

An insight investigation to the antiurolithic activity of *Trachyspermum ammi* using the in vitro and in vivo experiments

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Abstract

The crude extract of *Trachyspermum ammi* seeds (Ta.Cr) was studied for its antiurolithic activity using the in vivo and in vitro experiments. In the in vivo experiments, Ta.Cr treatment showed a diuretic activity at the dose of 30 and 100 mg/kg and exhibited curative effect in male hyperoxaluric Wistar rats, which received 0.75% ethylene glycol (EG) in drinking water given for 3 weeks, with 1% ammonium chloride (AC) for initial three days. In the in vitro experiments, Ta.Cr delayed the slopes of nucleation and inhibited the calcium oxalate (CaOx) crystal aggregation in a concentration-dependent manner like that of Potassium citrate. Ta.Cr also inhibited DPPH free radicals like standard antioxidant drug butylated hydroxytoluene (BHT), and significantly reduced cell toxicity and LDH release in Madin-Darby canine kidney (MDCK) cells, exposed to oxalate (0.5 mM) and COM (66 µg/cm²) crystals. In isolated rabbit urinary bladder strips, Ta.Cr relaxed High K⁺ (80mM) and CCh (1 µM)-induced contractions, showing antispasmodic activity. The findings of this study suggest that the antiurolithic activity of crude extract of *Trachyspermum ammi* seeds may be mediated by a number of mechanisms, including a diuretic, an inhibitor of CaOx crystal aggregation, an antioxidant, renal epithelial cell protection, and an antispasmodic. Thus, showing therapeutic potential in urolithiasis, for which there is no viable non-invasive option in modern medicine.