BPPT

BADAN PENGKAJIAN DAN PENERAPAN TEKNOLOGI

MICROBIAL UTILIZATION FOR AGRICULTURAL AND INDUSTRIAL APPLICATION

Center for Bioindustrial Technology

Bangkok February, 21st 2014

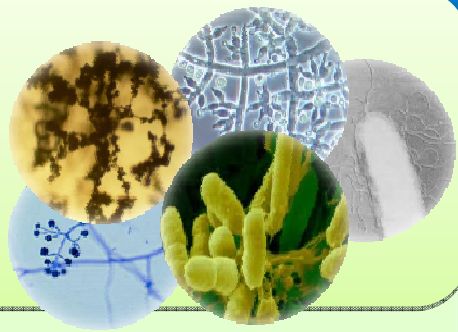
PRESENTATION OUTLINE

- BPPT Culture Collection
- Microbial Agents for Sustainable Agriculture
- Microbial Utilization for Industrial Application

BPPT Culture Collection

- Bacteria : 200
- Fungi : 3
- Identified : 15%

MICROBIAL AGENT FOR SUSTAINABLE AGRICULTURE



Background

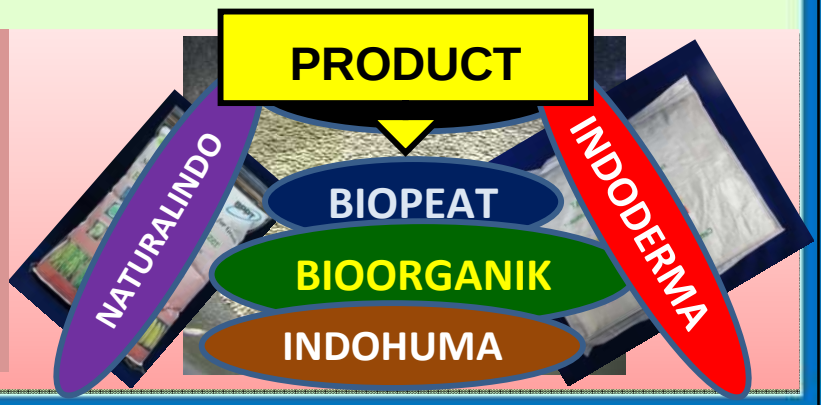
- Indonesian Government is running National Program to enhance **"National Food Security"** (Law no 7, 1996 that has been revised to Law no 18, 2012 regarding "National Food")
- The quality and fertility of agricultural land has continuously declined because of excessive use of inorganic/chemical-synthetic fertilizer and pesticide. At the same time, it caused accumulation of hazardous residue/pollutant in soil.
- There is a need to utilize marginal (sub-optimal) land to satisfy national food demand.

Objective

To promote **sustainable agriculture** through development of bio-fertilizer and bio-pesticide by utilizing Indonesian bio- resources.

MICROBE
- Bacteria
- Actinomycete
- Yeast
- Fungi

FUNCTION
- Nitrogen fixation
- Solubilization of phosphate and potassium
- Degradation of pesticide residue
- Increase in pH value of peat soil
- Bio-fungicide, bio-insecticide



APPLICATION OF " BIOORGANIC " IN CORN AND PADDY FIELDS

Dosage of application : 5 kg/ha

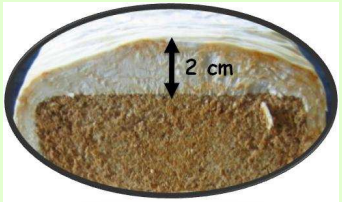
Reducing the use of chemical fertilizer to 40% while the yield increasing up to 20%

Cultivation

grown mycelia

Cassava pulp

cassava pulp



Extraction

crude β-glucan

Purification

pure β-glucan

HEALTH SUPLEMENT

Beta Glucan As Imunomodulator

Edible mushroom (oyster mushroom ; *Pleurotus ostreatus*) is grown in media made from cassava pulp industry. The grown mycelia is then extracted and purified for yielding beta glucan that has bioactivity as imunomodulator.

BIOREMEDIATION TECHNOLOGY
FOR FOOD SECURITY AND SAFETY

(i) Phytoremedian functions to entrap heavy metals.
(ii) Remedian microbes function to degrade pesticide residues (organochlorine and organophosphate).
(iii) Microbial consortia function as fertilizer.

Application in rice field

Reducing use of inorganic fertilizer to 50%, but increasing the production to 11.1 tonnes dried-grain /ha (or 29% higher as compared with conventional pracctice, 8.6 tons/ha).

Application for red onion cultivation

Reducing 25% of inorganic fertilizer use, but increasing the production 13% higher than conventional practice, moreover lowering content of organochlorine residue in the onion to 50% (below the maximum residue limit)

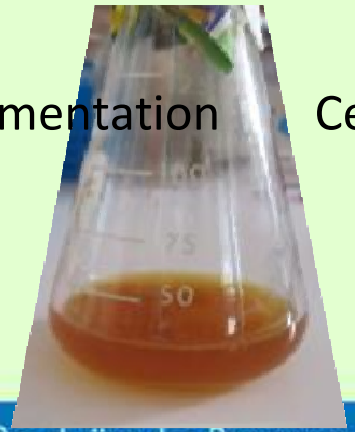
MICROBIAL UTILIZATION FOR INDUSTRIAL APPLICATION

Application of Protease in Leather Industry

Application of Xylanase for Deinking Process in Pulp & Paper Industry

CM1 in LB-xylan

Fermentation



Centrifugal Separation

Native xylanase

Recombinant xylanase

Successful application in deinking process

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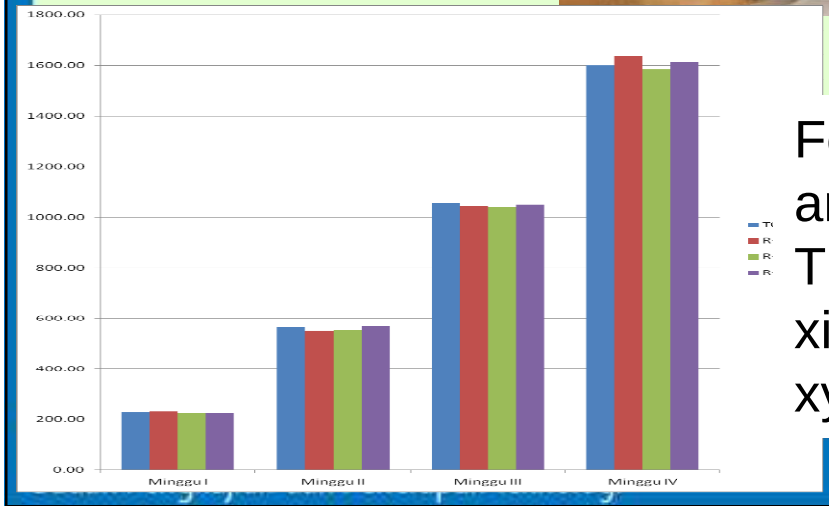
Application of Xylanase for Poultry Feed

Xylanase powder

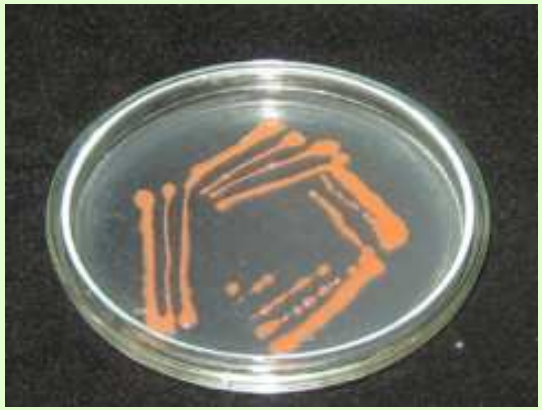
Mixing

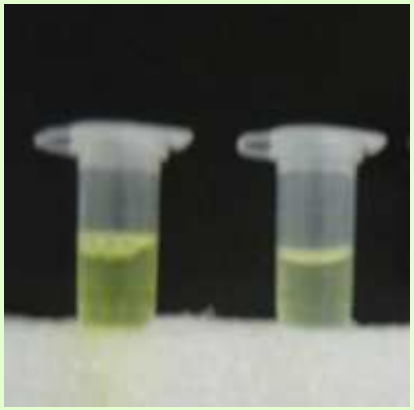


Food conversion ratio = feed amount/body weight

The most efficient is feed with xilanase and xylooligosaccharides addtion

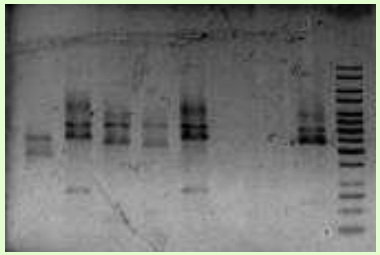
LIPASE FOR ENZIMATIC BIO-DIESEL PRODUCTION





Non Recombinant Lipase

Recombinant Lipase



Enzimatic Biodiesel

LAPTIAB – PUSPIPTEK, SERPONG

THANK YOU

For your kind attention