PROCEEDING

Animal Production International Seminar
APIS
3rd 2016

The 3rd Animal Production International Seminar
The 3rd ASEAN Regional Conference on Animal Production
3rd APIS & 3rd ARCAP – 2016

Enhancing Synergistic Roles of Stakeholders for Development of Sustainable Livestock Production

ISBN : 978-602-432-017-1

Bogor Agricultural University

Perpustakaan Nasional: Katalog dalam Terbitan (KDT)

Proceeding 3rd Animal Production International Seminar (3rd APIS) & 3rd ASEAN Regional Conference on Animal Production (3rd ARCAP)

Cetakan Ketiga, 2016

Penulis : Dr.Ir. Marjuki, M.Sc (Ed.)
Aswah Ridhowi, M.Sc (Ed.)
Wike Andre, M.Si (Ed.)

Perancang Sampul : Tim Prosiding
Penata Letak : Tim UB Press
Pracetak dan Produksi : Tim UB Press

Penerbit:

UB Press
Jl. Veteran 10-11 Malang 65145 Indonesia
Gedung INBIS Lt.3
Telp : 0341-554357, Fax: 0341-554357 (call)
E-mail : ubpress@gmail.com/ubpress@ub.ac.id
Website : http://www.ubpress.ub.ac.id

ISBN: 978-602-432-017-1
viii +724 hlm, 21 cm x 29,7 cm

RECTOR SPEECH

Assalamualaikum warohmatullahi wabarakatuh
Distinguished Guests and Delegates, Ladies and Gentlemen,

It gives me great previlege and pleasure to extend to you all a very warm welcome on behalf of Brawijaya University and to say how grateful we are to the organizing commitee of The Third Animal Production International Seminar (3rd APIS) and The Third ASEAN Regional Conference on Animal Production (3rd ARCAP) who made this important event happening from today onward. Your attendance in this conference will not be enough before exploring the serendipity of Batu city which has attracted so many visitors in the recent years. It offers you many attractive places to visit varying from leisure facilities to smallholder dairy farms that relevant to the topic of this conference.

The issues of livestock production and food security have been a hot topic of debates all over the world to challenge our capability to feed human population living on earth that is believed will reach 25 billion people by the middle of this millineum. The global call on quality human resources especially in developing countries may not be achieved without adequate supply of animal protein. This has urged animal scientists to make significant effort to increase animal production by inventing new technologies and approaches but have no negative impact on our natural resources because the majority of smallholder farmers face with scarcity of cultivable land to produce adequate quantity and quality fodder for their animals. The practice of uncontrolled fodder scavenging from forest and open land may provoke a serious natural disaster such as landslide, flood and loss of water resources for human beings. Through this stage I would like to extend my concern to all distinguished guests and delegates to pay more attention on sustainable development of animal production that assures our young generation lives on earth safely and happily.

As the rector of Brawijaya University, I am also delighted to welcome you in our green campus sometime in the middle of the conference to hasten mutual collaboration between Brawijaya University and either national or international partners . We are fully aware that in a modern life higher education quality should be built on the basis of collaboration for many reasons. Brawijaya University has 14 faculties that can be grouped into four science trees, that is engineering, humanity, economics, and life sciences. They have been growing significantly not only in the number of student enrollements but many prestigeous achievement on research findings, student competitions and administrative transparency are our flagships in the last ten years. Nevertheless, we also realize that first and foremost constraint for any institution is the limit of resources and thereby underpinning the importance of establishing mutual collaboration. It is our opportunities to meet delegates from varying places of origin that open initial discussion for further networking on relevant topics of interests concordance to the main topic of this conference and beyond.

To conclude my address, once again I would like to express my sincere gratitudes to all delegates, partners and conference committee who have made this important international conference occurs. I do hope that your stay and partcipation in these seminar and conference will be fruitful and unforgettable.

By the name of Almighty Allah Swt. I declare that The Third Animal Production International Seminar (3rd APIS) and The Third ASEAN Regional Conference on Animal Production (3rd ARCAP) are officially open.

Thank you very much
Wassalamualaikum warohmatullahi wabarokatuh.

Batu, 19 October 2016
Brawijaya University
Rector

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Congress Name:

3rd Animal Production International Seminar (3rd APIS) & 3rd ASEAN Regional Conference on Animal Production (3rd ARCAP)

Themes:

Enhancing Synergistic Roles Of Stakeholders for development Of Sustainable Livestock Production

Chairman:

Dr.Ir. Marjuki, M.Sc (Brawijaya University, Indonesia)

Date:

19-21 October 2016

Venue:

Royal Orchid Garden Hotel and Condominiums The Shining City of Batu

Official Website:

http://apis.ub.ac.id

Secretariat for APIS 2016:

Faculty of Animal Husbandry Brawijaya University, Malang Indonesia
Telephone +62 341 553513
Mobile/ Line/ WA: +62 857 076 327 91
E-mail : info.apis@ub.ac.id

ACKNOWLEDGMENTS

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Oral Presentation 5 Focus Session: Feed and Nutrition (2)

Friday, 21 October 12:30-14:40 Room: Panderman 2

Time	Title	Presenter	Code
12.30-12.40	Legumes wafer for improvement the post-weaning etawah crossbreed goats performance[1] [1] Brilian Desca Dianingtyas, Yuli Retnani, and Dwierra Evvyernie	Brilian Desca Dianingtyas	FN – 352
12.40-12.50	Utilization of cricket meal in creep feed diet of growing etawah cross breed goats[1] [1] Dewi Apri Astuti, Widya,L Khotidjah, A. Angraeny, K.Komalasari , and Dewi Apri Astuti	Dewi Apri Astuti	FN – 332
12.50-13.00	Performance of first cutting of Pennisetum purpureun cv.Mott under different level of light and nitrogen fertilizer[1] [1] David A. Kaligis, Selvie D. Anis, Johanis R. Tulung, and Sahrun Dalie	David A. Kaligis	FN – 360
13.00-13.10	Amino acid characterization of tofu waste fermentation using effective microorganism-4 and Lactobacillus plantarum culture[1] [1]Eka Fitasari and Budi Santosa	Eka Fitasari (MODERATOR 2)	FN – 325
13.10-13.20	In vitro digestibility profiles of cricket meal as protein source in the ration[1] [1]Dewi Apri Astuti, M. Miftakhul Solikhin, and Yuni Cahya Endrawati	Dewi Apri Astuti	FN – 331
13.20-13.30	Production of roughage feed under different drying methods and evaluation of the feeding value[1] [1]Jayaweera B. P. A.	Jayaweera B. P. A.	FN – 333
13.30-13.40	In vitro nutrient digestibility of Chromolaena odorata-based silage treated with Corypha gebanga meal and rumen content[1] [1]Yelly M. Mulik, Muhammad Ridla, Iwan Prihantoro, and Marthen L. Mullik	Yelly M. Mulik	FN – 335
13.40-13.50	Production, characterization and purification of xylanase from Staphylococcus aureus MBXi-K4[1] [1]Indah Wijayanti, Maggy T Suhartono, Khaswar Syamsu, and Yulin Lestari	Indah Wijayanti (MODERATOR 1)	FN – 336
13.50-14.00	To estimate intestinal truly absorbed protein of alfalfa hay and alfalfa silage using new dutch system (DVE/OEB)[1] [1]P. Kheyrandish, M. Danesh Mesgaran and A. Vakili	Parisa Kheyrandish	FN – 340
14.00-14.10	Chitosan protection to saga leaves extract (Abrus precatorius Linn) and Lingzhi mushroom (Ganoderma lucidum) from rumen microbial degradation[1] [1] Evvyernie D., Sukria H. A., Harlina E., Suningsih N., and Zetira H.	Dwierra Evvyernie	FN – 342
14.10-	Effects of different types of cakes in rations on the	Amani Osman	FN – 348

Oral Presentation 05 Focus season : Socio-Economics & Others

Friday, 21October 12:30-14:10 Room: Welirang

Time	Title	Presenter	Code
12.30-12.40	Financial analysis of the pig farming that utilizing waste disposal system as environmentally friendly farming practices (A case on a pig breeding farm in Tomohon, North Sulawesi)[1] [1]Richard E.M.F. Osak, Meiske L. Rundengan and Tilly F.D. Lumy	Richard E. M. F. Osak	**SE – 724**
12.40-12.50	Farmers group's role in farming management and rabbit farmers' communication in Lang – Lang Village, Singosari District, Malang Regency, Indonesia[1] [1] S. Azizah, B. Hartono, E. Nugroho and A. E. Kusumastuti	Siti Azizah (MODERATOR 1)	**SE – 723**
12.50-13.00	The Development Program "Village Poultry Farming" to local hens Farmers of Tenga Village[1] [1] Jein Rinny Leke, F. Ratulangi, D.Rembet, and J.Mandey	Jein Rinny Leke	**SE – 728**
13.00-13.10	Utilization of pig waste to biogas in Kotamobagu City[1] [1]T. F. D. Lumy, P. O. V. Waleleng, F. N. S. Oroh, N. M. Santa and F. S. Oley	T. F. D. Lumy (MODERATOR 2)	EV – 504
13.10-13.20	Spatial distribution model of dairy cattle productivity in West Java[1] [1]Ahmad Yani, Afton Atabany, Windi Al Zahra, and Hilda Susanty	Hilda Susanty (MODERATOR 1)	EV – 501
13.20-13.30	Methane emission from beef cattle production at low- and high-altitude of East Nusa Tenggara, Indonesia[1] [1]Gustaf Oematan, Yelly M. Mulik, and Mathen L. Mullik	Marthen L. Mullik	EV – 502
13.30-13.40	The effect of parity, month of lactation and incidence of subclinical mastitis on milk yield[1] [1]H. Susanty, B.P. Purwanto, M. Sudarwanto, and A. Atabany	Hilda Susanty	LP – 216
13.40-13.50	Production and Carcass Performance of Male Local Mojosari Ducks Given the Traditional Medicine Herbs on Drinking Water[1] [1]Ita Wahju Nursita and Nur Cholis	Ita Wahju Nursita	LP – 238
13.50-14.00	Effect of Closed House Temperature on feed intake, weight gain and Triiodothyronine (T3) and Thyroxine	Pratiwi Trisunuwati	LP – 242

	Hormone (T4) levels of Broiler Chickens[1] [1]Pratiwi Trisunuwati		
14.00–14.10	Production and nutrition composition of pollen from foraging honey bees (Apis mellifera L.) in the red caliandra (Calliandra calothyrsus) plantation area[1] [1] Sri Minarti, Yugi Mustofa, Firman Jaya	Sri Minarti	LP – 240

Oral Presentation 5 Focus Session: Feed and Nutrition (2)

Oral Presentation 5 Focus Session : Feed and Nutrition (3)

Oral Presentation 5 Focus Session: Livestock Production System

Oral Presentation 5 Focus Session : Socio-Economics & Others

Keynote Speakers Presentation

Wednesday, October 19th 10.00-12.00

Room: Panderman

Production, Characterization and Purification of Xylanase From *Staphylococcus aureus* Mbxi-K4

Indah Wijayanti[1], Maggy T Suhartono[2], Khaswar Syamsu[2], Yulin Lestari[3]

[1]*Departement of Nutrition and Feed Technology, Bogor Agricultural University, Agathis Street Bogor Agricultural University Dramaga-Bogor 16680.*
[2]*Research Center of Bioresource and Biotechnology, Bogor Agricultural University*
[3]*Departement of Biology, Bogor Agricultural University*
Corresponding author: indah_wjynt@yahoo.com.sg

Abstract

Pollard is a by-product from dry milling wheat into flour and contains 16,49% of crude fiber. The addition of xylanase in wheat-pollard diet is necessary to reduce viscosity of digesta. Thus could be easily absorbed in intestinal gut. The objectives of this research are to produce xylanase in batch system bioreactor, to characterize and purify xylanase from *Staphylococcus aureus* MBXi-K4. Maximum enzyme production was reached after 72 hours of cultivation with specific enzyme activity of 10,5 U/mg protein. Biomass specific growth rate (μ) was 0,107 per hour, yield of product of 2,255 (g product/g substrate). The optimum temperature and pH was 70^{o}C and 6 respectively. The xylanase maintained its stability for 30 minutes at 70^{o}C and over pH range 4 – 8. The Km and Vmax value at 70^{o}C on oatspelt xylan was 1,086 (mg/ml) and 3,195 (μmol xilose/min.ml) respectively. Xylanase was purified from the culture supernatant of *S.aureus* MBXi-K4. The purity of xylanase increased 11,69 fold than those of the crude enzyme. The specific activity after purification was 383,9 U/mg. Three kinds of xylanase activities was visualized by zymogram technique with estimated molecular weights of 45,6 kDa, 28,1 kDa and 21,6 kDa. The purified xylanase had one band protein with molecular weight of 47,9 kDa. Xylanase from *S.aureus* MBXi-K4 is a moderate thermostable enzyme and a good candidate as feed additive on feed industry with an improvement on its productivity and thermo stability.

Keywords : *xylanase, S.aureus, production, characterization, purification*

Introduction

Poultry production in Indonesia fulfill more than 50 percent of meat demand of the Indonesian community including chickens and ducks (Statistik Peternakan, 2015). In order to improve food security, the government still continues to improve availability of meat from chickens and ducks in sufficient quantity, high quality and affordable by the public. The feed is a major component and contributes about 60% - 70% of the total production costs in animal husbandry. Therefore it is very important to provide supply of cheap, easy and sustainable feed raw material without competing with human needs. Fine wheat bran (pollard) is one by-product of wheat processing that is available throughout the year in the country with a stable quality. Production of wheat processing industry in Indonesia reached 3.3 million tons per year (Aptindo, 2004). Pollard utilization as monogastrics rations is limited by high crude fiber content (16.49%), Neutral Detergent Fiber / NDF (38.4%) (Pantaya, 2003) and low energy content (1300 kcal EM / kg) (NRC, 1994). The use of pollard in poultry rations is generally not more than 30%.

Consumption of high crude fiber by the chicken broilers can increase the viscosity of the contents of small intestine (digesta), eventually interfere the absorption of energy and protein of rations (Adam, 2000) and thereby reducing the growth of the animals. To improve the nutritional value of diets containing high crude fiber ingredients, one of the methods is utilization of enzyme as feed supplement to hydrolyze crude fiber components into simpler products, which can be absorbed directly by livestock. The addition of xylanase enzymes into diets based on wheat bran (pollard) can decrease the viscosity of digesta and increased body weight of broiler age 6 weeks to 14.72% and 2.6% (Chiang *et al*., 2005). Xylanase can reduce viscosity of digesta by hydrolyze arabinoxylan into arabinose and xylose, so can easily be utilized by poultry.

The microbes were isolated from corn cob which produce xylanase. Isolate obtained (MBXi-K4) was grew optimally at 37^{o}C and pH 7 (mesophilik), whereas the xylanase produced has an optimum temperature of 70^{o}C and stable at wide pH range (4 - 10) with optimum pH of 6. The objectives of this research are to obtain pure enzyme from indigenous isolate *Staphylococcus aureus* MBXi-K4 and obtain information about the characters of xylanase produced.

Methodology

Media Preparation and regeneration of the media to grow bacteria thermophilic refers Richana *et al* (2000). Substrate used was 0.7% pollard, which mixed with growth media and media production. *S.aureus* MBXi-K4 regenerated in the LA medium (Luria Agar). Then grown in medium containing 0.7% oatspelt xylan with the same composition as the growth media. Inoculum was taken as many as 10% (v / v) and added to the media production with substrate of 0.7% oatspelt xylan and pollard xylan (Dung *et al*, 1993). Propagation of the cell culture was carried out in 250 ml erlenmeyer and production of xylanase to study of growth kinetics in Bioreactor 2L. Fermentation occur at optimum temperature and pH, agitation of 160 rpm and aeration 1 vvm, for 96 hours. Purification was carried out by ammonium sulfate precipitation, dialysis in a membrane dialysis with Molecular Weight Cut-off (MWCO) 12kDa in 0.1 M Tris-HCl buffer pH 7.5 overnight. The results of this enzyme concentration used for the purification method of gel filtration chromatography using matrix of Sephadex G- 100. SDS-PAGE method (Laemmli, 1970**)** can be used to predict the molecule weight of the protein, determine the number of protein components in the sample and determine the distribution of protein fraction in the sample and for the purification of proteins.

Results and Discussion

The maximum enzyme activity obtained of 2.26 U/ml at 72 hours of fermentation and specific activity of 10.5 U / mg protein. The rate of biomass, the use of substrate and product formation are presented in the Figure 1 below.

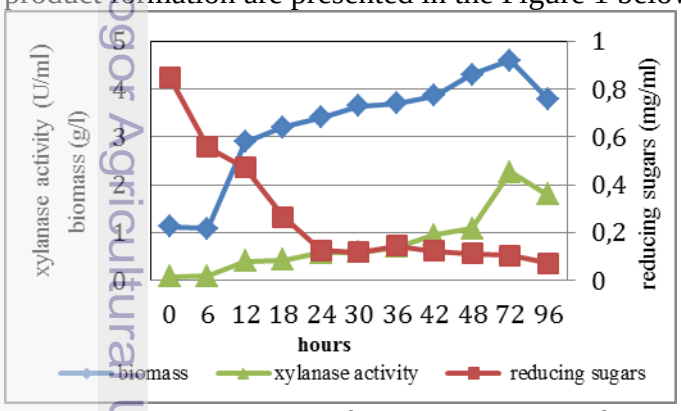

Figure 1. Graph the rate of biomass, the use of substrate and product formation.

S.aureus MBXi-K4 growth in pollard xylan substrate concentration value of 0.7% obtained Xmaks = 4.44 g / l. Data cell growth in exponential phase are plotted with the logistic model based on Monod equation, obtained form a linear relationship with the equation ln (X) = 0.107x+0.134 . The slope of the line (slope) is the value of specific growth rate (μ) of 0.107 / hour. Product yield (Yp/s) obtained by mapping the value (P-Po) which is the data from xylanase enzyme activity (U/ml) against the use of substrate (So-S) Yp/s obatain was 2.255 (U / mg substrate). Biomass yield (Yx/s) is obtained by mapping the value (X-Xo) against the use of substrate (So-S). The slope of the line is the value of Yx / s, ie for 0.004 (g biomass / g substrate), it means in each gram of substrate consumed obtain 4 mg of biomass. The purification process are summarized in Table 1 below.

Table 1. Purification of xylanase from *S.aureus* MBXi-K4

Step	Volume (ml)	Total Protein (mg)	Total Xylanase activity (U)	Enzyme spesific activity (U/mg)	Recovery (%)	Fold
Crude Extract	81	3.32	109.01	32.82	100	1
Amm.sulfate precipitation	10	0.48	18.06	37.39	16.57	1.14
Dialysis	5	8.81	8.81	32.59	8.08	0.87
Sephadex G-100	3	0.012	4.69	383.90	4.30	11.69

Conclusion

Xylanase from *Staphylococcus aureus* MBXi-K4 is classified as moderate thermostable where its maximum activities at 70^{o}C and still be maintained its activity more than 70% for 30 minutes. This enzyme can work at a pH range from 4 to 8 with optimum pH value of 6 and optimum temperature of 70^{o}C. Based on the character of xylanase obtained despite having a chance to be applied to the feed industry but needed some improvements, especially in its resistance to high temperature and its productivity.

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THE 3RD ANIMAL PRODUCTION INTERNATIONAL SEMINAR
THE 3RD ASEAN REGIONAL CONFERENCE ON ANIMAL PRODUCTION
19-21 OCTOBER 2016
MALANG, EAST JAVA, INDONESIA

ISBN : 978-602-432-017-1

Co-organized by :