



- [GOAL Events](#)
- [Advocate Magazine](#)
- [Aquademia Podcast](#)
- [Blog](#)
- [Contact](#)
-
-
-
-
-
- [Log In](#)



- [About](#)
 - [Who We Are](#)
 - [Our History](#)
 - [Our Team](#)
 - [Sustainable Development Goals](#)
 - [Careers](#)
- [Membership](#)
 - [Overview](#)
 - [Our Members](#)
 - [Corporate Membership](#)
- [Resources](#)
- [Certification](#)
 - [Best Aquaculture Practices](#)
 - [Best Seafood Practices](#)

Search...



[Log In](#)

- [About](#)
 - [Who We Are](#)
 - [Our History](#)
 - [Our Team](#)
 - [Sustainable Development Goals](#)
 - [Careers](#)
- [Membership](#)
 - [Overview](#)
 - [Our Members](#)
 - [Corporate Membership](#)
- [Resources](#)
- [Certification](#)
 - [Best Aquaculture Practices](#)
 - [Best Seafood Practices](#)
- [GOAL Events](#)
- [Advocate Magazine](#)
- [Aquademia Podcast](#)
- [Blog](#)
- [Contact](#)



Health & Welfare
Health & Welfare

Dietary threonine factor in tilapia fillet yield



2 July 2013 Dr. Wilson Massamitu Furuya Mariana Michelato Dr. Valéria R. Barriviera Furuya



Can be used to maximize fish growth, feed efficiency, meat production



Involved in protein synthesis, dietary threonine has a high influence on fish growth and fillet yield.

Tilapia culture has played an important role in the economy of Brazil, changing from traditional culture in earthen ponds to more intensive culture in cages. It is estimated that approximately 150,000 metric tons per year of this species are cultured in Brazil, making the country the most important producer in South America.

When fish are reared at high densities, nutritionally complete diets are necessary to support growth performance and fish health. Recently, tilapia nutrition and feeding – particularly the importance of amino acid nutrition for tilapia under intensive culture – have received special attention by many research groups in Brazil.

Fishmeal production has remained stable, and alternative ingredients such as feather meal, blood meal, and meat and bone meal protein have been used as substitutes for fishmeal in commercial diets for Nile tilapia in Brazil. However, the apparent digestibility coefficients for protein and amino acids in these ingredients are lower when compared to values for soybean meal.

Threonine

Threonine is the major component of mucin in the small intestines and skin of tilapia, and its supplementation is important for maintenance, growth and fish health. The threonine requirement for maintenance is high compared to other amino acids due to its high concentrations in intestinal and skin secretions. For this reason, threonine is very important for large fish, because the requirement for maintenance is much higher.

Threonine has an important influence on skeletal muscle, where it can change myoblast proliferation and differentiation, the composition of cytoplasmic organelles, the number and diameter of white and red muscle fibers, and patterns of gene expression related to muscle development. Involved in protein synthesis, dietary threonine has a high influence on fish growth and fillet yield.

Growth trial

To evaluate the effects of dietary threonine under commercial conditions, a trial was set up in the Paranapanema River in Brazil. Nile tilapia of 563.3 ± 15.9-g initial weight were randomly stocked into 20, 1,000-L net cages at 30 fish/cage and fed extruded isocaloric (3,043 kcal digestible energy/kg) and isoproteic (260 g/kg of digestible protein) diets containing digestible threonine values of 8.96, 10.58, 12.20, 13.83 and 15.44 g/kg. Fish were hand fed three times daily to apparent satiety for 30 days.

Results

Survival at the end of the experiment was about 98 percent, and no difference was observed among treatments. No statistically significant differences in daily weight gain and feed conversion were observed.

The dietary threonine:lysine ratios affected net protein utilization, with the best value at 11.54 g/kg of threonine (Table 1). For fillet weight and fillet yield, the maximum values were estimated at 11.43 and 11.45 g/kg of threonine, respectively (Figures 1 and 2). Diets containing 8.96-15.44 g/kg of threonine did not affect fish growth, feed conversion and survival. However, for maximal meat production of Nile tilapia from 550 to 800 g, the dietary threonine requirement is 11.40 g/kg.

Furuya, Mean values of Nile tilapia, Table 1

Parameter	Dietary Threonine (g/kg) 8.96	Dietary Threonine (g/kg) 10.58	Dietary Threonine (g/kg) 12.20	Dietary Threonine (g/kg) 13.83	Dietary Threonine (g/kg) 15.44	Standard Error	P Value
-----------	-------------------------------------	--------------------------------------	--------------------------------------	--------------------------------------	--------------------------------------	-------------------	------------

Parameter	Dietary Threonine (g/kg) 8.96	Dietary Threonine (g/kg) 10.58	Dietary Threonine (g/kg) 12.20	Dietary Threonine (g/kg) 13.83	Dietary Threonine (g/kg) 15.44	Standard Error	P Value
Initial weight (g)	558.75	565.5	566.5	572.25	553.50	3.26	≥ 0.05
Final weight (g)	783.74	829.31	786.79	769.96	761.29	3.34	≥ 0.05
Daily weight gain (g)	7.49	8.79	7.34	6.59	6.93	0.03	≥ 0.05
Feed-conversion ratio	1.47	1.26	1.51	1.68	1.60	0.07	≥ 0.05
Net protein utilization (%)	41.94	50.84	46.57	39.58	42.07	2.01	0.036

Table 1. Mean values of Nile tilapia performance fed graded levels of digestible threonine.

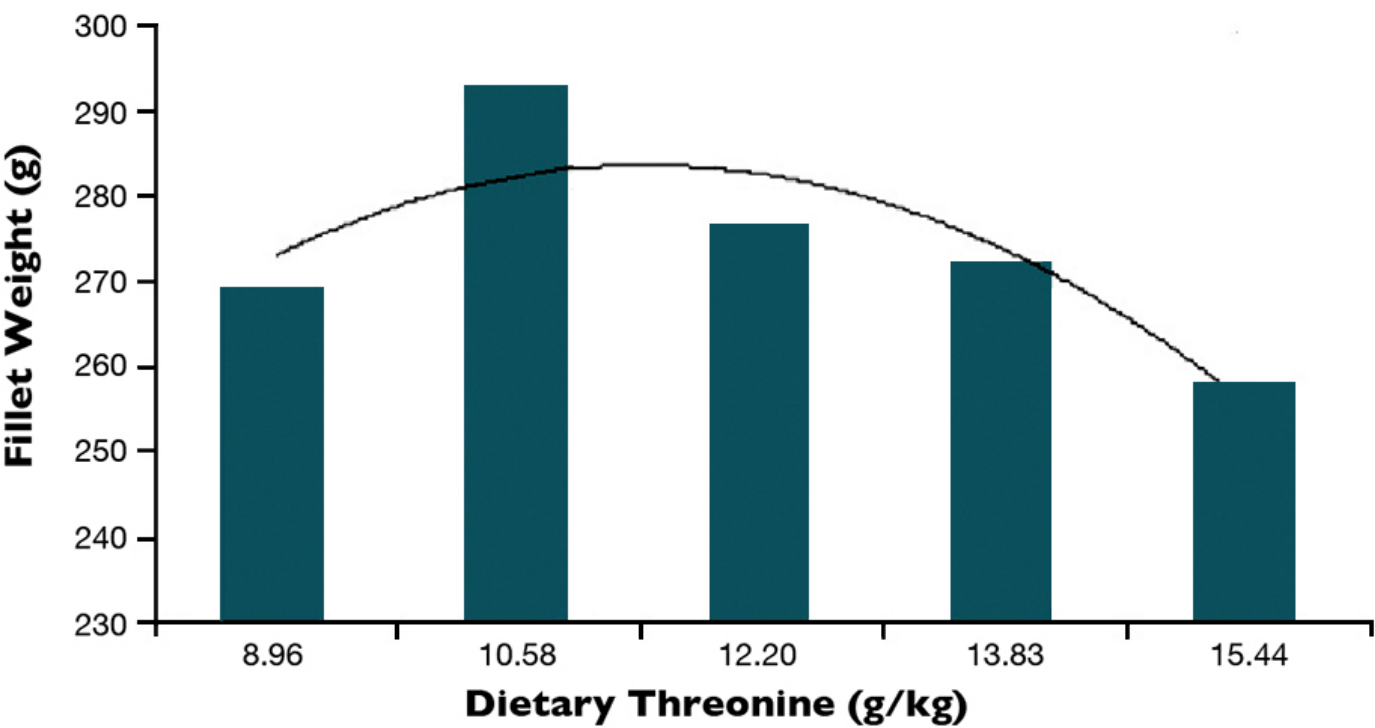


Fig. 1: Fillet weight of Nile tilapia fed graded levels of dietary threonine.

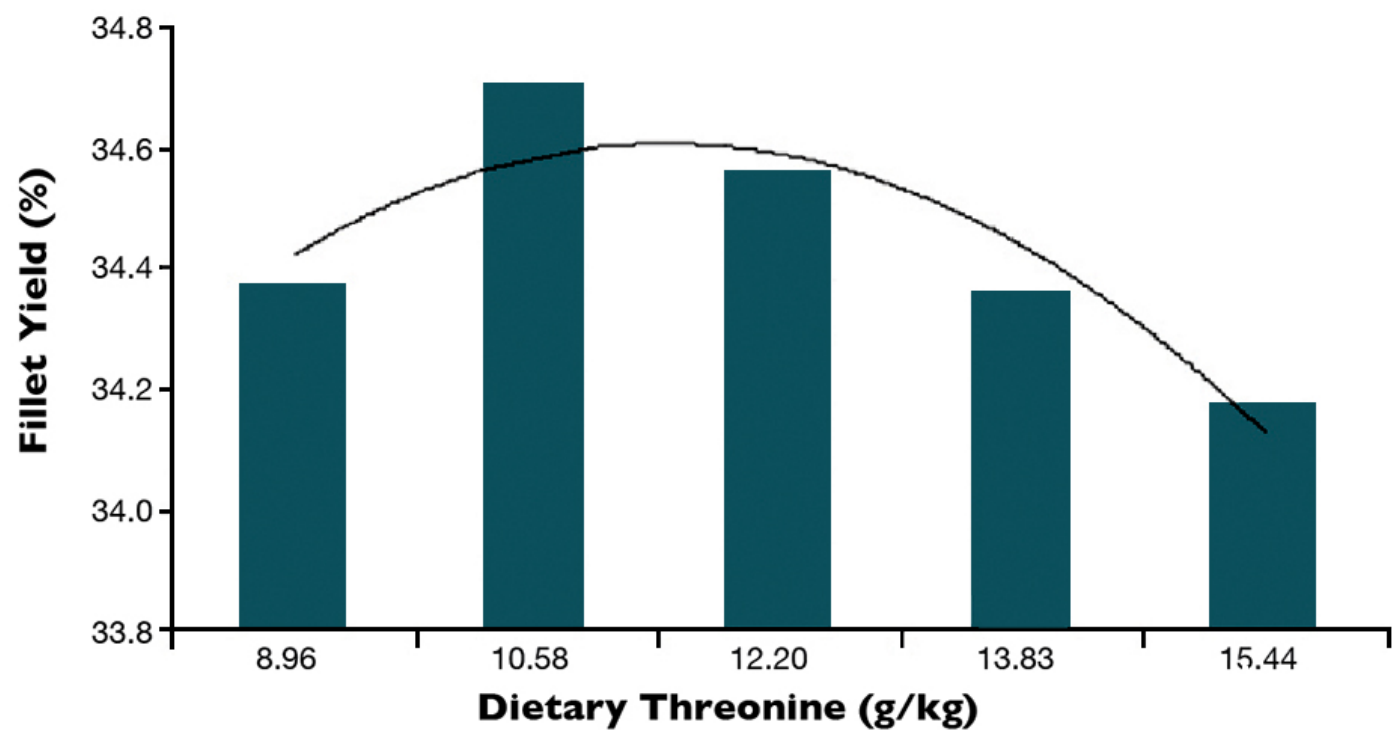


Fig. 2: Fillet yield of Nile tilapia fed graded levels of dietary threonine.

Perspectives

The use of crystalline amino acids in diets for tilapia must be based on the global benefits on fish growth, meat production and economic viability. For fillets, the most important product from tilapia aquaculture, L-threonine should be used to maximize fish growth, feed efficiency and meat production. Individual amino acids digestibility values should be determined for each ingredient to establish properly balanced diets for the sustainable and competitive growth of world tilapia production.

(Editor’s Note: This article was originally published in the July/October 2013 print edition of the Global Aquaculture Advocate.)

Authors

• Dr. Wilson Massamitu Furuya
Dr. Wilson Massamitu Furuya
Universidade Estadual de Ponta Grossa
Departamento de Zootecnia
Av. Carlos Cavalcanti, 4748
Uvaranas, CEP 84030-900
Ponta Grossa, Paraná, Brazil

[114,98,46,103,112,101,117,64,97,121,117,114,117,102,109,119]

• Mariana Michelato
Mariana Michelato
Universidade Estadual de Maringá
Programa de Pós-Graduação em Zootecnia

• Dr. Valéria R. Barriviera Furuya
Dr. Valéria R. Barriviera Furuya
Universidade Estadual de Ponta Grossa
Departamento de Zootecnia

Share

- [✉ Share via Email](#)
- [🐦 Share on Twitter](#)
- [f Share on Facebook](#)
- [in Share on LinkedIn](#)

Tagged With

[Brazil](#) [tilapia](#) [threonine](#) [Wilson Massamitu Furuya](#) [Mariana Michelato](#) [Valéria R. Barriviera Furuya](#)

Related Posts

Health & Welfare

[Amino acid supplementation reduces protein levels in pangasius diets](#)

Trials show that supplementation with amino acids could reduce protein levels from a typical 28 percent to 23 percent in pangasius diets.

Aquafeeds

[Insect meals: Novel protein, fat sources for farmed shrimp](#)

Poor-quality ingredients can't become good-quality ingredients. Quality protein is essential for the healthy growth of any omnivorous or carnivorous aquaculture species. Insect meals seem to fill this need, and their mass-scale production appears to be sustainable.

Aquafeeds

[Pangasius diet trials show promise of DDGS](#)

A feeding trial incorporated corn distillers dried grains with solubles (DDGS) as an energy and protein source in starter and grower diets for pangasius. Results showed excellent fish growth performance, and no negative effects on mortality, fillet yield or fillet color.

Intelligence

[Adding value to tilapia to tap into U.S. market](#)

New markets for tilapia and expansion of existing ones can be created by planning and implementing properly designed geographic strategies to meet discriminating consumer preferences. Low labor costs in most producing countries promotes value-adding by the production of fresh fillets.

About The Advocate

The Responsible Seafood Advocate supports the Global Seafood Alliance's (GSA) mission to advance responsible seafood practices through education, advocacy and third-party assurances.

[Learn More](#)

Search Responsible Seafood Advocate



Advertising Opportunities

[2022 Media & Events Kit](#)

Categories

[Aquafeeds](#) > [Health & Welfare](#) [Health & Welfare](#) > [From Our Sponsors](#) > [Innovation & Investment](#) > [Intelligence](#) > [Responsibility](#) > [Fisheries](#) > [Artículos en Español](#) >

Don't Miss an Article

Featured

- [Health & Welfare](#) [An update on vibriosis, the major bacterial disease shrimp farmers face](#)
- [Uncategorized](#) [A seat at the table: Fed By Blue team says aquaculture needs a stronger voice](#)
- [Responsibility](#) [Quantifying habitat provisioning at macroalgae cultivation locations](#)

Popular Tags

All Tags ▼






Recent

- [Fisheries](#) [Second Test: Another filler for the fisheries category](#)
- [Fisheries](#) [Test: This is filler for the fisheries Category](#)
- [Aquafeeds](#) [Test Article](#)
- [Responsibility](#) [Study: Climate change will shuffle marine ecosystems in unexpected ways as ocean temperature warms](#)
- [Health & Welfare](#) [Indian shrimp researchers earn a patent for WSSV diagnostic tool](#)



- [About](#)
- [Membership](#)
- [Resources](#)
- [Best Aquaculture Practices \(BAP\)](#)
- [Best Seafood Practices \(BSP\)](#)
- [GOAL Events](#)
- [Advocate Magazine](#)
- [Aquademia Podcast](#)
- [Blog](#)
- [Contact](#)

Stay up to date with GSA

- 
- 
- 
- 
- 

Copyright © 2024 Global Seafood Alliance
All rights reserved.

[Privacy](#)

[Terms of Use](#)

[Glossary](#)