

## Evaluation of Anti-inflammatory, Analgesic, and Antipyretic Activities of *Pseuderanthemum palatiferum*

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### ABSTRACT

*The objectives of this study were to evaluate the anti-inflammatory, analgesic, and antipyretic activities of water extract from fresh leaves of *Pseuderanthemum palatiferum* (WEPP). The anti-inflammatory activity of WEPP was evaluated in ethylphenylpropionate (EPP)-induced ear edema, carrageenan-induced paw edema, arachidonic acid (AA)-induced paw edema, and cotton pellet-induced granuloma experiments. Acetic acid-induced writhing and tail-flick experiments were conducted to evaluate analgesic activity. Finally, antipyretic activity was evaluated in yeast-induced hyperthermia model. WEPP showed the anti-inflammatory activity and the analgesic activity but without antipyretic property. WEPP (2 mg/ear) significantly inhibited edema thickness induced by EPP (75%). Oral administration of WEPP (600 mg/kg) significantly inhibited paw edema induced by carrageenan (57%), and arachidonic acid (47%). WEPP (600 mg/kg) did not significantly reduce the transudative weight, granuloma weight, and alkaline phosphatase activity in cotton pellet-induced granuloma formation model. The anti-inflammatory property of WEPP demonstrated on the acute phase and not on the chronic phase of inflammation. WEPP oral administration (150, 300, and 600 mg/kg) significantly reduced the writhing response induced by acetic acid by 21%, 57%, and 79%, respectively. In tail-flick test, WEPP slightly increased the reaction time of rats (25%). The analgesic activity of WEPP may act via peripheral pathway. The antipyretic effect of WEPP (600 mg/kg) was not observed in*

***yeast-induced hyperthermia model. WEPP displays an anti-inflammatory effect and has a prominent analgesic effect on the peripheral system.***

**Keywords:** *Pseuderanthemum palatiferum*, Anti-inflammation, Analgesic, Acetic acid, Tail-flick, Antipyretic

## INTRODUCTION

Inflammation is a complex defense reaction of live tissues to injury and has considerable impact on health and lifestyles. The current anti-inflammatory drugs, predominantly the traditional non-steroidal anti-inflammatory drugs (NSAIDs) and cyclooxygenase-2 (COX-2) selective inhibitors, have been used for centuries in the management of inflammation. There are several reports of their noticeable adverse effects including nausea, vomiting, dyspepsia, abdominal pain, ulcers or bleeding, hypertension, edema, fluid retention, and rarely congestive heart failure (CHF) and myocardial infarction (Sostres et al., 2010). Hence, there has been nowadays an increasing demand to search for less toxic anti-inflammatory drugs originating from natural products.

*Pseuderanthemum palatiferum* Nees Radlk, a shrub in Acanthaceae family, has been called as Hoanngoc in Vietnam and Payawanorn in Thai. The leaves of *P. palatiferum* have been use as a folk medicine for relieving pain, headache, inflammation, stomach-ache, gastrointestinal disturbances, colitis, diarrhea, nephritis and hypertension (Dieu et al., 2005; Khonsung et al., 2011).

The constituents found in leaves of *P. palatiferum* are kaempferol, salicylic acid, phytol, stigmasterol,  $\beta$ -sitosterol, apigenin, lysine, threonine, methionine, calcium, potassium, iron, magnesium, 4-ethyl-2-methoxyphenol, megastigmatrienone, 1,2,4-triethyl-5-methyl-benzene, 2-pyrrolidinone, 2-piperidinone, octadecatrienoic acid methyl ester, and hexadecanoic acid (Khonsung et al., 2011; Mai et al., 2011; Petsangkrit & Kittipongpatana, 2015).

Recently, the hypotensive and bradycardic effects of the water extract of *P. palatiferum* in the *in vivo* and *in vitro* models have been confirmed. Furthermore, the water extract of *P. palatiferum* shows the protective effect in gastric ulcer models (Khonsung et al., 2011; Inchab et al., 2018).

In the past decades, the water extract of *P. palatiferum* is a favorite preparation for the treatment of acute inflammation due to its improvement on swelling (Dieu et al., 2005; Khonsung et al., 2011). Although this formula has been widely used to treat inflammation with high efficiency, little is known about its mechanism of action. In Thai traditional medicine, the natural products with an anti-inflammatory effect could be used in combination with NSAIDs in order to reduce some of the unwanted adverse effects associated with NSAIDs, and this approach enables to decrease dosages of these medications without affecting efficacy.