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The Potency of Endophytic Fungal Isolates Collected from Local Aromatic Rice as Indole Acetic Acid (IAA) Producer

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Abstract

Endophytic fungi are fungi that live in plant tissues without causing disease symptoms and abnormalities in plants. This study aims to obtain endophytic fungal isolates from local aromatic rice and screening of their ability to produce the IAA hormone as a plant growth promoter. Totally 16 endophytic fungal isolates were isolated from aromatic rice tissue of Pulu Mandoti. Ten isolates obtained from stem, three isolates from the root and three isolates from leaf tissue. The ability of endophytic fungal isolates in producing hormones IAA varied from 0.635 to 2.651 mg l⁻¹. Similarly, the ability to dissolve phosphate also varied from 0.005 – 3.719 mg l⁻¹, and there is only 1 isolates that caused abnormal growth in rice seedlings.

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Key words: endophytic fungi, local aromatic rice, IAA

INTRODUCTION

South Sulawesi is one of the aromatic rice producing areas in Indonesia. Pulu Mandoti has higher level of fragrant than other aromatic rice in this area, and cultivated only by people in the District Salukanang Enrekang.

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Endophytic fungi are microorganisms that presence in plant tissues or organs such as seeds, leaves, flowers, twigs, stems and roots. Various functional compounds can be produced by endophytic fungi, and can act as anti cancer, antiviral, antibacterial, antifungal, plant growth hormones, insecticides and others [1.2]

Indole acetic acid is essential compound for the growth and development of roots and shoots, many microbes including Plant Growth Promoting Rhizobacteria (PGPR) produce IAA [1]. Soil fungi and endophytes secrete plant growth-promoting substances such as indole acetic acid (IAA) and gibberellins [3.4.5]

Auxin was first isolated and characterized as plant growth, and indole-3-acetic acid (IAA) is a type of auxin [6.7]. Most of the genus *Trichoderma* produce auxin indole acetic acid (IAA), with or without precursor L-tryptophan [8]. *Trichoderma* isolated from rhizosphere were more efficient in producing IAA compared *T. asperellum* T211 [9]. Deshwal *et al.* [10.11], observed that IAA produced by *Pseudomonas aeruginosa* MR-9 increases plant height, dry weight, number of nodules per plant, nodule fresh weight of *Mucuna pruriens* as many as 184, 124, 139, 180% compared with controls.

Essentially Phosphorus in the soil is presence in unavailable form for plants, and organisms associated with the plants can help in dissolving the mineral P to facilitate absorption by plants. The fungus has been reported to dissolve P by producing of organic acids and is known to have a higher efficiency than bacteria in dissolving of phosphorus [12]

The main objective of this research is to obtain endophytic isolates from local aromatic rice that has the ability to produce IAA hormones and dissolved phosphorus.

MATERIALS AND METHODS

Isolation of Endophytic Fungus

Local aromatic rice plant samples used in this study is Pulu Mandoti which is aromatic rice that has the most fragrant aroma and the highest economic value among 8 types of aromatic rice that is cultivated by farmers in this regions. Samples taken from rice plantation located in District Salukanang. Isolation of endophytic fungi carried out on the roots, stems and leaves of the local aromatic rice plants. Sterilization plant parts done gradually by soaking them for 60 seconds in 70% ethanol, 3% NaOCl for 60 seconds, and 70% ethanol for 30 seconds. Then rinsed four times with sterile distilled water dried on sterile filter paper. Cut a small part of the plant to be grown in PDA medium.

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