

A review of Malaysian herbal plants and their active constituents with potential therapeutic applications in sepsis

ABSTRACT

Sepsis refers to organ failure due to uncontrolled body immune responses towards infection. The systemic inflammatory response triggered by pathogen-associated molecular patterns (PAMPs), such as lipopolysaccharide (LPS) from Gram-negative bacteria, is accompanied by the release of various proinflammatory mediators that can lead to organ damage. The progression to septic shock is even more life-threatening due to hypotension. Thus, sepsis is a leading cause of death and morbidity globally. However, current therapies are mainly symptomatic treatment and rely on the use of antibiotics. The lack of a specific treatment demands exploration of new drugs. Malaysian herbal plants have a long history of usage for medicinal purposes. A total of 64 Malaysian plants commonly used in the herbal industry have been published in Malaysian Herbal Monograph 2015 and Globinmed website (<http://www.globinmed.com/>). An extensive bibliographic search in databases such as PubMed, ScienceDirect, and Scopus revealed that seven of these plants have antiseptic properties, as evidenced by the therapeutic effect of their extracts or isolated compounds against sepsis-associated inflammatory responses or conditions in *in vitro* or/and *in vivo* studies. These include *Andrographis paniculata*, *Zingiber officinale*, *Curcuma longa*, *Piper nigrum*, *Syzygium aromaticum*, *Momordica charantia*, and *Centella asiatica*. Among these, *Z. officinale* is the most widely studied plant and seems to have the highest potential for future therapeutic applications in sepsis. Although both extracts as well as active constituents from these herbal plants have demonstrated potential antiseptic activity, the activity might be primarily contributed by the active constituent(s) from each of these plants, which are andrographolide (*A. paniculata*), 6-gingerol and zingerone (*Z. officinale*), curcumin (*C. longa*), piperine and piperonal (*P. nigrum*), biflorin (*S. aromaticum*), and asiaticoside, asiatic acid, and madecassoside (*C. asiatica*). These active constituents have shown great antiseptic effects, and further investigations into their clinical therapeutic potential may be worthwhile..