

INSECTICIDAL ACTIVITY OF THAI BOTANICAL EXTRACTS AGAINST DEVELOPMENT STAGES OF GERMAN COCKROACH, *BLATTELLA GERMANICA* (L.) (ORTHOPTERA: BLATTELLIDAE)

Soraya Saenmanot¹, Ammorn Insung², Jarongsak Pumnuan², Apiwat Tawatsin³
Usavadee Thavara³, Atchara Phumee⁴, Frédérick Gay⁵, Wanpen Tachaboonyakiat⁶
and Padet Siriyasatien⁷

¹Medical Science Program, Faculty of Medicine, Chulalongkorn University, Bangkok;

²Department of Pest Management Technology, Faculty of Agricultural Technology, King Mongkut's Institute of Technology Lat Krabang, Bangkok; ³National Institute of Health, Department of Medical Sciences, Ministry of Public Health, Nonthaburi; ⁴Thai Red Cross Emerging Infectious Health Science Centre, King Chulalongkorn Memorial Hospital, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand;

⁵Université Pierre et Marie Curie-Paris 6, CHU Pitié-Salpêtrière, AP-HP, Groupe Hospitalier Pitié-Salpêtrière, Service Parasitologie-Mycologie, Paris, France;

⁶Department of Materials Science, Faculty of Science, ⁷Department of Parasitology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

Abstract. The German cockroach, *Blattella germanica*, is considered an important medical and economic pest in Thailand. The insecticidal activities of hexane, acetone and ethanol extracts derived from six Thai botanicals, namely, *Piper retrofractum* Vahl, *Stemona tuberosa* Lour, *Derris elliptica* (Wall.) Benth., *Rhinacanthus nasutus* (L.), *Butea superba* Roxb., and *Foeniculum vulgare* Mill. were used to evaluate their toxicities against a variety of developmental stages of *B. germanica* including nymphs, adults and gravid females. All botanical extracts showed high insecticidal activity (up to 100%) after a 24-hour exposure at 200 µg/insect, using 2 µl/insect 1% Tween-20 in distilled water as negative control. Extracts from *P. retrofractum* gave the highest mortality to all *B. germanica* developmental stages, with the acetone extract showing maximal insecticidal activity against both gravid (LD₅₀ = 39 µg/insect; LD₉₀ = 52 µg/insect) and adult (LD₅₀ = 53 µg/insect; LD₉₀ = 104 µg/insect) stages after a 6-hour exposure. Isolation and purification of the main components of *P. retrofractum* acetone extract by column chromatography led to a fraction with highest insecticidal activity against nymphs. Subsequent purification by thin layer chromatography led to identification of piperine as the major bioactive compound. This is the first report of insecticidal activity from *P. retrofractum* extracts against *B. germanica* and holds promise as a potential biopesticide.

Keywords: *Blattella germanica*, botanical extract, German cockroach, insecticidal activity

Correspondence: Padet Siriyasatien, Department of Parasitology, Faculty of Medicine, Chulalongkorn University, Bangkok, 10330, Thailand.

E-mail: padet.s@chula.ac.th