CERTIFICATE

THIS IS TO CERTIFY THAT

Budi Santoso (Indonesia/ Presenter)

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PREFACE

SAADC2013 is the fourth in the biennial conference on *Sustainable Animal Agriculture for Developing Countries;* the first being held in Kunming, China in 2007 and the second and third in Kuala Lumpur, Malaysia and Nakhon Ratchasima, Thailand in 2009 and 2011 respectively. This series of conferences is designed to provide a platform for the exchange of experience and knowledge among academicians, researchers, graduate students and producers for development of sustainable animal industry in developing countries. A total of 181 Extended Abstracts have been accepted for presentation during the 4-day conference and are published in this proceedings.

The Extended Abstracts, submitted by participants from 26 different countries, consist of 2 Keynote addresses, 10 Plenary lectures, 13 Lead papers and 162 scientific presentations. They cover policies and management strategies, nutrition and feeding, physiology, breeding and genetics, production systems, and biotechnology pertaining to the development of sustainable livestock industry.

The SAADC2013 had assembled together a proficient team for the Editorial Board. However, their duties were constrained by the late submissions of many abstracts, hence these will appear 'as is' with minimal editing. The accuracy of the contents, including methodologies and results of the Abstracts are the sole responsibility of the authors.

I would like to extend my sincere gratitude to the members of the SAADC2013 Editorial Board for their commitment and diligence in coming up with this Proceedings.

With best regards

Chairman SAADC2013 Editorial Board

Members of the Editorial Board

Oral 57

Influence of Concentrate Containing Probiotics on Fermentation Characteristics and *in vitro* Methane Production of *Pennisetum purpureophoides*

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Introduction

Methane (CH_4) production from ruminant does not only cause a substantial loss in efficiency of animal production, but also contributes significantly to global warming. Recently, there is an increasing interest in research to evaluate the potential of probiotics as feed additives instead of chemical compounds *i.e.* ionophores and antibiotics as manipulators of rumen fermentation to decrease CH_4 production. In a previous study, Mwenya *et al.*, (2004) reported that adding yeast culture containing 21% of *S. cerevisiae* reduced CH_4 production by 10% in sheep as compared to the control sheep. In *in vitro* study, Lila *et al.*, (2004) concluded that *S. cerevisiae* stimulated mixed rumen fermentation with decreased lactate, and a small decrease of methane and hydrogen. Therefore, the objective of the present study was to evaluate the effect of different concentrate containing probiotics on fermentation characteristics and *in vitro* methane production.

Materials and Methods

The concentrates were mainly formulated from agricultural and food industry by-products *i.e.* tofu waste, cassava waste, sago waste and rice bran. Two LAB strains *i.e Lactobacillus plantarum* and *Lactobacillus acidhophilus*, and one yeast strain of *Saccharomyces cerevisiae* were used as probiotics. The LAB and yeast were mixed with sago gelatin, $ZnSO_47H_2O$, $CoCl_6H_2O$ and urea as catalytic supplement. Four type of concentrates namely I. Concentrate containing *L. plantarum* and *L. acidophilus* 2% (w/w); II Concentrate containing *L. plantarum*, *L. acidophilus* and *S. cerevisiae* 2% (w/w); III. Concentrate containing *L. plantarum* and *L. acidophilus* 4% (w/w); IV. Concentrate containing *L. plantarum*, *L. acidophilus* and *S. cerevisiae* 4% (w/w). Six treatments tested were (A) *P. purpureophoides* as control; (B). *P. purpureophoides* + concentrate without probiotic; (C) *P. purpureophoides* + + concentrate I; (D) *P. purpureophoides* + concentrate II; (E) *P. purpureophoides* + concentrate III; (F) *P. purpureophoides* + concentrate IV. The ratio of *P. purpureophoides* and concentrate was 70 : 30 on DM basis. The samples were incubated in syringes containing rumen liquor-buffer mixtures at 39 °C for 48 hours. Variables measured were CH_4 production, and ammonia-N and volatile fatty acids (VFAs).

Results and Discussion

CH_4 production was reduced by 60.3% in grass substrate with concentrates (B, C, D, E and F) compared to grass alone (A). Addition of probiotics in concentrate reduced CH_4 production

by 18.8% compared to concentrate without probiotics. Methane production was significantly lower ($P<0.05$) in treatments D and F than treatments C and E. The reduction could be due to increasing utilization of hydrogen by ruminen acetogenic bacteria (Chaucheyras *et al.*, 1995). Total VFA concentration was higher ($P<0.01$) in grass substrate with concentrate (B, C, D, E, F) than grass alone (A). Concentration of propionic acid decreased ($P<0.01$) in grass substrate with concentrate than grass substrate alone, whereas concentration propionic acid increased ($P<0.01$) in grass substrate combined with concentrate. Addition of *L. plantarum, L. acidophilus* and *S. cerevisiae* in the concentrate increased ($P<0.05$) propionic acid concentration. This result was supported by Lila *et al.*, (2004) that increasing concentration of *S. cerevisiae* caused a linear increase in the proportion of propionate. Chamberlain (1987) revealed that lactic acid that produced by *lactobacillus* could be converted to propionic acid by *Megasphaera elsdenii* in the rumen.

Conclusion

Addition of probiotics, strain of *L. plantarum, L. acidophilus* and *S. cerevisiae* in concentrate increased propionic concentration and decreased *in vitro* CH_4 production.

References

Chaucheyras, F., G. Fonty, G. Bertin and P. Gouet, 1995. In vitro H_2 utilization by a ruminal acetogenic bacterium cultivated alone or ini association with an archea methanogen is stimulated by a probiotic strain of *Saccharomyces cerevisiae*. *Appl. Environ. Microbiol.* 61:3466-3469.

Chamberlain, D. G. 1987. The silage fermentation in relation to the utilization of the nutrients in the rumen. Process Biochem. 22: 60–63.

Lila, Z.A., N. Mohammed, T. Yasui, Y. Kurokawa, S. Kanda and H. Itabashi, 2004. Effects of a twin strain of *Saccharomyces cerevisiae* live cells on mixed ruminal microorganism fermentation *in vitro*. *J. Anim. Sci.* 82:1847-1854.

Mwenya, B., B. Santoso, C. Sar, Y. Gamo, T. Kobayashi, I. Arai and J. Takahashi, 2004. Effects of including β 1-4 galacto-oligosaccharides, lactic acid bacteria or yeast culture on methanogenesis, energy and nitrogen metabolism in sheep. *Anim. Feed Sci. Technol.* 115 : 313–326.