

The Effect of a Herbal Growth Promoter Feed Additive on Shrimp Performance

¹J.A. Olmedo Sanchez, ²A. Curiel Flores and ¹J.R. Orozco Hernandez

¹Departamento de Ciencias Biologicas, Centro Universitario de Los Altos,
Universidad de Guadalajara, P.O. Box 58. Km 7.5 Carretera Tepatitlan-Yahualica,
Tepatitlan de Morelos, Jalisco, Mexico

²Laboratorio Medalvet, Guadalajara, Jalisco, Mexico

Abstract: The consumer of seafood relates the potential development of animals to the constant use of commercial growth promoters. Nevertheless, nowadays with the development of nonantibiotic feed additives the animal performance has improved. Some phytogetic compounds have augmented animal production by reducing levels of pathogenic bacteria. The objective of the present study was to assess the use of Fortimax™ as a natural phytogetic growth promoter in intensive shrimp production. Assessment was based on the performance of the animal when fed a commercial diet. With the phytogetic, shrimp weight and average daily gain were increased ($p < 0.05$) and the interaction of sampling time and treatments was significant for both parameters ($p < 0.05$).

Key words: Shrimp, feed additive, phytogetic growth promoter, performance, commercial diet

INTRODUCTION

In feeding farm animals the actual research is aimed at finding natural feed additives that can replace antibiotics with natural occurring promoters (probiotics, prebiotics, feed enzymes, organic acids, herbs) to achieve the production goal (Buchanan *et al.*, 2008; Cullen *et al.*, 2005; Czech *et al.*, 2009; Griggs and Jacob, 2005; Hanczakowska and Swiatkiewicz, 2007).

Herbs may be used as preparations containing a herbal mixture or as individual ingredient in the diet (Czech *et al.*, 2009). The product resulted of the use of natural promoters from herbs and spices is of a more favorable acceptance by the consumer. Research has proven that certain herbal extracts act as a growth promoters in intensive systems of production (Czech *et al.*, 2009; Garcia *et al.*, 2007; Hernandez *et al.*, 2004; Mitsch *et al.*, 2004; Muniruzzaman and Chowdhury, 2004; Stanley *et al.*, 2004), however the results are still contradictory.

Few studies (Citarasu *et al.*, 2003; Immanuel *et al.*, 2004; Michael Babu *et al.*, 2008 and Venketramalingam *et al.*, 2007) have reported the effect of herbal extract mixture as phytogetic growth promoting agent on the shrimp growth.

MATERIALS AND METHODS

Eight hundred one day-old *Peneaus indicus* juveniles shrimps (5 g, average individual weight) were group separated ($n = 30$) in tanks and sampled every 7 days. The study lasted until the age of the shrimp reached 58 days. The phytogetic growth promoter Fortimax™ (Herbal extracts (*Illicium verum*, *Aloe vera*, *Passiflora* sp., *Petroselinum sativum*, *Allium cepa*, *Rosmarinus officinalis*) and Neutraceutical (extracts of *Avena sativa*, *Yucca schidigera*, *Arnica longifolia*, *Chrysanthemum cinerariaefolium*, *Cynara scolymus*) and therapeutics (somatotropin and hypofisis extract)) was used at the rate of 1 kg ton^{-1} of feed. The shrimp feed was sprayed with the Fortimax prior the start of the experiment. The shrimp was sampled and weighted using an electronic scale to assess the gain of weight for each 7 day period. Data were submitted to variance analysis as a random trial and repeated measurements, establishing a 0.05 alpha to declare differences among treatments and times (SAS).

RESULTS AND DISCUSSION

Final body weight of shrimps averaged 48.96 g. With the use of the phytogetic growth promoter (Fortimax™)

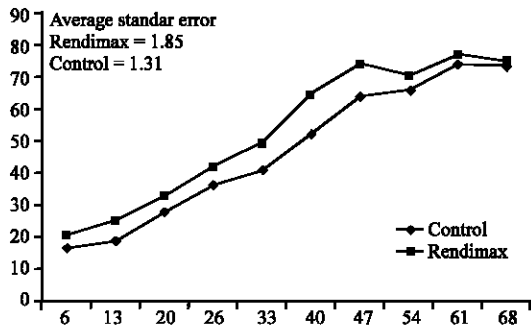


Fig. 1: Effect of phytogenic growth promoter on shrimp final weight (g)

the individual final weight was increased 13.18% ($p < 0.05$; 53.08 ± 0.59 vs. 46.90 ± 0.41 g, for growth promoter and control, respectively). The latter result has evidently an important economical impact since Fortimax diminishes the time required to achieve the commercial shrimp weight demand. Also the interaction between the growth promoter and the time of sampling was statistically significant ($p < 0.05$; Fig. 1).

The Average Daily weight Gain (ADG) was affected by the promoter ($p < 0.5$; 1.70 ± 0.03 vs. 1.44 ± 0.02 g day⁻¹, for Fortimax and control, respectively) and the interaction ($p < 0.05$) of this promoter and the assessed sampling time. The mean ADG was 1.53 g.

CONCLUSION

Based on the results of the trial, it could be concluded that with the phytochemical growth promoter performance of the shrimps can be improved.

REFERENCES

Buchanan, N.P., J.M. Hott, S.E. Cutlip, A.L. Rack, A. Asamer and J.S. Moritz, 2008. The effects of a natural antibiotic alternative and a natural growth promoter feed additive on broiler performance and carcass quality. *J. Applied Poult. Res.*, 17: 202-210. DOI: 10.3382/japr.2007-00038.

Citarasu, T., K. Venket Ramalingam, R. Raja Jeya Sekar, M. Micheal Babu and M.P. Marian, 2003. Influence of the antibacterial herbs, *Solanum trilobatum* *andrographis paniculata* and *Psoralea corylifolia* on the survival, growth and bacterial load of *Penaeus monodon* post larvae. *Aquac. Int.*, 11: 583-595. DOI: 10.1023/B:AQU.0000013322.53358.53.

Cullen, S.P., F.J. Monahan, J.J. Callan and J.V.O. Doherty, 2005. The effect of dietary garlic and rosemary on grower-finisher pig performance and sensory characteristics of pork. *Irish J. Agric. Food Res.*, 44 (1): 57-67. <http://www.teagasc.ie/research/journal-archives/vol44no1/207.pdf>.

Czech, A., E. Kowalczyk and E.R. Grella, 2009. The effect of an herbal extract used in pig fattening on the animals' performance and blood components. *Annales Universitatis Mariae Curie-Sklodowska*, 27 (2): 25-33. DOI: 10.2478/v10083-009-0009-7.

Garcia, V., P. Catala-Gregori, F. Hernandez, M.D. Megias and J. Madrid, 2007. Effect of formic acid and plant extracts on growth, nutrient digestibility, intestine mucosa morphology and meat yield of broilers. *J. Applied Poult. Res.*, 16: 555-562. DOI: 10.3382/japr.2006-00116.

Griggs, J.P. and J.P. Jacob, 2005. Alternatives to antibiotics in organic poultry production. *J. Applied Poult. Res.*, 14: 750-756. <http://japr.fass.org/cgi/reprint/14/4/750?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&andorexactfulltext=and&searchid=1&FIRSTINDEX=0&sortspec=relevance&volume=14&firstpage=750&resource=HWCIT>.

Hanczakowska, E. and M. Swiatkiewicz, 2007. Application of herbs and herbal preparations in pig feeding. *Ann. Anim. Sci.*, 7 (1): 13-22. http://www.izoo.krakow.pl/czasopisma/annals/2007/AnnalsOfAnimalScience_2007_No1.pdf.

Hernandez, F., J. Madrid, V. Garcia, J. Orengo and M.D. Megias, 2004. Influence of two plant extracts on broilers performance, digestibility and digestive organ size. *Poult. Sci.*, 83: 169-174. <http://ps.fass.org/cgi/reprint/83/2/169?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&searchid=1&FIRSTINDEX=0&sortspec=relevance&volume=83&firstpage=169&resource=HWCIT>.

Immanuel, G., V.C. Vincybai, V. Sivaram, A. Palavesam and M.P. Marian, 2004. Effect of butanolic extracts from terrestrial herbs and seaweeds on the survival, growth and pathogen (*Vibrio parahaemolyticus*) load on shrimp *Penaeus indicus* juveniles. *Aquaculture*, 236 (1-4): 53-65. DOI: 10.1016/j.aquaculture.2003.11.033.

Michael Babu, M., V. Sivaram, G. Immanuel, T. Citarasu and S.M.J. Punitha, 2008. Effects of herbal enriched artemia supplementation over the reproductive performance and larval quality in spent spawners of the tiger shrimp (*Penaeus monodon*). *Turk. J. Fish. Aquac. Sci.*, 8: 301-307. http://www.trjfas.org/pdf/issue_8_2/301_307.pdf.

- Mitsch, P., K. Zitterl-Eglseer, B. Kohler, C. Gabler, R. Losa and I. Zimpernik, 2004. The effect of two different blends of essential oil components on the proliferation of *Clostridium perfringens* in the intestines of broiler chickens. *Poult. Sci.*, 83: 669-675. <http://ps.fass.org/cgi/reprint/83/4/669?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&searchid=1&FIRSTINDEX=0&sortspec=relevance&volume=83&firstpage=669&resourcetype=HWCIT>.
- Muniruzzaman, M. and M.B.R. Chowdhury, 2004. Sensitivity of fish pathogenic bacteria to various medicinal herbs. *Bangl. J. Vet. Med.*, 2 (1): 75-82. DOI: 10.3329/bjvm.v2i1.1941.
- Stanley, V.G., C. Gray, M. Daley, W.F. Krueger and A.E. Sefton, 2004. An alternative to antibiotic-based drugs in feed for enhancing performance of broilers grown on *Eimeria* sp. infected litter. *Poult. Sci.*, 83: 39-44. <http://ps.fass.org/cgi/reprint/83/1/39?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&andorexactfulltext=and&searchid=1&FIRSTINDEX=0&sortspec=relevance&volume=83&firstpage=39&resourcetype=HWCIT>.
- Venketramalingam, K., J.G. Christopher and T. Citarasu, 2007. *Zingiber officinalis* an herbal appetizer in the tiger shrimp *Penaeus monodon* (Fabricius) larviculture. *Aquac. Nutr.*, 13 (6): 439-443. DOI: 10.1111/j.1365-2095.2007.00495.x.