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Dicoma Anomala Sond [Asteraceae]: A Possible Resource of Future Antimalarial Agents

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Editorial

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INTRODUCTION

South Africa has the world's richest flora with several indigenous plants and a huge indigenous knowledge, while the indigenous Africans have maintained a deep intrinsic cultural belief and trust in their African traditional medicines. Interestingly, this is paralleled by a global increase in the use and demand for natural products [1]. The abundance of indigenous medical knowledge, together with the past successes in the discovery of the plant-derived anti-malarial (i.e., quinine, artemisinin) and the continued global urgent need for effective antimalarial drugs have stimulated more discovery research for novel anti-malarial agents from South African medicinal plants [2]. *Dicoma anomala Sond (Asteraceae)*, one of the commonly used medicinal plants in the southern African region, has drawn much attention to researchers for its medicinal properties against the malaria causing parasite, Plasmodium falciparum. *D. anomala* is mostly found in stony grasslands on sandy soils. The common ethno medicinally important species of Dicoma include *D. anomala, D. capensis, D. schinzii and D. zeyheri. D. anomala Sond* is the most commonly used species by the Traditional Health Practitioners (THPs) in the traditional primary health care systems of Botswana, Namibia and South Africa [3].

The various ethno medicinal benefits that have been documented on the use of *D. anomala Sond* include the healing of coughs, colds, fevers, ulcers, dermatitis, venereal diseases, labour pains, dysentery, intestinal parasites, stomach pains, toothache and internal worms [1,4-7]. The traditional use of *D. anomala Sond* can be linked to its several pharmacological activities, *viz.*; anti-bacterial, anti-helminthic, anti-viral, anti-spasmodic, wound healing, analgesic, anti-inflammatory and anti-parasitic uses [5]. During phytochemical screenings of *D. anomala Sond*, researchers found the presence of many classes of secondary metabolites such as acetylenic compounds, phenolic acids, flavonoids, sesquiterpene lactones, triterpenes and phytosterols [5,8]. The asymmetrical sesquiterpene dimers isolated from the dichloromethane extract of the roots of *D. anomala Sond* exhibited potent anti-plasmocidal properties [8,9]. Currently studies in our laboratory have indicated that the dichloromethane extract of *D. anomala Sond* has plasmocidal effects on both the chloroquine-sensitive (D10) and on the chloroquine-resistant (FAC8) strains of *P. falciparum*. Further studies of our preliminary results on this plant (*D. anomala Sond*) in an animal model also support the antimalarial properties of the isolated sesquiterpene dimers from the plant [10], i.e., sesquiterpene dimers had a protective effect on *Plasmodium berghei* infected mice better than chloroquine (unpublished data). Based on the chemical structural studies, researchers have confirmed that the α-methylene lactone moiety is required for its anti-plasmocidal activity, a feature absent in the current antimalarial drugs including the potent antimalarial agent, artesunate. Of note, transcriptome analysis of the sesquiterpene dimers from *D. anomala Sond* and a related sesquiterpene lactone from artesunate revealed little overlap, and this may suggest that these sesquiterpenes have different modes of action. Free radicals were implicated in the pathogenesis of severe malaria including organ damage [5,8]. As such, antioxidant mechanisms have been suggested for *D. anomala Sond* anti-plasmocidal activity, specifically, the high phenolic content of *D. anomala Sond* could be responsible for the plant's strong antioxidant activity [11]. Overall, several scientific reports have provided information on *D. anomala* as a potent resource for production of an effective remedy for the treatment or even prophylaxis against parasitic infections, in particular malaria. This comprehensive research on *D. anomala Sond* highlights the potency of indigenous medical knowledge and the medicinal plants that they could continue to provide new sources of molecules or chemical scaffolds for development of novel antimalarial drugs.

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