Original Article

Journal of Animal Feed Science and Technology
Volume 12 Number 1, January - June 2024
DOI: http://dx.doi.org/10.21088/jafst.2321.1628.12124.1

Effect of Inclusion of Rice DDGS and MOS on Serum Biochemical Parameters in SVVU T 17 Grower Pigs

L.S.S.Varaprasad Reddy[1], S. Harsha Lekha[2], A.V. Siva Reddy[3], K. Mounica[4], B.R. Naik[5], A.V.N. Sivakumar[6], M. Kalyana Chakravarthi[7]

How to cite this article:
L.S.S.Varaprasad Reddy, S. Harsha Lekha, A.V. Siva Reddy, *et al.* Effect of Inclusion of Rice DDGS and MOS on Serum Biochemical Parameters in SVVU T 17 Grower Pigsr. Jrl of Ani Feed Sci and Tech 2024;12(1):07-10.

Abstract

A study was conducted on eighteen SVVU T-17 grower pigs with similar body weights, and were divided into three groups with 6 pigs in each group for a period of 60 days to study the effect of inclusion of rice distillers dried grains with solubles (DDGS) and Mannan oligosaccharide (MOS) supplementation to the basal diet on serum biochemical parameters. The study revealed that among the biochemical parameters ALT, AST, Creatinine and Cholesterol exhibited significant decrease ($P<0.05$) in Mannan-oligosaccharides (MOS) supplemented group compared to other groups. Whereas, total protein and blood urea nitrogen (BUN) did not differ significantly ($P>0.05$) among the different groups. whereas in rice DDGS supplemented group there was no much observable effects on serum biochemical parameters in SVVU T17 crossbred pigs.

Keywords: MOS; Rice DDGS; Serum biochemical parameters; SVVU T17 Grower pigs.

INTRODUCTION

Since 70% of the pig population is raised using a conventional small-holder, demand-driven, low-input production system, pigs maintain a significant position among livestock species. Feed additives have been used extensively as livestock growth promoters to boost animal productivity and profitability. Therefore, it is crucial to alter the gut microbiota to benefit the host by using high nutritional value by-products, prebiotics, etc., Distillers dried grains with solubles (DDGS) is a by-product of the beverage and fuel alcohol industries. It has a relatively high concentration of energy and a moderate concentration of protein. For swine producers, DDGS is a popular and affordable alternative feed ingredient due to its excellent nutritional content, low cost, and relative abundance. Including DDGS in swine diets concurrently minimized cost of production (De Matteis et al, 2018). Prebiotics are substances that encourage helpful microbes to multiply and improve the gut health of their hosts. Mannan-

Author Affiliation: [1-7]Department of Veterinary Physiology, College of Veterinary Science, Sri Venkateswara Veterinary University, Tirupati 517502, Andhra Pradesh, India.

Corresponding Author: L.S.S. Vara Prasad Reddy, Department of Veterinary Physiology, College of Veterinary Science, Sri Venkateswara Veterinary University, Tirupati 517502, Andhra Pradesh, India.

E-mail: shivavet@gmail.com

Received on: 15.10.2024

Accepted on: 13.11.2024

oligosaccharides (MOS) offered better feed consumption, comparable daily weight gains and reduced mortality rate (Van der Aar et al., 2017). Intestinal microflora, which breaks down MOS, can alter the flora by reducing harmful bacteria and increasing healthy ones (Quigley, 2005). Hence, the present study is aimed to evaluate the effect of inclusion of Rice DDGS and Mannan oligosaccharide (MOS) supplementation on serum biochemical parameters in SVVU T-17 grower pigs

MATERIALS AND METHODS

The experiment was conducted in eighteen SVVU T17 grower pigs of around 3 months age and were assigned into three homogeneous treatment groups randomly Control (T1), Rice DDGS supplemented group (T2) and MOS supplemented group (T3) with six pigs in each group. The trail was conducted for a period of 60 days in order to investigate the effects of supplementation of rice DDGS and MOS on serum biochemical parameters. The research was conducted at ICAR-AICRP on pigs, SVVU, Tirupati. Blood samples were collected from pigs on 60th day of experimental period from the ear vein of pigs into clot activator vials for serum collection. The semi-automatic biochemistry analyzer calculated the serum biochemical parameters in accordance with industry standards using kits provided by Erba. The results obtained were subjected to analysis through software (version 22.0, SPSS 2013) by applying one-way analysis of variance through generalized linear model and the treatment means were ranked using Duncan's multiple range test with a significance at P<0.05 (Duncan 1955). All the statistical procedures were done as per Snedecor and Cochran (1994).

RESULTS

Table 1: Experimental Design

Group	Number of Animals	Supplementation
T1	6	Basal diet as per NRC 2012
T2	6	Basal diet + rice DDGS @ 10% of diet
T3	6	Basal diet + Mannan oligosaccharide @ 5g/kg of diet

The biochemical parameters that were designed for the study were estimated from serum separated from blood collected at the 60th day of the experiment were given in the table 2.

Table 2: Biochemical profile of experimental groups (60th day)

Parameter	Control (T1)	Rice DDGS (T2)	MOS (T3)
ALT (IU/L)	41.85±0.79^{b}	40.23±1.52^{b}	31.87±1.03^{a}
AST (IU/L)	48.94±0.61^{b}	48.03±1.06^{b}	37.24±1.18^{a}
Total Protein (g/dl)	6.68±0.19^{a}	6.75±0.14^{a}	6.73±0.19^{a}
Creatinine (mg/dl)	1.63±0.03^{b}	1.61±0.04^{b}	1.50±0.03^{a}
BUN (mg/dl)	26.82±1.36^{a}	28.69±0.90^{a}	27.79±1.69^{a}
Cholesterol (mg/dl)	102.61±2.85^{b}	97.11±2.72^{b}	85.68±2.12^{a}

Serum collected from 60th day of experimental period (table 2) represented a significant decrease (P<0.05) in alanine transaminase (ALT) levels in group T3, compared to group T1 and group T2. Similarly, AST levels were also decreased significantly (P<0.05) in group T3 compared to group T1 and group T2. Total protein and blood urea nitrogen (BUN) did not differ significantly (P>0.05) among the different groups. Whereas Creatinine and Cholesterol concentration showed a significant (P<0.05) decrease in group T3, compared to group T1 and group T2.

DISCUSSION

From the current results, it was observed that biochemical parameters were influenced with MOS supplementation, especially ALT, AST,

Creatinine and Cholesterol levels were decreased significantly (P<0.05) in T3 group. The ALT and AST activity levels can be used to assess the health condition of liver (Króliczewska et at., 2017). Better liver functionality is indicated by the drop in liver enzymes (ALT and AST) across all treatment groups while they were still within physiological range. In our present study decreased ALT and AST levels in the MOS supplemented group when compared with control group and rice DDGS supplemented groups clearly indicated the hepato-protective nature of Mannan-oligosaccharides. ALT and AST results were obtained in the study were in agreement with the results of Cui Ma et al. (2020) and Xie peng et al. (2020) in sows. Whereas, these results were conflicted by Jie yin et al. (2019) in piglets and Hussein et al. (2020) in broiler chickens. Abd-Allah et al. (2020) reported no significant change in ALT and AST levels.

The decreased levels of creatinine in our study were in agreement with the findings of Jie yin et al. (2019) with xylo-oligosaccharide supplementation in weaned piglets. These results were further supported by Abdelhady and El-Abasy, (2015) by supplementation of prebiotic (Bio-MOS) and probiotic (Bio-Plus). Whereas, no influence on BUN levels in our study were in agreement with Wang et al. (2015) in broilers. But in contrary to our results, Cui Ma et al. (2020) reported a significant change in BUN levels in piglets with prebiotic and symbiotic supplementation. Cholesterol levels were significantly (P<0.05) reduced in the present study may be due to MOS that enhances bile production and hence lipid digestion. Inclusion of MOS in the diet led to a decrease in total cholesterol biosynthesis.

CONCLUSIONS

Among several serum biochemical parameters ALT, AST, Creatinine and Cholesterol exhibited significant decrease (P<0.05) in Mannan-oligosaccharides (MOS) supplemented group. Whereas, total protein and blood urea nitrogen (BUN) did not differ significantly (P>0.05) among the different groups.

REFERENCES

1. Abd-Allah, M., Hassan, E. H. S., and Daghash, M. W. H. (2020). Influence of feeding different types of oligosaccharides on growth performance, digestibility and some blood parameters of fattening egyptian buffalo steers. Egyptian Journal of Animal Production, 57(2), 53-61.
2. Abdelhady, D. H., and El-Abasy, M. A. (2015). Effect of Prebiotic and Probiotic on Growth, Immuno-hematological responses and Biochemical Parameters of infected rabbits with Pasteurella multocida. Benha Veterinary Medical Journal, 28(2), 40-51.
3. Cui Ma, C., Gao, Q., Zhang, W., Zhu, Q., Tang, W., Blachier, F., and Kong, X. (2020). Supplementing Synbiotic in Sows' Diets Modifies Beneficially Blood Parameters and Colonic Microbiota Composition and Metabolic Activity in Suckling Piglets. Frontiers in veterinary science, 7, 1004.
4. De Matteis M C, Yu T E, Boyer C N, DeLong K L and Smith J 2018. Economic and environmental implications of incorporating distillers' dried grains with solubles in feed rations of growing and finishing swine in Argentina. International Food and Agribusiness Management Review. 21(6): 803–816.
5. Duncan, D. B. 1955. Multiple range and multiple F tests. Biometrics, 11(1), 1-42.
6. Hussein, E. O., Ahmed, S. H., Abudabos, A. M., Aljumaah, M. R., Alkhlulaifi, M. M., Nassan, M. A., and Swelum, A. A. (2020). Effect of antibiotic, phytobiotic and probiotic supplementation on growth, blood indices and intestine health in broiler chicks challenged with Clostridium perfringens. Animals, 10(3), 507.
7. Jie Yin, J., Li, F., Kong, X., Wen, C., Guo, Q., Zhang, L., and Yin, Y. (2019). Dietary xylo-oligosaccharide improves intestinal functions in weaned piglets. Food & function, 10(5), 2701-2709.
8. Króliczewska, B., Mišta, D., Króliczewski, J., Zawadzki, W., Kubaszewski, R., Wincewicz, E., Zuk, M., and Szopa, J. 2017. A new genotype of flax (Linumusitatissimum L.) with decreased susceptibility to fat oxidation: Consequences to hematological and biochemical profiles of blood indices. Journal of the Science of Food and Agriculture, 97(1), 165-171.
9. Quigley, J. D. (2005). Mannan-oligosaccharides and other non-antibiotic alternatives to the management of enteric disease of cattle. In American Association of Bovine Practitioners Proceedings of the Annual Conference, 19-24.
10. Recharla, N., Balasubramanian, B., Song, M., Puligundla, P., Kim, S. K., Jeong, J. Y., and Park, S. 2021. Dietary turmeric (Curcuma longa) supplementation improves growth performance, short-chain fatty acid production, and modulates bacterial composition of weaned piglets. Journal of Animal Science and Technology, 63(3), 575.
11. Snedecor, G. W., and Cochran, W. G. 1994. Statistical methods. 8th edition East West press private limited, New Delhi, India, 313.
12. SPSS Inc.,2013. SPSS for windows (Release 22.0) Standard Version. SPSS Inc. Headquarters, 233 S. Wacker Drive, 11th floor Chicago, Ilinois 60606,

USA.

13. Van der Aar, P. J., Molist, F. V., and Van Der Klis, J. D. (2017). The central role of intestinal health on the effect of feed additives on feed intake in swine and poultry. Animal feed science and technology, 233, 64-75.
14. Wang, W., Yang, H., Wang, Z., Han, J., Zhang, D., Sun, H., & Zhang, F. (2015). Effects of prebiotic supplementation on growth performance, slaughter performance, growth of internal organs and small intestine and serum biochemical parameters of broilers. Journal of Applied Animal Research, 43(1), 33-38.
15. Xie Peng, X., Yan, C., Hu, L., Huang, Y., Fang, Z., Lin, Y., and Che, L. 2020. Live yeast supplementation during late gestation and lactation affects reproductive performance, colostrum and milk composition, blood biochemical and immunological parameters of sow. Journal of Animal Nutrition, 6(3), 288-292.