

MORPHOLOGY, PHYSIOLOGY AND ANATOMY CHARACTERIZATION OF LEAVES FOR OPTIMIZATION OF THE DEVELOPMENT OF BLACK Betel (*Piper Betle* L. var *Nigra*) CULTIVATION HABITAT AS A NATURAL MEDICINE PLANT IN INDONESIA

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ABSTRACT

Black betel is a plant native to Indonesia that has been detected to contain secondary metabolites such as alkaloids, flavonoids, saponins, tannins, phenolic compounds, carotenoids, steroids, and tripernoids. Black betel leaf extract and fraction proved to be active as an antimicrobial (Dwivedi and Tripathi, 2014; Prasetya, 2012; Foo et al., 2015). In the development of medicinal plants, sufficient raw materials are needed to meet the needs of extracts but need optimal propagation technology (Nugroho and Ningsih 2017). This study aims to study the effect of environmental differences, namely in natural and artificial habitats (in cultivation areas) on several morphological, physiological and anatomical characters of black betel. The method used in this study is a survey method and random sampling from four locations. The locations of the sample plants are: Banyuwangi, Karanganyar, Ngaglik and Pakem. Leaf samples are leaves 2-6 from the tip of the plant. Measurement of environmental parameters: air temperature and humidity, soil moisture and light intensity were carried out at each location. Analysis of leaf area, wet weight, dry weight and total chlorophyll content were carried out for leaf samples. The preparation of cross-sectional leaf preparations was also observed to see the differences in leaf anatomy from the four locations. The results showed that there were a range of environmental parameters in the original habitat and cultivation of black betel. Leaf morphological measurements (leaf area and percentage of water content) showed no significant difference between samples from the four sampling locations. Measurement of total chlorophyll content showed a significant difference ($P < 0.05$) in leaves from Banyuwangi and Pakem. Leaf cross sections also showed differences between samples from the four locations and it was possible that the differences were influenced by variations in environmental parameters.

Kata Kunci: *black Piper betel, habitat, morphology, physiology, anatomy*