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Screening of Fungal Rot Isolates from Cocoa as Phosphate-Dissolving and Their Growth Ability on Three Types of Media

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ABSTRACT

This paper discuss about the potential of fungal rot isolates as phosphate-dissolving fungi and their vegetative growth ability on three solid media. All fungal rot isolates were collected from decayed cocoa plants in Bila Village, Pitu Riase, Sidrap District, South Sulawesi. The potential to dissolve phosphate was examined on Pikovskaya broth media and measured using spectrophotometer. The Vegetative ability to grow on solid media was tested on Potato Dextrose Agar (PDA), Malt Pepton Agar (MPA), and Malt Extract Agar (MEA). The results showed that the highest quantitative ability to dissolve phosphate was observed on fungal rot isolate BPB, followed by JT, BPG, and BPE1 isolates. MPA medium supported the best mycelial growth compared with others media.

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Key words: Phosphate dissolving fungi, fungal rot isolates, growth media.

INTRODUCTION

Efforts on the agricultural sector activities produces abundant agricultural waste as a by-product. Waste can be straw, srover, stem, leaf, coat of berry, bran, husks, and remaining of pruning.

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These abundant agricultural waste that still not used. It can be serve as a source of organic matter and nutrients that are beneficial to the plant. Organic waste materials can be absorbed perfectly when it degraded completely. Factors that play an important role in the decomposition of litter is the climate, environmental conditions, and the presence of microorganisms. Climate factors include rainfall, humidity, the sunlight intensity, and temperature. The environmental conditions factor are the temperature of the water, the pH of the water, the salinity of the water and the others. In the decomposition process, all these factors interacting with each others. There are associations between physical factors and biological factors. Biological factors have a greater role than physical factors. Biological factors are affected by a host of fungi and bacteria. However, fungi have a greater ability than bacteria to break down the remains of plants (cellulose, hemicellulose, and lignin), could soon make soil organic matter decompose to a simple organic compound. It serves as the primary ion exchanger and release nutrients around plant [2,3,4].

The relationship between organic matter and plant growth can be directly or indirectly. Organic material of natural substrates for microorganisms saprophytic and indirectly provide nutrients for the plants through the activity of microorganisms. During the process of decomposition of organic material, the resulting organic acids such as fulvic and humic acid. Humic acid and fulvic acid is a part that has a large role in chemical reactions as a part of the organic material. Phosphorus deficiency may occur in plants growing on cultivated lands containing phosphate in sufficient amounts. This happens because the plants can only absorb of phosphorus in a form that is available. The form of phosphate in soil can available through the secretion of organic acids by microbes. Microbes may also release inorganic phosphate that can dissolve into the soil through decomposition event. In addition an increase in uptake of micro elements by plants with organic humus that grant. Some types of rot fungi are able to absorb phosphate [5]. However his ability varies greatly depending on the type, power and capability, adaptations to life in different environments. Microbial phosphate from the specific soil if inoculated on other land not necessarily maintain the ability of phosphate dissolving [6,9].

MATERIALS AND METHODS

Isolation of Fungal Rot

Isolates of rot fungi was obtained from decayed stems cacao in central of cocoa cropping the Bila village of Pitu Riase, Sidrap district, South Sulawesi. The fruiting body of 10 kinds of rot fungi were stored in the paper bag until it isolated in the laboratory. Pieces of fungal fruit bodies (1 cm x 1 cm in size) were surface sterilized with 70% alcohol, rinsed 2 times with sterile water and placed on to sterile filter paper. Each piece (ø 7 mm) cultivated aseptically on PDA medium and incubated at room