



UNIVERSITY OF CONCEPCION

Faculty of Pharmacy

Department of Food Science, Nutrition and Dietetics.



" HPTLC AS TOOL FOR QUALITY CONTROL IN SALMON CULTURE: Evaluation of nutritive quality in Salmon feed ."

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Introduction

Salmon farming has become the main activity of Chilean aquaculture. Inside of the chain of value of salmon, nutritional value of feed delivered is vital. Requirement of different nutrients change according to reproductive cycle, where an adequate dose of amino acids and vitamins will have an important role in growth and productivity of salmon.

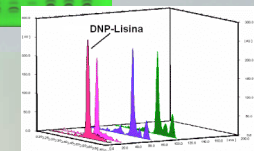
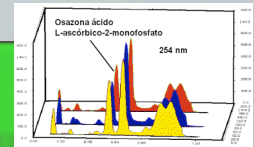
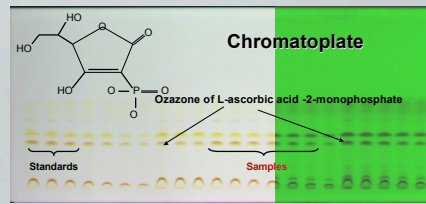
Deficit of vitamin C in salmon increase susceptibility to infections and skeletal malformation during development. Because the lack of stability of ascorbic acid, it is incorporated during the extrusion process as L-ascorbic acid 2-phosphate.



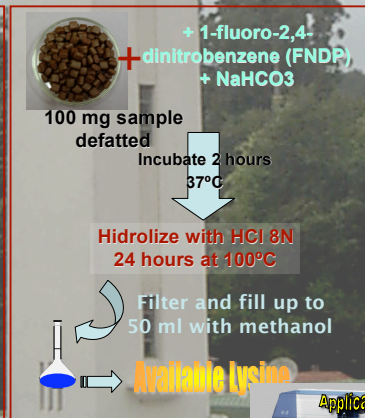
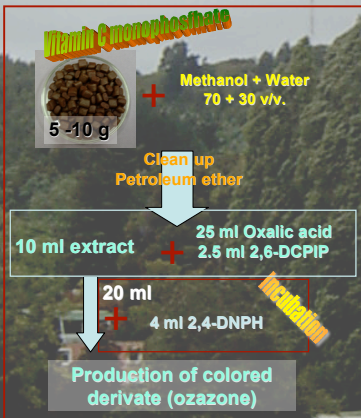
Salmon species have requirement of at least 10 essential amino acids, Lysine is one of them. Lack of this amino acid is related with high mortality of alevins and a noticeable erosion of the caudal fin. Available Lysine it is at the same time a good parameter to evaluate Protein Quality.



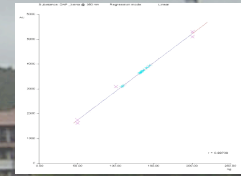
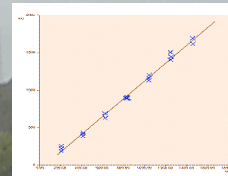
Chromatography



Methods of analysis



Validation Parameters



	Vit C-2-monophosphate	Available Lysine
LOD	24.1 ppm	0,7 g/100 g protein
LOQ	102.2 ppm	1,3 g/100 g protein
Linearity	0,99704	0,99798
Recovery	87 %	
Repeatability RSD	< 5%	< 5%
Intermediate Repeatability RSD	< 5%	< 5%

*Mean of available lysine in extruded feeds

CHROMATOGRAPHY CONDITIONS

L- ascorbic -2-monophosphate	Available Lysine
Plate: HPTLC F ₂₅₄ 10x20	Plate: HPTLC F ₂₅₄ 10x20
Sample Application: ATS III, 6 mm band	Sample Application : ATS III, 6 mm band
Detection: Densitometer Scanner 3 Camag, Absorbance UV 254 nm Vis 530 nm	Detection: Densitometer Scanner 3 Camag Absorbance UV 360 nm Vis. 480 nm
Mobile phase : Toluene+Ethylacetate+Formic acid. (1 + 1 + 0,25, v/v/v)	Mobile Phase : n-Propanol + NH ₄ OH (25%) (7 : 3 v/v)

Conclusions

1. Extruded feed suffers a high temperature impact during processing. lysine is one of the amino acid affected in this process because its -NH₂ group can react with carbonyl groups producing non digestible products lowering protein nutritional quality. The range of Available Lysine (AL) considered as adequate is 3 - 5 g/100 g of crude protein.
2. Knowing the AL content is possible to estimate the level of protein damage because Maillard reaction.
3. In relation to Vitamin C, this also suffers degradation during feed processing and storage.
4. HPTLC has become an effective tool for quality control in food and feeds, both to detect deterioration (AL) and nutrient dose (Vitamin C).

