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ABOUT THE AUTHORS

Subehan Subehan
Biopharmaca Research
Center, Faculty of
Pharmacy, Hasanuddin
University, Indonesia
Indonesia

Yusnita Rifai
Biopharmaca Research
Center, Faculty of
Pharmacy, Hasanuddin
University, Indonesia
Indonesia

. Mufidah
Biopharmaca Research
Center, Faculty of
Pharmacy, Hasanuddin
University, Indonesia
Indonesia

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The characterization and anti-osteoporotic activity of Sappan Lignum (*Caesalpinia sappan* L.) extracts

Subehan Subehan, Yusnita Rifai, . Mufidah

Abstract

The standardization and characterization of medicinal plants is important for establishing the scientific basis for the therapeutic effects of a traditional medicine. Sappan Lignum (*Caesalpinia sappan* L.) is a plant that is commonly used as a traditional medicine in Southeast Asia. In Indonesia, it is used to treat dysentery, hemoptysis, and ophthalmic diseases and as a depurative; the Buginese tribe add it to daily drinking water to prevent and treat osteoporosis. This study aimed to characterize the *Caesalpinia sappan* heartwood extracts and to evaluate the anti-osteoporosis activity of the characterized extracts to provide evidence for the efficacy of this traditional medicinal plant. The characterization was performed by chromatographic and spectrophotometric methods after treating the Sappan Lignum with n-hexane, methanol and 70% ethanol. Numerous high intensity peaks were detected on the spectrum from the methanol extract, indicating that the secondary metabolites of this plant were more soluble in methanol than in ethanol and n-hexane. The anti-osteoporosis activity was determined by evaluating the ability of the extracts to stimulate the proliferation of osteoblasts that were isolated from neonatal mouse calvaria and to inhibit the formation of osteoclast-like cells, which are responsible for bone absorption and resorption. The data revealed that all the extracts increased the proliferation of osteoblasts and inhibited the formation of osteoclast-like cells. In the osteoblasts, the ethanol extract was 64% more active than the untreated control and the other extracts at 100 µg/ml (0.01%). Compared with calcitonin, which was the positive control (2 U/ml), the extracts weakly inhibited the formation of osteoclast-like cells. Among the extracts, the ethanol extract most robustly stimulated the osteoblasts and inhibited the formation of osteoclast-like cells, suggesting that it has potential as a candidate anti-osteoporosis agent.

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