

# The effects of oral and bath treatment with metronidazole and levamisole on some of the serum enzymes and proteins in common carp (*Cyprinus carpio*)

Barakitabar, S.<sup>1</sup>; Peyghan, R.<sup>2</sup> and Razi jalali, M.<sup>2</sup>

Received: 28.07.2017

Accepted: 17.03.2018

## Abstract

Metronidazole and levamisole have several clinical and biochemical side effects such as changes in the activity of serum enzymes and proteins and other profiles. There are some reports of metronidazole and levamisole effect on blood serum proteins in animals, but there is no report of these drugs on criteria in common carp. In this study, 150 common carp (75±15 gr) were divided randomly into five categories. One group served as the control (no drug) and four treatment groups: Metronidazole bath (5mg/l/24hr in 2 days interval), Oral metronidazole (5mg/kg/10 days), Levamisole bath (5mg/l/24hr in 2 days interval) and Oral levamisole (5mg/kg/10days) were considered. After 10 days, on days 1, 7 and 14 after completion of treatment, blood samples were collected from fish and serum total protein in combination with electrophoresis and the activity of serum enzymes (AST, ALT and ALP) were performed. The results showed that there was no significant difference in plasma total protein in the studied groups compared to the control group. Serum enzymes activity in the control group was not significantly different between the two groups of levamisole bath and oral levamisole except for alkaline phosphatase. Aspartate aminotransferase enzyme activity in the oral metronidazole group was significantly higher than the control group. The mean values of albumin, alpha-1 globulin, alpha-2 globulins, beta-globulins and gamma globulins in the control group did not significantly differ with other groups. Based on the findings of this study, it can be concluded that levamisole and metronidazole drugs in the recommended doses in these treatments have altered some of the serum indices but did not significantly increase the number of studied factors. It does not have a significant effect on blood protein factors and it is advisable to recommend it as an antiparasitic treatment in common carp, although supplementary research seems necessary in this regard.

**Key words:** Common carp, Metronidazole, Levamisole, Enzyme, Electrophoresis

---

1- DVM Graduated from Faculty of Veterinary Medicine, Shahaid Chamran University of Ahvaz, Ahvaz, Iran  
2- Professor, Department of Clinical Sciences, Faculty of Veterinary Medicine, Shahaid Chamran University of Ahvaz, Ahvaz, Iran

**Corresponding Author:** Peyghan, R., E-mail: peyghan2014@gmail.com

## References

- Ali, S.S. (2013). Comparison of haematology and biochemistry of infected common carp (*Cyprinus carpio*). *Journal of Himalayan Ecology and Sustainable Development*, 2: 47-54.
- Alvarez-pellitero, P.; Stija-Bobadilla, A.; Bermuolez, R. and Quiroga, M.I. (2006). Levamisole activates several innate immune factors in *Scophthalmus maximus* (1) (Teleostei) *International Journal of Immunopathology and Pharmacology*, 19 (4): 727-738.
- Cho, M.J. and Haynes, L.C. (2013). Serum-catalyzed hydrolysis of metronidazole amino acid esters. *Journal of Pharmaceutical Sciences*, 74 (8): 883-885.
- Ispir, U. and Dorucu, M. (2005). A study on the effects of levamisole on the immune system of *Rainbow trout* (*Oncorhynchus mykiss*, walbaum). *Turkish Journal of Veterinary Animal Sciences*, 29: 1169-1176.
- Jeney, G. and Anderson, D.P. (1993). Enhanced immune response and protection prior immersion in immune stimulants. *Fish and Shellfish Immunology*, 3: 51-58.
- Kajita, Y.; Sakai, M.; Atsuta, S. and Kobayashi, M. (1990). The immunodulatory effects of levamisole on rainbow trout, *Oncorhynchus mykiss*. *Fish Pathology*, 25: 93-98.
- Kodama, H.; Mikami, T. and Izawa, H. (1980). Effects of levamisole on pathogenesis of marek's disease. *Journal of Nutle cancer Institute*, 65: 155-159.
- Kołodziejska, M.; Maszkowska, J.; Białk-Bielińska, A.; Steudte, S.; Kumirska, J.; Stepnowski, P. et al. (2013). Aquatic toxicity of four veterinary drugs commonly applied in fish farming and animal husbandry. *Chemosphere*, 92 (9): 1253-1259.
- Kumari, J. and Sahoo, P.K. (2005). Non-Specific immune response of healthy (*Clarius batrachus*) to several immunostimulants, *Aquaculture*, 255 (1-4), 133-141.
- Li, G.; Guo, Y.; Zhao, D.; Qian, P.; Sun, J.; Xiao, C. et al. (2006). Effects of levamisole on the immune response and disease resistance of *Clarias fuscus*, *Aquaculture*, 253. (1-4): 212-217.
- Li, P.; Wang, X. and Gatlin, D.M. (2006). Evaluation of levamisole as a feed additive for growth and health management of Hybrid striped bass (*Morone chrysops* × *Morone saxatilis*). *Aquaculture*, 251: 201-209.
- Midtlyng, P.J.; Reitan, L.J. and Speilberg, L. (1996). Experimental studies on the efficacy and side effects of intraperitoneal vaccination of Atlantic salmon (*Salmo salar* L.) against furunculosis. *Fish and Shellfish Immunology*, 6: 335-350.
- Nelson, J.S. (2006). *Fishes of The World*, 4<sup>th</sup> ed., John Wiley and Sons Inc. publisher, New Jersey, Pp: 138-148.
- Peyghan, R.; Khadjeh, G.H. and Enayati, A. (2014). Effect of water salinity on total protein and electrophoretic pattern of serum proteins of grass carp, *Ctenopharyngodon idella*. *Veterinary Research Forum*; 5(3): 225-229.
- Peyghan, R.; Razi Jalali, M. and Farrokhfar, S. (2012). Effect of levamisole on cholesterol, triglycerol and lipoprotein level of common carp (*Cyprinus carpio* L.) blood serum. *Journal of Pajouhesh and Sazandegi*. 101: 2-8.
- Peyghan, R.; Boloki, A. and Ghorbanpour, M. (2010). Case report and treatment of hole in the head in oscar, *Astronotus ocellatus*, *Iranian Journal of Veterinary Science and Technology*. 19 (6): 30-44.
- Roberts, R.J. (2012). *Fish Pathology*, 4<sup>th</sup> ed, London, Pp: 38-40.
- Treves-Brown, K.M. (2000). *Applied Fish Pharmacology*. Kluwer Academic Publisher, Pp: 155-160.