Effect of Drying Techniques on Phytochemical Contents and Biological Activities on Bamboo Leaves as Potential Herbal Tea

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Abstract: Presently, bamboos have gained global attention for their therapeutic potential. However, it is rarely considered for its biological activities due to the limitations of studies, especially in Sabah, Malaysia. Thus, searching for the phytochemical content and biological activities among bamboo leaves has increased demand in certain Asian countries. Six species of bamboos, namely *Bambusa vulgaris*, *B. multiplex*, *B. tuldoides*, *Dinochloa sublaevigata*, *Gigantochloa levis*, and *Schizostachyum brachycladum*, were studied with five drying methods: sun drying, shade drying, microwave drying, oven drying, and freeze-drying. The infused leaves of bamboo extracts were analyzed for their total phenolic (TPC) and flavonoid (TFC) contents. The antioxidant activities were determined using two assays; the 2,2-diphenyl-1-picrylhydrazyl (DPPH) and the ferric reducing antioxidant power (FRAP) assays. Toxicity tests of potential bamboo extracts were investigated using the brine shrimp lethality bioassay (BSLB). Bioactive compounds of potential bamboo extracts were determined using liquid chromatography-tandem mass spectrometry (LC-MS). The freeze-drying method exhibited the highest yield for the phytochemical contents and antioxidant activities, excluding *B. vulgaris*, which is preferable to microwave drying. TPC and TFC results showed a range of 2.69 ± 0.01 – 12.59 ± 0.09 mg GAE/g and 0.77 ± 0.01 – 2.12 ± 0.01 mg QE/g, respectively. The IC_{50} of DPPH ranged from 2.92 ± 0.01 to 4.73 ± 0.02 µg/mL, showing high radical scavenging activity. FRAP values also significantly differed, ranging from 6.40 ± 0.12 to 36.65 ± 0.09 mg TE/g. Toxicity studies of potential bamboo extracts displayed no toxicity activity against the BSLB based on LC_{50} analysis. This data may help in utilizing the bamboo leaves as functional food applications to be developed into bamboo tea.

Keywords: antioxidant activities, brine shrimp lethality bioassay, drying methods, LC-MS, phytochemical contents