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## Evaluation of *In vitro* Anti-inflammatory Activity of a Formulation Developed by Rhizome of *Curcuma zedoaria*

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**Background:** The rhizome of *Curcuma zedoaria* is used in the Ayurveda system to treat inflammatory conditions.

**Objectives:** To evaluate *in vitro* anti-inflammatory activity of different fractions of aqueous extract of *C. zedoaria* rhizome and develop an anti-inflammatory cream incorporating *C. zedoaria*.

**Methods:** The aqueous extract of *C. zedoaria* rhizome was made by boiling 480 g of fresh rhizome in 1920 mL of distilled water until volume reduced up to 1/8. A part of the filtered aqueous extract was freeze dried and the other part of the aqueous extract was subjected to sequential fractionation. The resulted hexane, dichloromethane, ethyl acetate fractions and the remaining aqueous part were evaporated using a rotary vacuum evaporator. The dry products of all the extracts were assessed for their *in vitro* anti-inflammatory activity using egg albumin denaturation assay. Diclofenac sodium was used as the reference drug. A cream was formulated by incorporating the most effective extract to a base selected by stability studies of different bases. The anti-inflammatory activity of the developed cream was compared against the commercially available diclofenac sodium cream.

**Results:** The aqueous extract of *C. zedoaria* rhizome and its hexane, dichloromethane, ethyl acetate fractions and the remaining aqueous extract showed activity against albumin denaturation assay at a concentration range of 31.25-4000 µg/mL with the IC<sub>50</sub> values; 94.45, 3822, 373.2, 337.7 and 565.4 µg/mL, respectively. The IC<sub>50</sub> value obtained for the diclofenac sodium was 915.7 µg/mL. The IC<sub>50</sub> value obtained by albumin denaturation assay for the formulated cream with 3% (w/w) aqueous extract of *C. zedoaria* rhizome was 1894 µg/mL and for a commercially available diclofenac sodium cream was 1227 µg/mL.

**Conclusions:** The highest anti-inflammatory activity can be observed in the aqueous extract of *C. zedoaria* rhizome compared to its fractions and was higher than the reference drug. The formulated cream with aqueous extract of *C. zedoaria* rhizome also exhibits *in vitro* anti-inflammatory activity but, further studies are required to improve its drug releasing capacity.

**Keywords:** Anti-inflammatory, *C. zedoaria*, Egg albumin denaturation assay, *In vitro*, Sequential extraction