Phytochemical screening, antibacterial and cytotoxic activity of Mikania cordata extracts

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Abstract

Mikania cordata is a wild plant which provides many benefits such as antibacterial, antiinflammatory, anticancer, treat stomach problems and also as antidote for poisonous scorpion bites. The research work was conducted to investigate the phytochemical content, antibacterial and cytotoxic activity of Mikania cordata extracts. The leaf and root parts were extracted by using maceration method with three different solvents, each consist of 70% ethanol, ethyl acetate and n-hexane. The extracts were tested by standard phytochemical screening test. Phytochemical test result showed that the extracts contain saponins, alkaloids, flavonoids, tannins, and steroids compounds. Well diffusion technique was used for antibacterial screening. Zone of inhibition were observed in well diffusion for antibacterial investigation against three Gram-positive and one Gram-negative bacteria (Micrococcus luteus, Staphylococcus aureus, Bacillus Subtilis and Eschericia coli). The result showed that only ethyl acetate extract give antibacterial activity. The largest zone of inhibition was observed 14 mm against Staphylococcus aureus. Brine shrimp lethality bioassay was used to determine cytotoxic activity of the extracts. The LC50 values of 70% ethanol, ethyl acetate and n-hexane extract are 40.4264 µg/mL, 31.2104 µg/mL and 22.3546 µg/mL respectively.

Keywords: Mikania cordata, phytochemical screening, well diffusion, brine shrimp, Staphylococcus aureus

Introduction

Flora diversity (biodiversity) means the diversity of bioactive molecules which is likely to be contained in it. It is makes them become a rich source of different types of medicines. Natural products play an important role in drug development programs in the pharmaceutical industry (Baker et al., 1995). In Asian countries, especially for the rural population, herbal drugs come into the first choice for treatment. Nowadays, developed countries have a tendency to turn into traditional medicines, especially herbal drugs that showed a highly significant improvement. Herbal drugs have gained importance in recent years because of their efficacy and cost effectiveness (Ripa et al., 2009). In the continuation of strategies to discover a new drug, we have studied Mikania cordata herbs for their phytochemical content, antibacterial activity and cytotoxicity.

The existing plants, mainly grown in Indonesia, are known as a potent ingredient for drugs beside their use as traditional medicines. Actually, plants which can be used as drugs are easily found in our neighborhood. One of them is Mikania cordata, also known as heartleaf hempvine, belongs to the family Asteraceae, that grows vines at the soil surface or tree. Mikania cordata is initially cover crops, but as time goes by it becomes a weed of rubber plantation. Although considered to be weeds, some studies proved that Mikania cordata have active substances which are capable to kill the golden apple snail. In traditional medicine, water extract of Mikania cordata has been used for gastric treatment (Ahmed, 1990). Biological test was reported for antiulcer (Rabin et al., 2000), analgesic (Ysrael et al., 1990), antiinflammatory (Battacharaya et al., 1987) and anticancer (Bishayee & Chatterjee, 1994). According to Sankaran (2010), Mikania cordata has antibacterial effect and effective in injury cure. This study was conducted to investigate the phytochemical content, antibacterial and cytotoxic activity of three kinds of different extracts of Mikania cordata.

Materials and Methods

Plant Material

The leaf and root parts of Mikania cordata were collected from Cikaret, South Bogor in the month of November 2010 and determined by the Herbarium Bogoriense, Research Center for Biology, Indonesian Institute of Sciences (LIPI), Cibinong-Bogor.