



EFFECTS OF ERGOSAN ON THE EXPRESSION OF IMMUNE RESPONSE GENES IN RAINBOW TROUT *Oncorhynchus mykiss* JUVENILES FOLLOWING AQUAVAC™ (ERM) VACCINATION

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ABSTRACT¹* Dipartimento Scienze del mare, Università, Politecnica delle Marche Via Brecce Bianche, 60131, Ancona (Italy),
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In this study the effects of administration of the immunomodulator Ergosan, an algal extract containing alginic acid, in rainbow trout juveniles after ERM (AquaVac™) vaccination, were tested. Juveniles were divided in two different groups : one fed for 95 days from the beginning of first solid feeding with Ergosan, and a second one, considered the control group, fed for the same period of time on a commercial diet solely. Both groups were vaccinated by immersion in AquaVac™ solution. A time course to detect the effects of vaccination on the immune response genes modulation and on the tolerance to stress manipulation connected with vaccination practices, was carried out. Interleukin-1β (IL-1β), interleukin-8 (IL-8), tumor necrosis factor α 2 (TNF2) and heat shock protein 70 (Hsp 70) genes expression in trout liver was monitored by real time PCR using Acidic Ribosomal Phosphoprotein P0 (ARP) as internal standard. The evaluation of the plasma cortisol levels was performed by EIA. The results obtained indicated the positive role of Ergosan on improving the immune responsiveness to AquaVac™ vaccine and on the manipulation stress response.

INTRODUCTION

Innate immune mechanisms act as a first line of defense against infection by inducing inflammation as an early immune response. Whilst a large number of cell types and mediators are involved in inflammatory events, in this study we focused on the expression levels of the cytokines, a group of molecules that have a key role as co-ordinators of these processes. Recently, significant progress has been made in identifying many cytokines and other immune related genes in rainbow trout, but very little is known about their expression after vaccination against viral infections [1]. In the last few years, some studies confirmed the immunostimulatory activity of Ergosan on fish [2,3], however, the involvement of Ergosan oral administration on immune genes modulation and on stress response tolerance related to vaccination procedures is still unclear. The aim of this work was to provide information on the effects of Ergosan on the innate immune system in liver trout juveniles exposed to AquaVac™ vaccine against enteric red mouth disease (ERM).

MATERIALS AND METHODS

 *A batch of 470000 rainbow trout embryos were divided in groups each of 10,000 specimens.
*First ERGOSAN administration started in all fries 7-10 days from the beginning of first solid feeding

CONTROL GROUPS
(COMMERCIAL DIET) →

← **TREATED GROUPS**
(COMMERCIAL DIET+ ERGOSAN)

ERGOSAN ADMINISTRATION PROTOCOL:
30 DAYS WITH ERGOSAN
15 DAYS WITH COMMERCIAL FEED
10 DAYS WITH ERGOSAN
20 DAYS WITH COMMERCIAL FEED
10 DAYS WITH ERGOSAN

AFTER 95 DAYS
AquaVac™ (ERM)
VACCINATION by immersion

SAMPLING

PLASMA:

•cortisol level

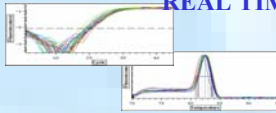
EIA



LIVER:

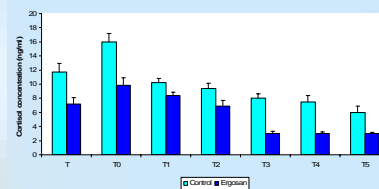
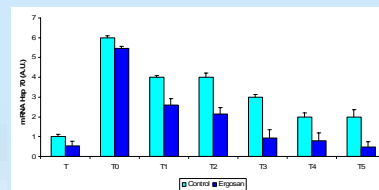
•Hsp70,IL-1,IL-8 and TNF2 gene expression

REAL TIME PCR

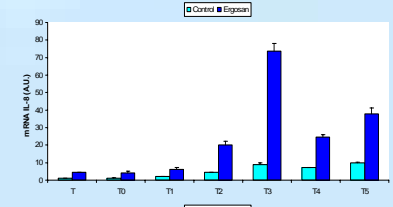
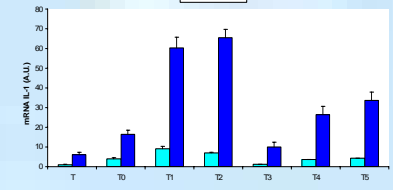
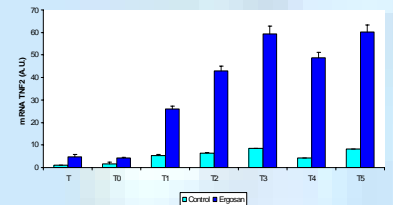


RESULTS

STRESS RESPONSE



INNATE IMMUNO SYSTEM RESPONSE



CONCLUSION

The current work represents the first study on cytokines expression in juvenile rainbow trout liver induced by AquaVac™ vaccination and the results reported here represent a step forward the understanding of the role of these immune molecules in fish following anti-bacterial vaccination. All the results obtained evidenced that AquaVac™ vaccinations up-regulated the cytokine expression, and that Ergosan played an immunomodulatory role, as indicated by a more prompt and greater immune response. In addition, the data obtained in this work apparently confirm recent data in trout [4] concerning the induction of IL-8 gene expression by IL1β and TNF2, as well as the control of TNF2 gene expression by IL-1β. In conclusion, this work clearly demonstrated that Ergosan oral administration in fish increased the efficacy of hepatic innate immunity activity and improved the tolerance to stress manipulation.

ACKNOWLEDGMENTS

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