Cairo University

Studies on Microbial Degradation of Some Agricultural Wastes

Presented by

Akram Hassan Mohamed
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Botany and Microbiology Department

Faculty of Science

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Approval sheet

TITLE OF THE M.S.C THESIS :

Studies on Microbial Degradation of Some Agricultural Wastes

Name of the candidate

Akram Hassan Mohamed

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Besides the work carried out in this thesis the candidate Akram Hassan Mohamed has attended postgraduate courses during the academic year 2008-2009 in the following topics:

- Biostatistics .
- Instrumental Microanalysis .
- Tissue culture & Biotechnology .
- Radiobiology .
- Seed Microbiology .
- Soil Microbiology .
- Host parasite interaction.
- Advanced virology.
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Academic Report

Student code: 8604012

Name: Akram Hassan Mohamed

Degree: M. Sc. Degree

Specialization: Microbiology

Percent: 85.1%

General Grade: Very Good

Date	code	Subject Name	Mark	Points	Grade
January 2009	MS676	Biostatistics	99	4.9	Distinguished
January 2009	CA626	Instrumental Microanalysis	97	4.7	Distinguished
January 2009	BPP657	Tissue Culture &Biotechnlogy	94	4.4	Distinguished
January 2009	B601	Radiobiology	72	2.2	Good
June 2009	BM629	Seed Microbiology	76	2.6	Good
June 2009	BM627	Soil Microbiology	62	1.2	Passed
June 2009	BM626	Host Parasite Interaction	140	4.33	Distinguished
June 2009	BM625	Advanced Virology	126	3.4	Very Good

2-6-2016

The Dean

21/6/2016

Naked

Abstract

Student Name: Akram Hassan Mohamed
Title: Studies on microbial degradation of some Agricultural wastes
Degree: The master of science (Microbiology)

Biodegradation of agricultural wastes by microorganisms is an acceptable method which results in useful end product andreduces environmental pollution. Two agricultural wastes (sugar cane bagasse and rice straw) weresubjected to biodegradation. One hundred and forty microbial isolates (fungi, actinomycetes and bacteria) were isolated from different sources, were screened for cellulase production on carboxymethylcellulose(CMC) agar. The most active (67)selected isolates were secondary screenedfor their ability for production of cellulolytic enzymes using alkali pretreated sugar cane bagasse and rice straw as sole carbon sources. Three enzymatic activities namely, (FPase, CMCase and xylanase) were determined.Microbial isolates exhibited high variation in their cellulolytic activity. Based on the results of secondary screening experiment, the highly active seven microbial strains (3 fungi, 2 actinomycetes and 2bacteria) were further investigated for their ability to degrade the untreated as well as alkali pretreated sugar cane bagasse and rice straw through solid state fermentation (SSF) experiment. After 15-30 days of fermentation, cellulolytic activity and Physicochemical parameters (EC, pH, weight loss %, N% and C/N ratio) of fermented substrates were evaluated. The 7 microbial strains showed variation in their ability for degradation of agricultural wastes depending on the type of agricultural wastes and the duration of fermentation. F14 (*Aspergillus terreus*) gave the highest FPase activity on both agricultural wastes. While, the highest CMCase activities were obtained by F53 (*penecilliumchrysogenum*) to be 4.99 and 5.97U/g on alkali pretreated sugar cane bagasse and rice straw, respectively. On the other hand, A15 (*streptomyces* sp.)exhibited high xylanase activities by 44.65 and 46.56 U/g on untreated and alkali pretreated sugar cane bagasse, respectively. While, the highest xylanase activity 62.66U/g was recorded by B8 (*Bacillus subtilis*) on untreated rice straw after 30 days. Regarding to the C/N ratio, which is considered as a determining factor for degradation and maturity of agricultural wastes. The C/N ratio of alkali pretreated sugar cane bagasse, were reduced to 44:1 by F53(*penecillium chrysogenum*),while the untreated rice straw was reduced to 36:1.On the other hand, C/N ratio of alkali pretreated rice straw reduced to (18:1),(25:1),(26:1) and (22:1) by local strainsF14*(Aspergillus terreus),* F53*(penecillium chrysogenum*) , F61 (*Scopulariopsis halophilica)* and A15*(streptomyces* sp.) respectively, after 30 days of fermentation.

Supervisors:

1- **Prof. Dr. Nahed Z. M. Haikal** ( )
2- **Prof.Dr. Saleh Ahmed Saleh** **( )**

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