PROCEEDING

ICOLIB

International Conference on Life Sciences and Biotechnology

EXPLORATION AND CONSERVATION OF BIODIVERSITY

The ICOLIB 2015 focuses on life sciences and biotechnology aspects to explore and conserve biodiversity by bringing together investigators from different fields such as health and medicine, agriculture, food technology and security, new and renewable energy, conservation and management including exploration of biodiversity

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International Conference on Life Sciences and Biotechnology (ICOLIB)

Exploration and Conservation of Biodiversity

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Preface from the Editor

The explosive development of the sciences and its expansion into other disciplines such as the Life Sciences field is yielding groundbreaking discoveries from novel genes and bio-products to cutting-edge nanotechnology, resulting in a transformed science landscape with profound global applications in understanding life, eradicating diseases, securing a more equitable food and water supply distribution as well as creating novel bio-industries and products.

Based on these phenomena above, the ICOLIB 2015 with theme "**Exploration and Conservation of Biodiversity**", provide an interdisciplinary platform of life sciences for researchers, academics, students, professionals, industries, and policy makers. This meeting also proposed to among scientists and professionals to stay at the leading edge of recent advances in life sciences and sustainability, act as a catalyst for further research, improve international collaboration while bridging the scientific and technological differences among scientists, and foster global health security.In order to disseminate to community more broadest, the articles were published as a proceeding.

The conference was organized by the Department of Biology, Faculty of mathematic and natural sciences, The University of Jember collaboration with the Flensburg University of Applied Sciences, Deutscher Akademischer Austauch Dienst (DAAD), Indonesian-German Network for Teaching, Training and Research Collaboration (IGN-TTRC), University of Kassel and IndoBIC (Indonesian Biotechnology Information Centre) The Southeast Asian Regional Centre for Tropical Biology (SEAMEO BIOTROP). The conference participants from 5 countries and of which 9 lectures within the field health and medicine, agriculture, food technology and security, new and renewable energy, conservation and management including exploration of biodiversity. Presentation divided into plenary, oral and poster session. More than 150 researchers including students participated on this meeting.

On behalf of the organizing committee, i would like to thank all invited speakers and presenters for participating in the ICOLIB 2015 for giving valuable contribution to this conference. Also, acknowledgements are address to Rector University of Jember, Flensburg University of Applied Sciences, DAAD, Indonesian-German Network for Teaching, IGN-TTRC, University of Kassel and IndoBIC-SEAMO BIOTROP as well as all sponsors for the efforts. Finally, i would like to express deep appreciation to the member of the organizing committee for the good teamwork and the great effort to bring success to the conference.

Jember, September 2015

Kahar Muzakhar
Committee

CONTENTS

POSTER SESSION

PRODUCTION SINGLE CELL PROTEINS *Saccharomyces cerevisiae* USING PRODUCT HYDROLYSIS JATROPHA CURCAS CERNEL CAKE FERMENTATION by *Aspergillus niger*

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Abstract

S. cerevisiae can production by using media hydrolysis Jatropha cernel cake yield solid state fermentation by *Aspergillus niger*. Treatment fermentation of jatropha cernel cake with using *Aspergillus niger* can to uptake reduction sugar until 88,87% equal with first concentration before fermentation. In this research succeed growing S. cereviceae in media hydrolysis that. Determination optimum concentration and time for production S. cereviceae in media hydrolysis jatropha cernel cake has been found that in optimum concentration 632.727 µg/ml and time optimum is 60 hour with total cell until 22,756498 x 10^6/ml.

Keywords: *Saccharomyces cerevisiae*, *Jatropha curcas* cernel cake, fermentation, *Aspergillus niger*

Introduction

Jatropha curcas cernel cake (jatropha curcas L) are belongs industrial waste from product manufacture jatropha seed oil. In Indonesia, area crop jatropha curcas around 68.200 hectare in 2007 year with production reach 7.852 ton and advance production in 2009 year reach 8.013 ton (Syakir, 2010). In this production 30% became jatropha seed oil and jatropha cernel cake waste for another. Employing of *Jatropha curcas* cernel cake in Indonesia only became material biobriket not yet optimum to increase addition value jatropha waste (Fahmi, 2013) and employing for animal feed can consequently poisoning because obtain toxin as tannin, alkaloid and saponin (Sanusi *et al*., 2013).

Single cell proteins are manifestation resources high protein production can be used for protein supplement human although for animal. In some single cell proteins, *S. cerevisiae* is contains simple fat, proteins and carbohydrate in absorbed, well, and not toxic (Purwitasari *et al*., 2004). Production *S. cerevisiae* common in general media *Yeast Extract Peptone Dextrose* (YEPD) and *Yeast Extract Peptone Glycerol* (YEPG) (Goeddel, 1990; Purwitasari *et al*., 2004), but also capable growing in easy media as industrial waste. *S. cerevisiae* can growing in fruit shell waste (Wilkins *et al.*, 2007), cassava starch waste capable growing *S. cerevisiae* with high quality (Ejiofor *et al*., 1996), and soybean molasses waste (Siqueira *et al*., 2008).

Jatropha curcas cernel cake are nutrition resources for growing Single cell proteins have less effective because contains compound toxic and high fiber (Tjakradidjaja, 2007; Mahajati, 2008), so needed detoxification and hydrolysis with enzyme microbe. Some microbe have extra-celluler enzyme, but *A. niger* have ability for detoxification compound antinutrition in cake (Belewu *et al*., 2010) and high efectivity for reduction celullosa become glucose because produce high β-glucosidase (Juhasz, 2003; Safaria *et al*., 2013). Some research about solid-state fermentation by *A. niger* can be able to increase release nitrogen into Jatropha cernel cake. So, for increase employing jatropha cernel cake waste be needed hydrolysis by extra-celluler enzyme *A. niger* and then for production single cell proteins *S. cerevisiae.*

Materials and Methods

Collection and processing *Jatropha curcas* cernel cake

Jatropha curcas carnel cake from Indonesian Gresik cement foundation pounding until like pebble and then dry in the sun until 24 hours. After this, jatropha curcas cernel cake can use for material substrate water saturated.

Collection and Pre-culture Isolate Used

Isolate *A. niger* including to o 10 ml media PDA into petridish in streak plate, After this incubation 3 days in temperature 30°C. Futhermore isolate subculture in 5 ml oblique PDA into reaction tube, and incubation until 3 days in temperature 30°C for stoke mold isolate.

S. cerevisiae to get from association knowledge and application technology including to 10 ml media YEPD with streak plate, and then incubation until 24 hours in temperature 30°C for stoke single cell protein isolate.

Fermentation *Jatropha curcas* Cernel Cake Using *A. Niger*

Production hydrolysis filtrate from fermentation in high scale with using 50 gram jatropha cernel cake saturation water included by 5 ml suspension inoculum *A. niger* age 4 days then incubation in temperature 30°C until 4 days. Futhermore, extraction with H_2O equivalent *Jatropha curcas* cernel cake 1:4 and then shaker until 6 hours for mixed soluble. Soluble filtration with paper filter until to get filtrate and then centrifugation in 4000 rpm until 10 minute for separated filtrate with pellet. Hydrolysat filtration with fiber filter 0,2 µm into cool condition and then product filtration incubation in -20°C.

Analysis Concentration First Reduction Sugar With Method Somogyi Nelson

Hydrolysis product fermentation 0,5 ml addition reagen somogyi 0,5 ml for end enzyme reaction and boiling in water steam bath until 15 minute. After not warm, addition reagen nelson for bundle reduction sugar yeald process hydrolysation substrat and then addition aquadest 2,5 ml and measure value absorbantion with spectrophotometer λ 500 nm.

Analysis Optimum Concentration and Time Incubation *S. cerevisiae* in Filtrat Jatropha Cernel Cake

Culture Isolate *S. cerevisiae* incubation 3 days including 100 µl to 20 ml filtrate hydrolysis cernel cake after in variation concentration with 2 refrain. After that, Every suspension measuring with spectrophotometer in 600 nm for first population *S. cerevisiae* and then incubation shaker until 72 hours in temperature 30°C and every 6 hours measuring absorbance with spectrophotometer for final absorbance in every time incubate. Counting total population growing in media filtrate hydrolysis jatropha cernel cake.

Analysis End Concentration Reduction Sugar With Method Somogyi Nelson

End concentration reduction sugar counting with isolate *S. cerevisiae* including to 10 ml media filtrate hydrolysis jatropa cernel cake with conditioning into optimum concentration and time then every day until optimum time production s. cerevisiae carry out shaker 4000 rpm until 20 minute for precipitate *S. cerevisiae*. Residue Filtrate addition 0,5 ml reagent somogyi for finishing enzyme reaction and then boiling into water steam bath until 15 minute. After this, addition reagent nelson 0,5 ml for bundle recidue reduction sugar and then addition aquadesh 2,5 ml and measuring value absorbance with spectrophotometer in 500 nm with 3 refrain.

Results

Concentration filtrate hydrolysis jatropha cernel cake fermentation using A. niger until optimum time

Fermentation 50 gram substrate saturated water jatropha cernel cake by A. niger with total inoculum first spora $83{,}2375x10^6$ in incubation until 4 days production raising concentration reduction sugar 297,727 µg/ml with extraction using aquadest 200 ml.

Tabel 1 yield concentration reduction sugar in optimum time

Treatment	ABS (nm)	Concentration (µg/ml)
Control	0.754	335.000
Fermentation 4 days	1.409	632.727
Fermentation 5 days	1.078	482.272

Aspergillus niger with age 4 days as first inoculum because in time incubation this already give total spora until $83{,}2375x10^6$ according (Mojsov, 2010) total spora until $6x10^6$ are optimum for inoculum process fermentation using *A. niger*. While fermentation until time optimum 4 days for product high concentration reduction sugar 632.727 with raising reduction sugar until 88,87% equal with first concentration before fermentation. According (Sa'adah, *et al* 2010) in incubation 96 hours product high activity celulace enzyme so can production reduction sugar with high concentration.

Production *S. cerevisiae* into media hydrolysis jatropha curcas cernel cake

Population S. cerevisiae in this research measuring with spectrophotometer 600 nm for observe absorbance in every time and concentration filtrate yield hydrolysis jatropha cernel cake by *Aspergillus niger*.

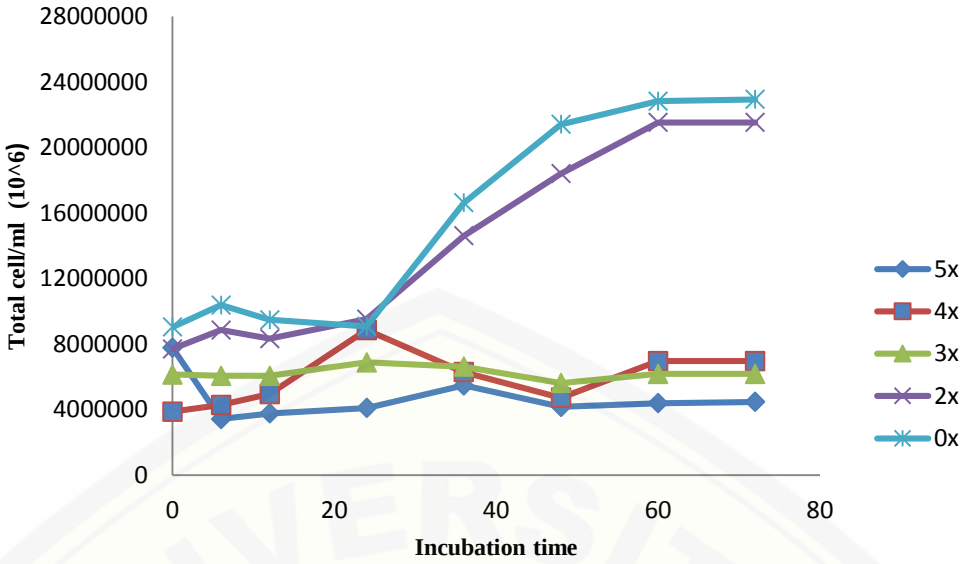


Figure 1. Kurva growth S. cerevisiae in variation Concentration and Time

S. cerevisiae can growing in media contains resource simple carbon and protein. Figure 1 describe growing *S. cerevisiae* in media hydrolysis with variation concentration and time. Every line describe variation concentration hydrolisat, while X axis for describe incubation time and Y axis total cell/ml. In curve can show optimum growing *S. cerevisiae* available in delution filtrate 0x (No delution) from first concentration and time optimum is 60 hour with total cell until 22,756498 x 10^6/ml. Decreasing total cell in lower concentration filtrate Jatroha because in lower concentration have limited nutrition so growing cell will be slow (Button , 1985). *S. cerevisiae* can used nutrition into filtrate yield hydrolysis Jatropha cernel cake for growing. Condition population *S. cerevisiae* in media filtrate can show in figure 2.

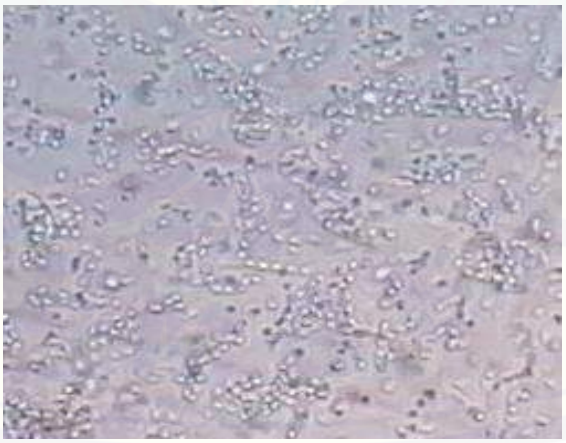
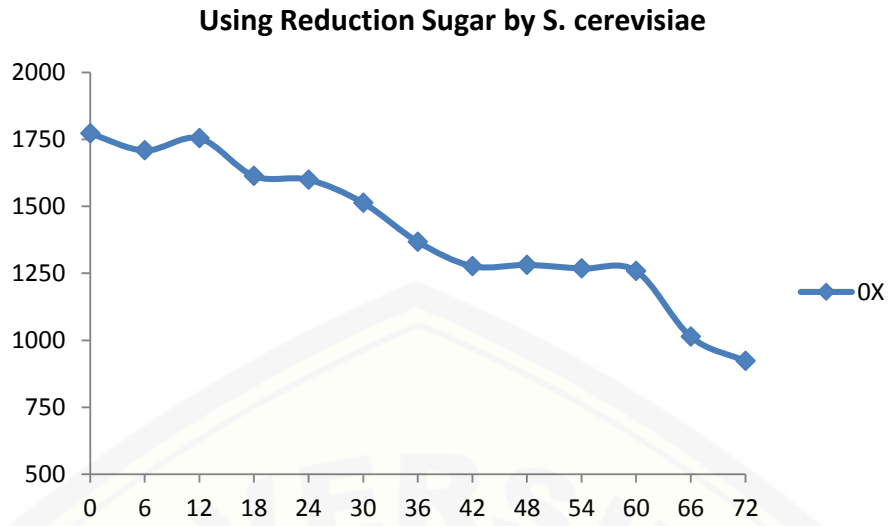


Figure 2. *S. cerevisiae* in Media Filtrate yield hydrolysis Jatropha cernel cake using *Aspergillus niger*

End Concentration Reduction Sugar in Time and Concentration Optimum

Analysis end reduction sugar can evidence *S. cerevisisae* using carbon resource in filtrate yield hydrolysis with *A. niger*. Figure 3. can describe ability *S. cerevisiae* using reduction sugar for become energy resource.



Decreasing total reduction sugar because *S. cervisiae* consumption reduction sugar such as glucose yield hydrolysis by enzyme cellulose or glucose and xylose with xylanase enzyme (Lamid, 2011).

Conclution

Fermentation until time optimum 4 days for product high concentration reduction sugar 632.727 with raising reduction sugar until 88,87% And using this hydrolysat for media production *S. cerevisiae* give highest total population until 22,756498 x 10^6/ml in delution filtrate 0x from first concentration and 60 hour.

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