



Research project of counterparts funded at IPB

Name	Counterpart	Title
Anja Meryandini, Mazidah Noer Inayah, Suhartini Evans	B02	Characterization of mannanase bacteria from Bukit Duabelas, Jambi, Sumatra for degrading palm kernel cake

Background and Methods

Terrestrial environments are the richest and most complex of all microbial environments. And the diversity of terrestrial microorganisms is interesting because of the potential harnessing of their unique capacities (Maier et al. 2000). This diversity of microorganisms is determined the amount of food available for them. Palm kernel cake contains various mannans. Culture methods were used to isolated mannanolytic actinomycete bacteria.

Objective

The main objective of this study was to select actinomycetes that can degrade palm kernel cake for further research such as producing prebiotics.

Approach

Soil samples were collected from rubber forest and oil palm plantation. The actinomycetes were isolated using HV Agar ISP4 media. Mannanolytic actinomycetes were then selected using locust Bean Gum media. The quality of the enzyme was calculated using the hydrolytic index.

Table 1. Source of Soil Samples

(<http://www.uni-goettingen.de/en/oil+palm+management+experiment+%28at+ptpn+vi%29/584053.html>)

Code of Isolates	Mannanase Index on LBG media	Transformation system
OM2rh(e)1	2.6	Oil palm management with reduced fertilization and herbicide application
OM2rh(e)3b	2.5	Oil palm management with reduced fertilization and herbicide application
HJ4.2	3.3	Jungle rubber at Harapan landscape
HJ4.2a	2.8	Jungle rubber at Harapan landscape
HJ4.5a	2.7	Jungle rubber at Harapan landscape
HJ4.5b	3.7	Jungle rubber at Harapan landscape
HJ4.6	3.2	Jungle rubber at Harapan landscape
HJ4.7	3.6	Jungle rubber at Harapan landscape
OM4cw(c)8	0.33	Oil palm management with conventional fertilization and mechanical weeding
P26(b)18	2.4	01°56'53.4", 103°15'26.9"
OM1ch(d)13	3.83	Oil palm management with conventional fertilization and herbicide spaying
OM4cw(c)17A	1.38	Oil palm management with conventional fertilization and mechanical weeding

Results

From twelve isolates, one, HJ4.2a, gave the largest hydrolytic index and was characterized further. The mannanase from HJ4.2a had the highest activity with 0.5% palm kernel cake at 50°C and pH7.

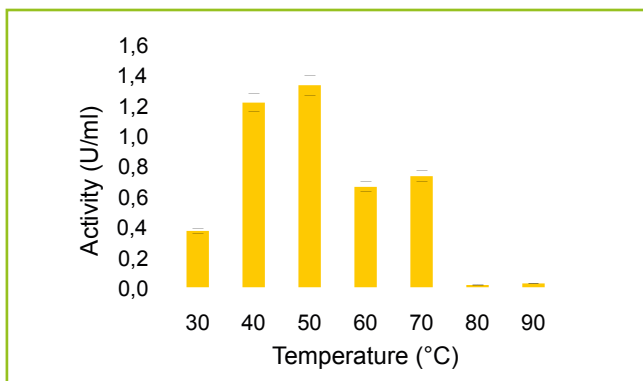


Figure 1. The effect of temperature on mannanase activity from HJ4.2a

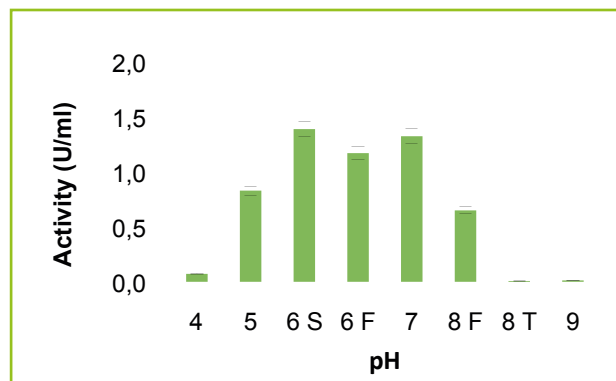


Figure 2. The effect of pH on mannanase activity isolate from HJ4.2a isolate at 50°C. S = citrate buffer, F = phosphate buffer, T = Tris HCl buffer

References

Maier MM, Pepper IL, Gerba CP. 2000. Environmental Microbiology. Academic Press. California 92101-4495, USA.