

Role of Microbial Consortium on Nitrogen and Phosphorus Accumulation in Leaf of Jackbean (*Canavalia ensiformis*)

Dwi Nur Rikhma Sari¹, Sucipto Hariyanto² ✓

¹Departement of Biology
Airlangga University, Surabaya, Indonesia
e-mail: dnrs129_dinnurrisa@yahoo.com

²Departement of Biology
Airlangga University, Surabaya, Indonesia
e-mail: suciptohariyanto@yahoo.com

Abstract

The purpose of this research was to know the role of microbial consortium (symbiotic and non symbiotic of N fixing bacteria; solvent P bacteria and microbial decomposers) with different concentrations (0, 10, 20, 30 mL) on nitrogen and phosphorus accumulation in leaf of Jackbean (*C. ensiformis*). This research is an experimental design is used Completely Randomized Design (CRD). The treatment in this experiment was inoculating the microbial consortium in various concentrations to the rhizosphere of the soil which would be used as the medium for the *C. ensiformis* growth. Data were analyzed using ANOVA and followed by Duncan's test 5%. Results of this research indicated that no a marked different for the concentration of microbial consortium, except chlorophyll a content ($\alpha = 0,023$). However giving of microbial consortium at a concentration of 30 mL showed best value for the parameters leaf area, chlorophyll content a, chlorophyll b content and leaf N content. The microbial consortium showed that no effect on P content in leaf of *C. ensiformis*.

Keywords: *Canavalia ensiformis*, consortium, leaf

1 Introduction

Microbial consortium is a combination of several potential microbial, such as microbial N-fixing, microbe solvent-P and microbial decomposers [17]. Microbial consortium if used in organic farming systems can provide a positive impact on the availability of nutrients needed by plants, and enhance plant growth and productivity [20].

Although the use of microbial consortium is highly effective in increasing plant growth and productivity, but to know the results of productivity takes a long time. So it necessary to find out a quick way to the results of seed productivity, one of by increasing the ability of photosynthesis in leaves which is an important component in the growth and crop productivity [27].

Photosynthesis is a biochemical process in the formation of nutrient or energy that uses carbon dioxide, water and sunlight [29]. The process of photosynthesis cannot occur in all cells, but only the cells containing pigment of photosynthesis [35]. In leaves, there is a mesophyll composed of spongy tissue and chloroplasts (consist of chlorophyll), that play a role in the process of photosynthesis [21]. Chlorophyll is an important catalyst for photosynthesis found in thylakoid membranes as a green pigment in plant photosynthetic tissues [8]. The more of chlorophyll content in the leaves, then the process of photosynthesis will also increase.

In addition to chlorophyll, nitrogen, phospor and leaf surface area can also be used as an indicator to express the growth of healthy seedlings, because the leaves act as the site of photosynthesis [28]. Increasing the process of photosynthesis will affect the growth and productivity of plants [29]. In addition, symptoms of nutrient deficiencies can be determined quickly through the leaf growth.

Nitrogen and Phosphorus are macro-nutrients which also affect the process of photosynthesis in leaves, where the plants need large amounts of N and P to used in the process of formation of chlorophyll [5]. In plant tissues, nitrogen is a constituent component of many essential compounds such as proteins, amino acids, nucleic