Thesis Title Anti-inflammatory Activity of DMPBD, a Phenylbutanoid from Zingiber cassumunar

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ABSTRACT

This study aimed to evaluate the anti-inflammatory effects of a pure substance, [(*E*)-1-(3,4-dimethoxyphenyl)butadiene; (DMPBD)] isolated from *Zingiber cassumunar* Roxb., by using both *in vivo* and *in vitro* methods. The *in vivo* models included rat ear edema induced by topical applications of ethyl phenylpropiolate (EPP), arachidonic acid (AA) or 12-O-tetradecanoylphorbol 13-acetate (TPA) and rat paw edema induced by subplantar injections of carrageenan or platelet-activating factor (PAF). The *in vitro* method was the study of antiplatelet aggregating activities of various compounds on platelet aggregation induced by collagen, adenosine diphosphate (ADP), AA or PAF.

Topically applied DMPBD suppressed ear swelling induced by EPP or AA with higher potency than oxyphenbutazone and phenidone. In both cases, maximum activity was achieved at 30 minutes after application. Low doses of DMPBD (0.1-1000 ng/ear) inhibited ear

edema induced by TPA in a dose-related manner. However, with higher doses (10-1000 μg/ear) the activities were diminished. DMPBD was more potent than diclofenac with the ID_{50} values at 8 hr of 660 and 7200 pmole/ear, respectively.

DMPBD and diclofenac inhibited carrageenan-induced rat paw edema with similar potencies and peak time activity which was achieved at 4-5 hr after drug administration. The inhibitory effects were dose-related. However, both compounds failed to inhibit PAF-induced paw edema; while salbutamol, a selective β_2-agonist, significantly inhibited edema in a dose-dependent manner.

When comparing the inhibitory effects of DMPBD, aspirin and phenidone on platelet aggregation induced by collagen, ADP, AA and PAF, DMPBD was the most potent inhibitor of PAF-induced platelet aggregation. Phenidone was more effective than DMPBD and aspirin when collagen, ADP and AA were used as inducers of platelet aggregation.

The overall results of this study indicate that DMPBD is a topically active anti-inflammatory agent. It appears to interact with the inflammatory process in a similar way as drugs inhibiting cyclooxygenase and lipoxygenase enzymes of AA metabolism. The chemical structure of DMPBD is, however, entirely different from those of previously known anti-inflammatory drugs. DMPBD may, thus, represent a novel class of compounds with a potential for developing into anti-inflammatory drugs. Further studies related to toxicological studies, pharmaceutical formulation and clinical trials should be conducted.