**Background:** Carbon dots are increasingly recognized as promising nanomaterials for bioimaging and anticancer applications. Nevertheless, the biological role of multi-herb-derived carbon dots remains poorly characterized.

**Materials and methods:** Carbon dots were synthesized from Aicao (*Artemisia argyi*) and Honey (AC/H). Their physical and biochemical properties were analyzed using zeta potential, scanning electron microscopy, confocal microscopy, flow cytometry, and enzyme activity assays.

**Results:** AC/H carbon dots displayed an average size of ~100 nm. When combined with the MET kinase inhibitor crizotinib or the PI3K/AKT inhibitor LY294002, the particles reached 150–200 nm, suggesting stable complex formation. AC/H treatment led to significant cancer cell death, which was reversed by NAC, indicating a ROS-dependent mechanism. Confocal microscopy demonstrated AC/H fluorescence under UV light and Golgi localization, pointing to potential interference with protein phosphorylation pathways. Furthermore, AC/H showed strong anti- peroxidase and phosphatase activity. Importantly, co-treatment with AC/H and either crizotinib or LY294002 resulted in greater cytotoxicity compared with single treatments.

**Conclusion:** The study suggests that AC/H carbon dots act as ROS-dependent, Golgi-targeted nanostructures with enzyme-like activity. Their

combination with kinase inhibitors enhances anti-cancer efficacy, highlighting AC/H as a potential candidate for fluorescence-guided drug delivery systems in cancer therapy.

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**Key words:** Carbon dots, Aicao, Honey, MET kinase, ROS, cancer

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