

# You Decide: Global Aquaculture Innovation Award Finalists Make Their Pitch, Sponsored by Skretting

- **CRISTIÁN MORENO**, MNL GROUP / FUTERPENOL
- **MIHIR PERSHAD**, VAKSEA
- **ZACH STEIN**, OSMO SYSTEMS / OSMOBOT



CRISTIÁN  
MORENO  
DEPUTY  
DIRECTOR

# Futerpenol

Cristián is deputy director of the animal health division at Santiago, Chile-based MNL Group. Previously, he served as CEO of SalmonChile, focusing on rebuilding the industry in the wake of the ISA crisis. He understands the challenges aquaculture faces dealing with raising healthy, disease-resistant animals. MNL Group's innovation is Futerpenol®, a non-pharmacological, natural feed additive that reduces the need for antibiotics in aquaculture by producing stronger, more disease-resistant fish.



# THE FUTERPENOL STORY

CRISTIÁN MORENO T. - MBA

DEPUTY DIRECTOR  
ANIMAL HEALTH DIVISION  
MNL GROUP

**GOAL 2018**

GUAYAQUIL, ECUADOR  
SEPTEMBER 27, 2018.

**HELLO!**

*“The best way to predict your future, is to create it”  
Abraham Lincoln.*



A close-up photograph of a branch with several dark, round blackberries. The berries are attached to a reddish-brown stem and are surrounded by bright green, serrated leaves. The background is a soft-focus green, suggesting more foliage.

Natural Products: Maquibright® & Delphinol®

A dark, moody sky filled with heavy, grey clouds. The lighting is low, creating a somber and dramatic atmosphere. The clouds are dense and textured, with some lighter patches where light might be breaking through.

Day Zero





Typical Headline:

# Addicted to Antibiotics **Chile's Salmon Flops** **at Costco, Grocers**





**What will fish and shellfish  
farming look like  
in 10 years?**

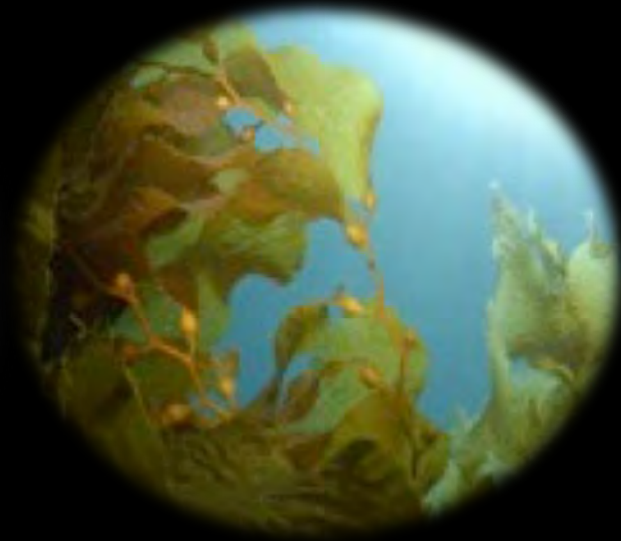




- 
- ✓ Uses Sustainable Feeds
  - ✓ Animal Welfare Is the “New Normal”
  - ✓ Positive Social and Environmental Impact



# OUR INNOVATION JOURNEY







## WHAT IS IT? AN ECO-FRIENDLY FEED ENHANCER

A novel class of immunostimulant that works on an intracellular level.

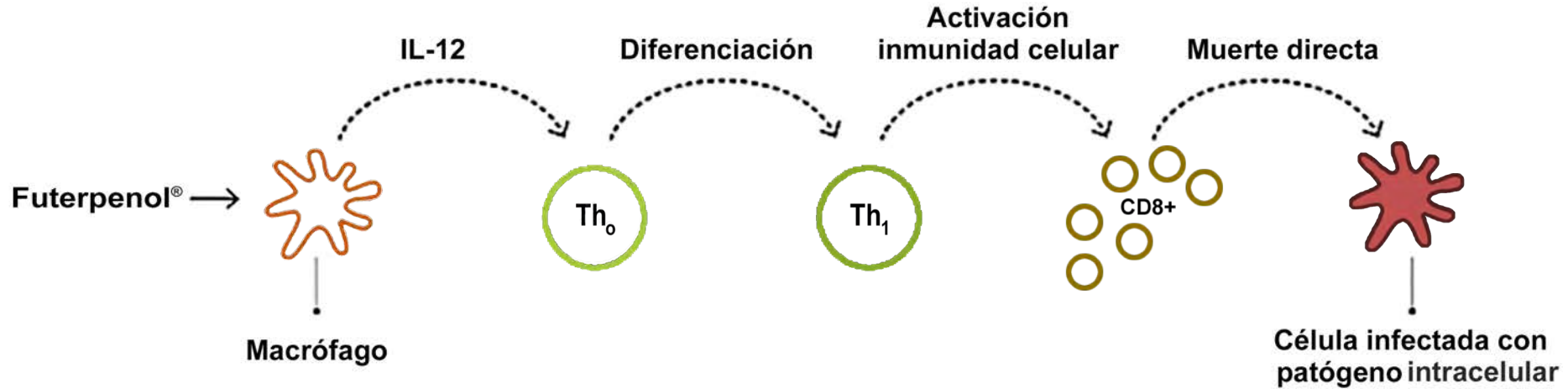
A proprietary nutraceutical and non-pharmaceutical product that contains bioactive molecules from botanical and algal sources.

Based on in vitro, in vivo, and field trials, Futerpenol® has clearly demonstrated its effectiveness in producing more disease-resistant fish.

Fish fed a Futerpenol-enhanced diet had better specific growth rates, better feed conversion ratios, and lower mortality rates.

As a result, salmon growers will have the option to reduce the use of antibiotics during the life cycle of the animal.

# HOW IT WORKS: MECHANISM OF ACTION





Contents lists available at ScienceDirect

Aquaculture

journal homepage: [www.elsevier.com/locate/aquaculture](http://www.elsevier.com/locate/aquaculture)



# The effects of supplemented diets with a phytopharmaceutical preparation from herbal and macroalgal origin on disease resistance in rainbow trout against *Piscirickettsia salmonis*

Adrián J. Hernández <sup>a,\*</sup>, Alex Romero <sup>b,c</sup>, Roxana Gonzalez-Stegmaier <sup>b,c</sup>, Patricio Dantagnan <sup>a</sup>

<sup>a</sup> Núcleo de Investigación en Producción Alimentaria/Escuela de Acuicultura, Facultad de Recursos Naturales, Universidad Católica de Temuco, Temuco, Chile

<sup>b</sup> Instituto de Patología, Facultad de Ciencias Veterinarias, Universidad Austral de Chile, Valdivia, Chile

<sup>c</sup> Centro FONDAPI: Interdisciplinary Center for Aquaculture Research (INCAR), Chile

## ARTICLE INFO

### Article history:

Received 30 September 2015

Received in revised form 15 December 2015

Accepted 16 December 2015

Available online 18 December 2015

### Keywords:

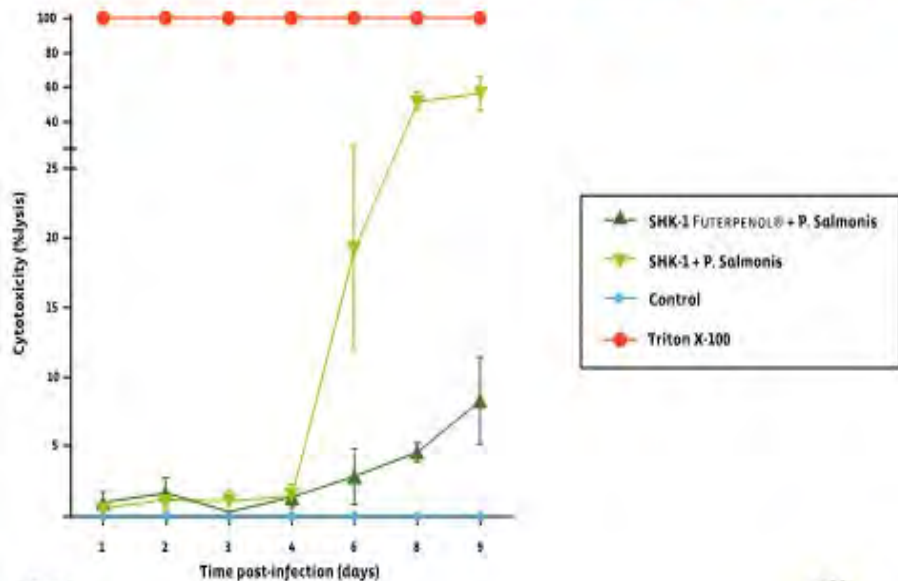
Phytopharmaceuticals

Labdane diterpenes

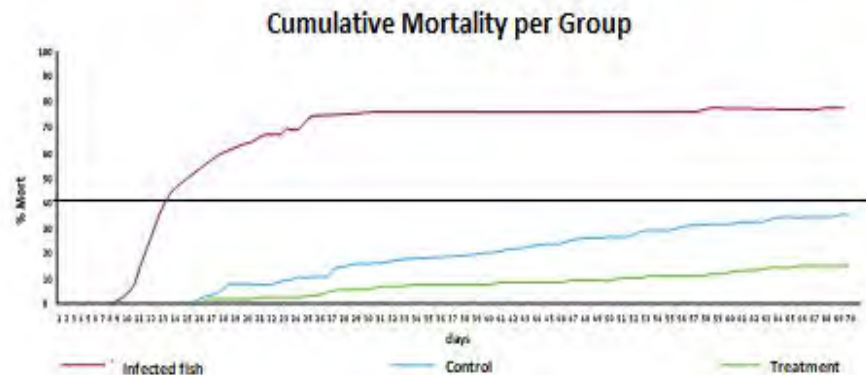
## ABSTRACT

The present study aimed to evaluate the effects of a commercial phytopharmaceutical preparation from herbal and macroalgal origin on the growth and immune response of rainbow trout adapted to seawater and its susceptibility to *Piscirickettsia salmonis* infection. Preliminary in vitro trials, evaluated the effects of the commercial product Futerenol® on the expression levels of selected immune-regulatory genes and its protective effect in a challenge against *Piscirickettsia salmonis* (LF89). Subsequent in vivo feeding trials were conducted to corroborate fish protection against *Piscirickettsia salmonis*. Control and treatment diets (with or without the commercial product Futerenol® at a concentration of 1 kg/ton) were fed to triplicate groups of 50 fish (average weight: 100.1 ± 11.1 g) during 30 days. Fish from all dietary groups were equally redistributed in three tanks and challenged with *Piscirickettsia salmonis*. Fish in control diet (without Futerenol®) showed a higher mortality rate compared to fish in treatment diet (with Futerenol®). The results of the study suggest that the commercial product Futerenol® has a protective effect against *Piscirickettsia salmonis* infection in rainbow trout.

## IN VITRO ASSAYS



## IN VIVO ASSAYS



After cohabitation challenge with *P. salmonis*, the group of fish fed treatment diet with Futerpeol showed a significant reduced mortality compared to the control group ( $P \leq 0.05$ ). A cumulative mortality of 35% in control group and 15% in Futerpeol group.

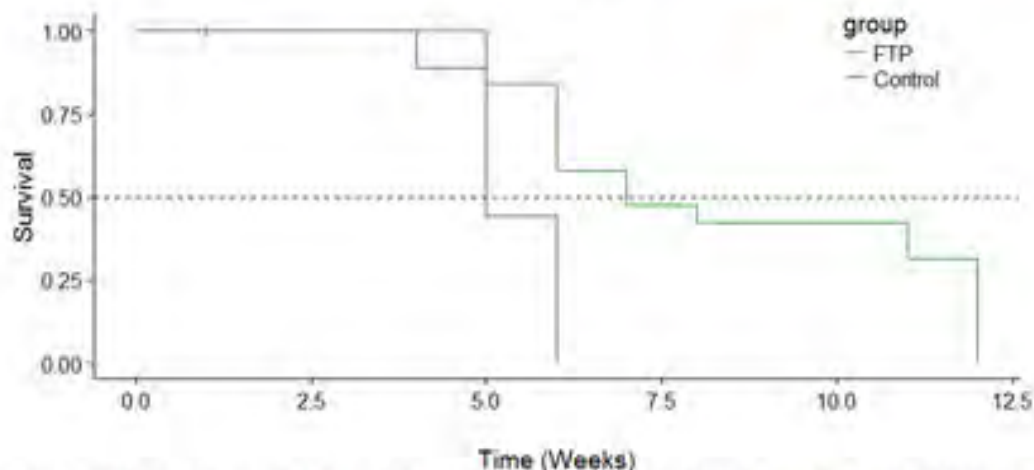






## Re-Infection Time Post-Treatment 0.1%

Overall Cages/Farm



The figure shows the time until the presentation of the event of interest, in this case when a cage reached a 0.1% mortality per week by SRS. Differences between control and Futerpenol group were analyzed with Long-Rank test  $p=0.0011$ .





**40%**  
**RPS**

**Vibriosis**

**IPN**

**Furunculosis**

**BKD**

**SRS**

**ISA**

**Flavobacteriosis**

**Yersiniosis**

**Francisellosis**

**HSMI**





PECES : 1.119.195

## Dieta Normal

SGR  
0,99

FCR<sub>e</sub>  
1,16

FCR<sub>b</sub>  
1,12



SGR  
1,16



FCR<sub>e</sub>  
1,09



FCR<sub>b</sub>  
1,06

## Dieta + **Futerpenol®**

PECES : 1.005.968

**WHAT'S NEXT FOR  
#FEEDGREEN?**





**SHRIMP!**

# CAN SHRIMP BENEFIT FROM #FEEDGREEN?



Futerpenol® is a nutraceutical immunostimulant. It is expected to activate the hemocytes, such as bacterial and/or fungal cell wall components, as a result, activating the immune response PRRs (Pathogen recognition receptors).



Help Us Keep Contributing to a  
**Responsible Aquaculture** Future:  
Vote for **#FeedGreen!** by **MNL**



- **Sharing Ideas?**
- **Talk About R&D Collaborative Project and Founding?**
- **Or want to know more about Futerpenol®?**

**cristian.moreno@mnl-group.com**

