



Research project of counterparts funded at UNJA

Name	Counterpart	Title
Hesti Riany, Hasnaul Maritsa, Zulkarnain	B02	Actinomycetes from different ecological habitats as biocontrol agents of fungal plant pathogens

Background and Method

Actinomycetes (Actinobacteria) is a unique group among microbes and prokaryotes. They have the characteristics of both fungi and bacteria. The ability of actinomycetes to live in different conditions will bring many advantages if it is applied in the plant and soil environment. Actinomycetes produce a wide range of secondary metabolites with, potentially antibiotic, antifungal, antiprotozoal, antiviral, anticholesterol, antihelminth, anticancer or immunosuppressant action. It is possible that among these metabolites are compounds better able than those currently available to act as a biocontrol agent against fungal pathogens of plants. Such an agent would be useful in Jambi which is a province with large plantations (oil palm, rubber and coffee) and extensive agriculture. But, it likewise also has many types of habitats such as primary forest, plantations, farming, fresh water lake, peat, and forest rubber. It is possible that this variety of habitats contains rich sources of actinomycetes. We therefore investigated the potential of these habitats as producers of new bioactive compounds, especially as antifungals for use in Jambi plantations and farming.

Our methods consist of relatively few steps. We collected samples of soils and sediments in primary rain forest (Harapan Rainforest) and in the soils of oil palm plantations and coffee plantations. We then isolated actinomycetes, characterized them and evaluated their antifungal activity.

Objective

This research aims at investigating the potential of actinomycetes from different habitat as biocontrol agents of fungal plant pathogens.

Results

We collected 29 actinomycete isolates. There were 12 isolates from rain forest soil and sediment, 10 from oil palm plantation soil and sediment and 7 from coffee plantation. Of the 29, 23 had antifungal activity against *G. boninense*. The intensity of the antifungal activity was 0-39.55% (Table 1). The antifungal activity rate of isolated actinomycetes from the highest to lowest were isolated actinomycetes from oil palm plantation (1.8; 50%) followed by isolates from coffee plantation (1.6; 42%) and rainforest (1.3; 35%) (Fig. 1). There was no significant influence of their collection habitat on antifungal activity. The antifungal activity was not highly inhibitory. Nevertheless, they showed three kinds of antagonistic mechanism. These were antibiosis, parasitism and competition.

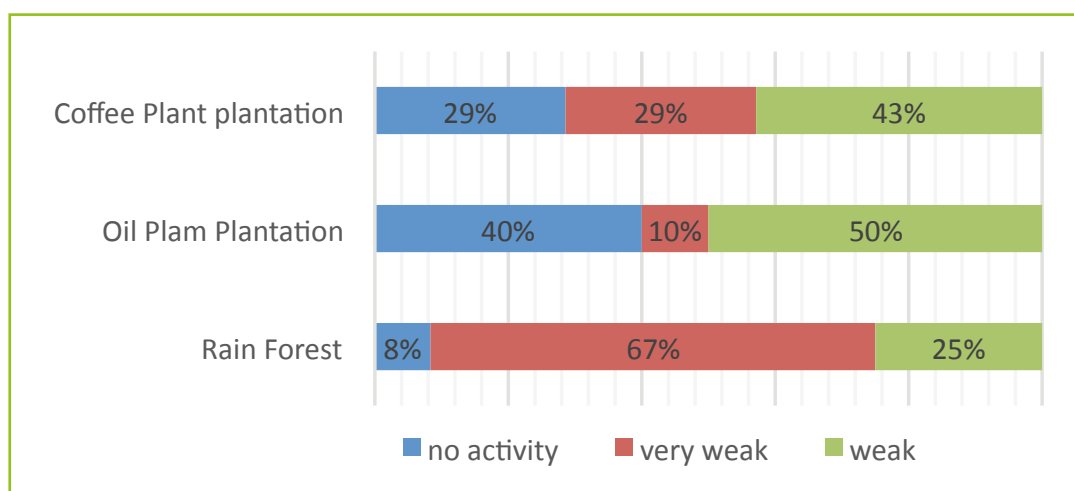


Figure 1. Antagonist activity of Actinomycetes from different locations

Table 1. Antifungal activity of *Actinomycetes* from different locations

Rainforest		Oil Palm Plantation		Coffee Plantation	
Isolate Code	Inhibition percentage (%)	Isolate Code	Inhibition percentage (%)	Isolate Code	Inhibition percentage (%)
HS15	31.9	S1	0	KT07	26.2
HS04	29.79	S2	24.55	KT09	15.65
HS06	12.7	S6	39.2	KT10	27.3
HS07	8.55	S7	31.39	KT11	18.5
HS09	18.55	S8	0	KT12	0
HS11	7.2	S15	0	KT 3	25.85
HT03	27	S16	39.2	KT14	0
HT12	0	T1	37.93		
HT19	27.55	T10	0		
HT20	18.6	T19	39.53		
HT11	16.8				
HT10	13.05				