”Changes in nutrients in farmed African catfish during household preparation”

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Work developed in the frame of the Project ”Consumerproducts”

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Overview

- **Introduction**
  - **Importance of selenium in human health**
  - **Effect of culinary treatments in nutrients**
- **Objective**
- **Material and Methods**
- **Results**
- **Conclusions**

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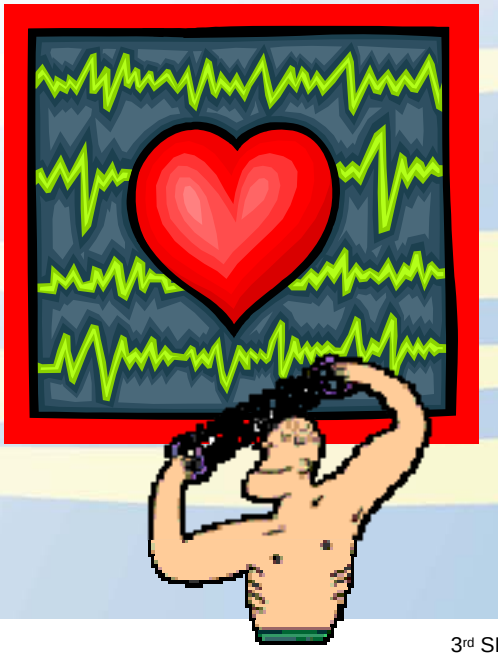
Introduction

- **Effect of selenium compounds in human health**

Protection against cardiovascular diseases and cancer



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Introduction

- **Effect of culinary treatment in nutrients**

Retention/loss of nutrients with culinary treatment

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Objective

1. **Influence of selenium feed supplementation in catfish**

2. **Influence of cooking processes on Se levels, taurine, glycine, alanine and fatty acids**

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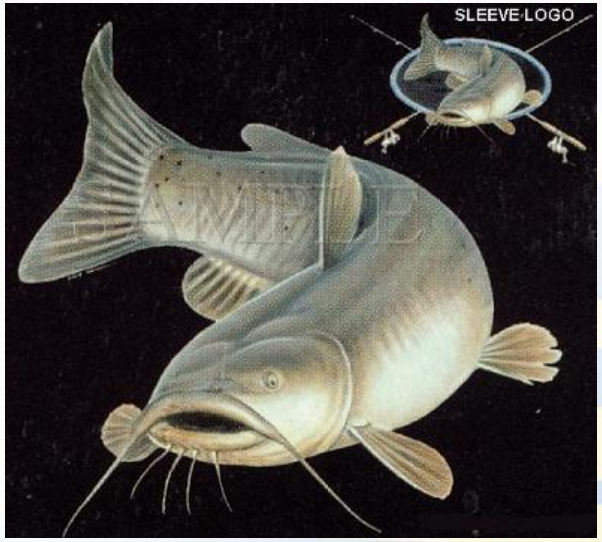
Material and Methods

Material

Catfish



Fish enriched with functional selenium

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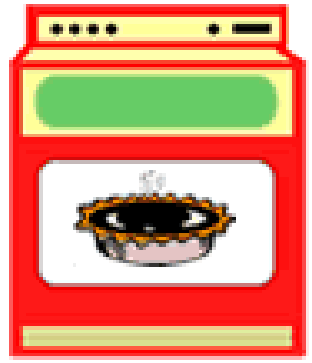
Material and Methods

Culinary treatments

Aluminium heating

(fish wrapped in aluminium foil)

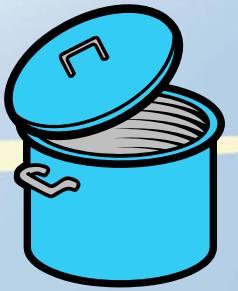
T= 180 ºC, t=27 min



Cooking

(boiled in plastic pouches water)

T= 90 ºC, t=10 min



Deep frying

(fried in vegetable oil)

T= 180 ºC, t=4 min

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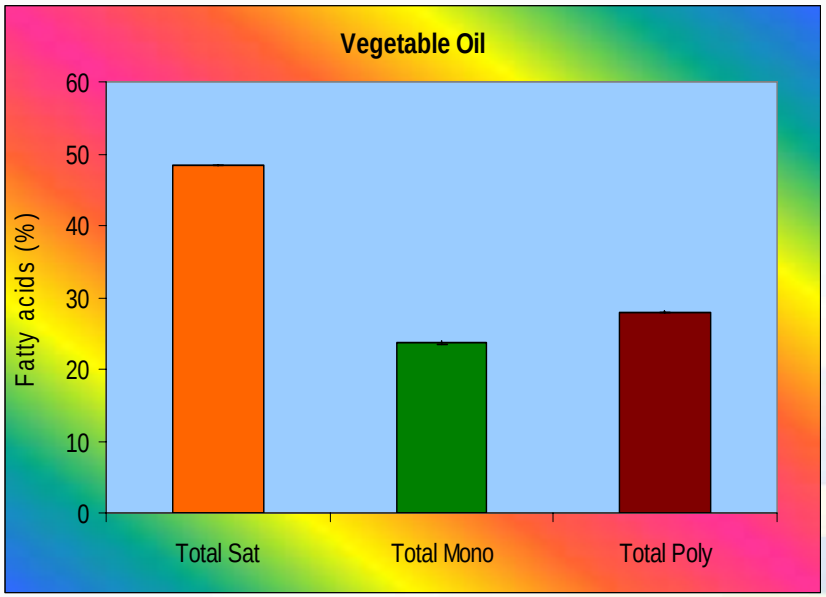
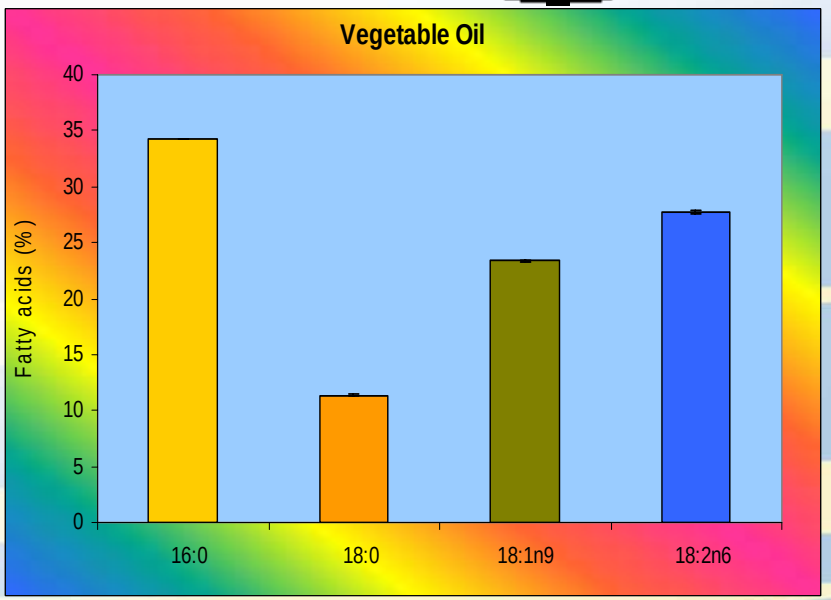
Material and Methods

Frying oil: Fatty acid profile





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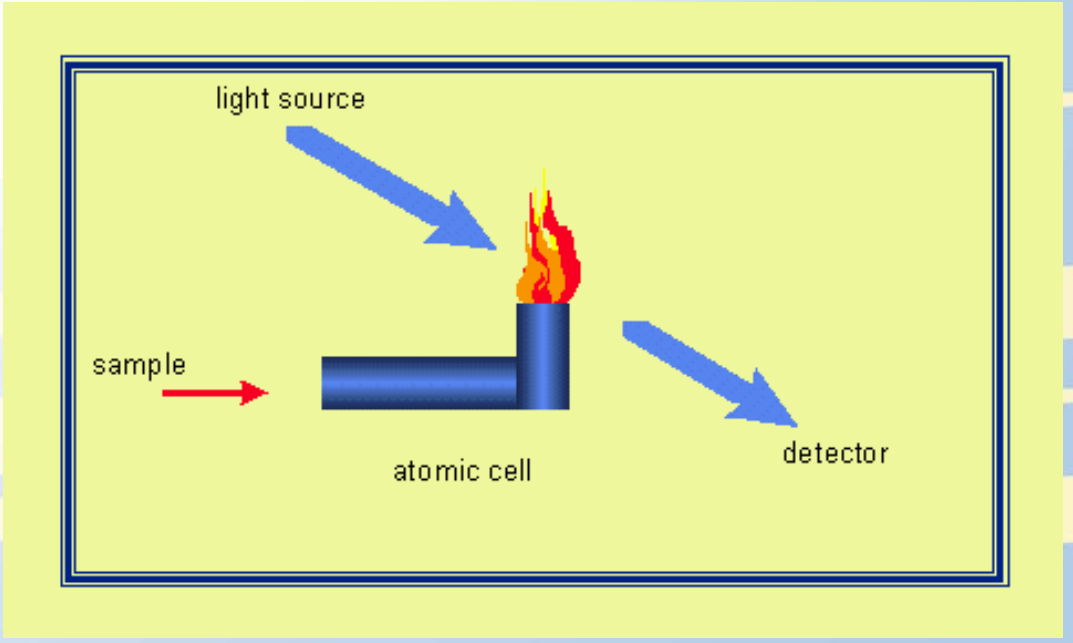
Material and Methods

Analytical Methods

- **Selenium**

Determination by atomic absorption spectrophotometry at 196 nm after wet digestion with nitric acid.



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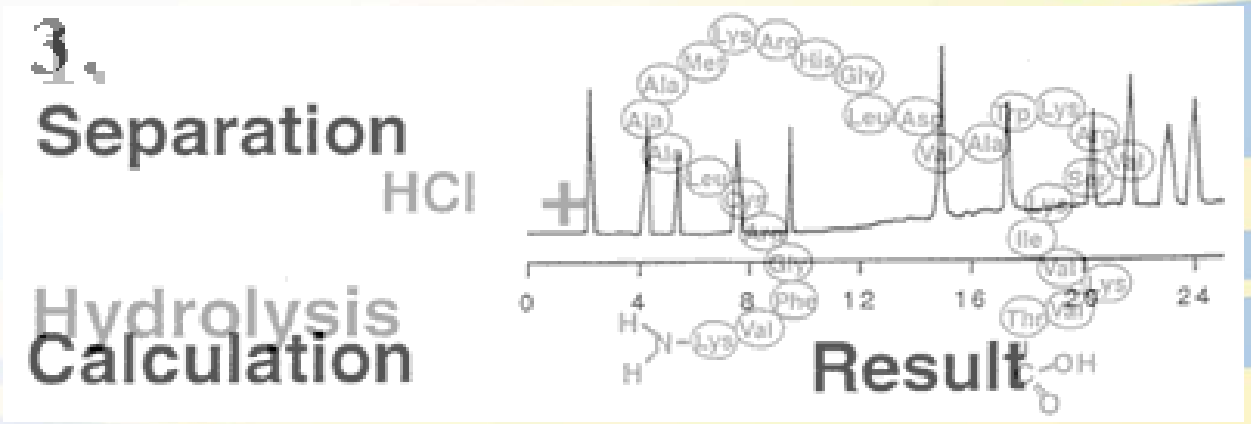
Material and Methods

Analytical Methods

- **Free amino acids**

Amino acid analysis using lithium citrate buffer and norleucine as internal standard.



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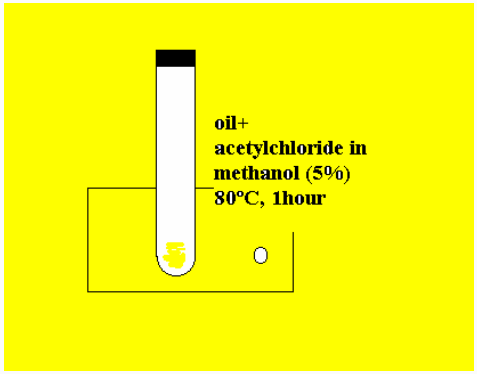
Material and Methods

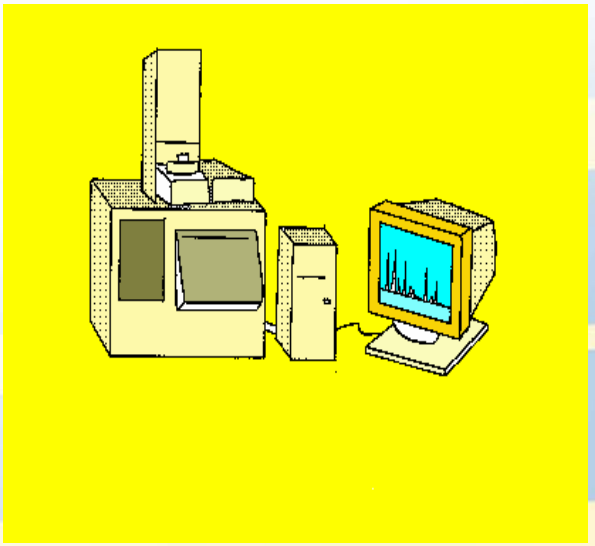
Analytical Methods

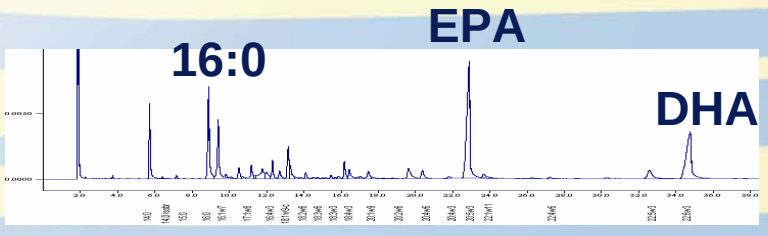
- **Fatty acids**



n-Heptane, water

Upper Layer





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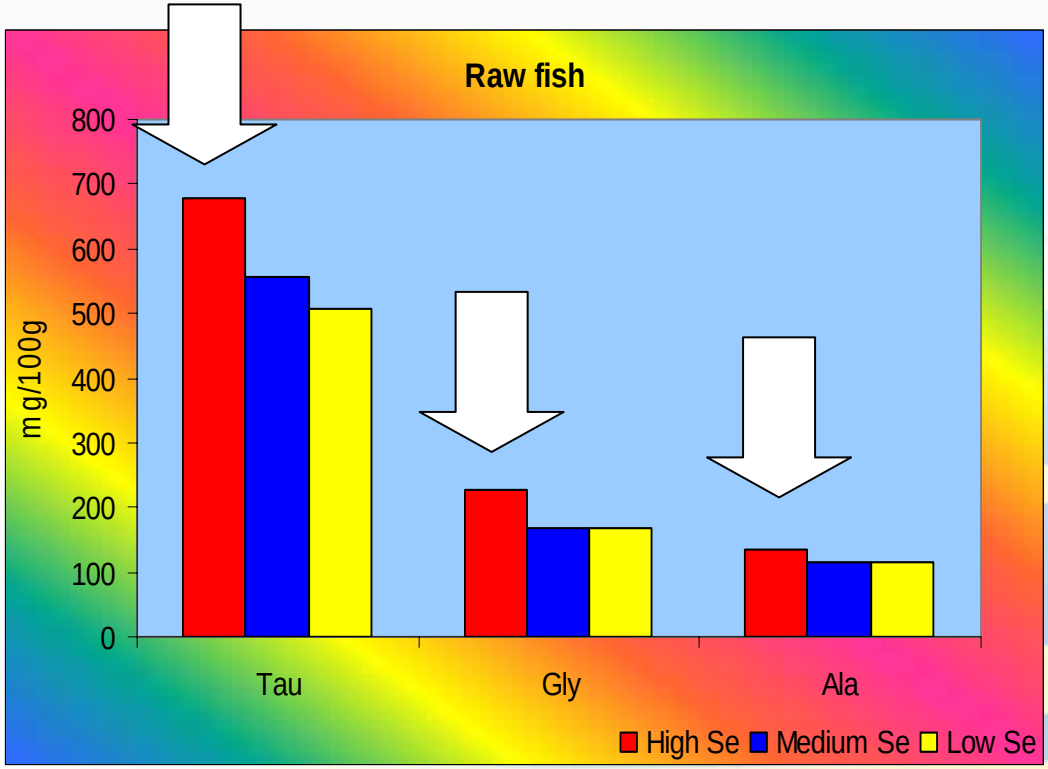
Results

Effect of selenium supplementation

Free amino acids



- **High selenium supplementation – the highest amount of taurine, glycine and alanine.**

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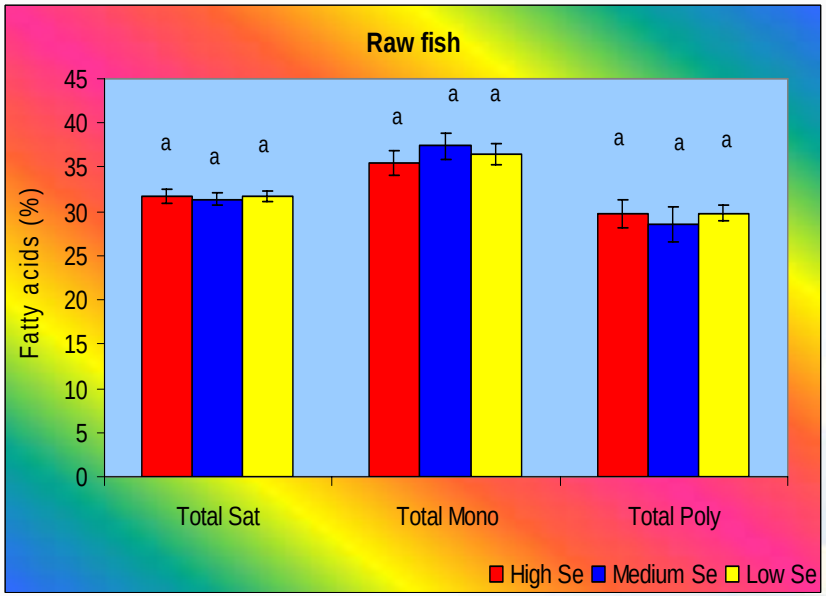
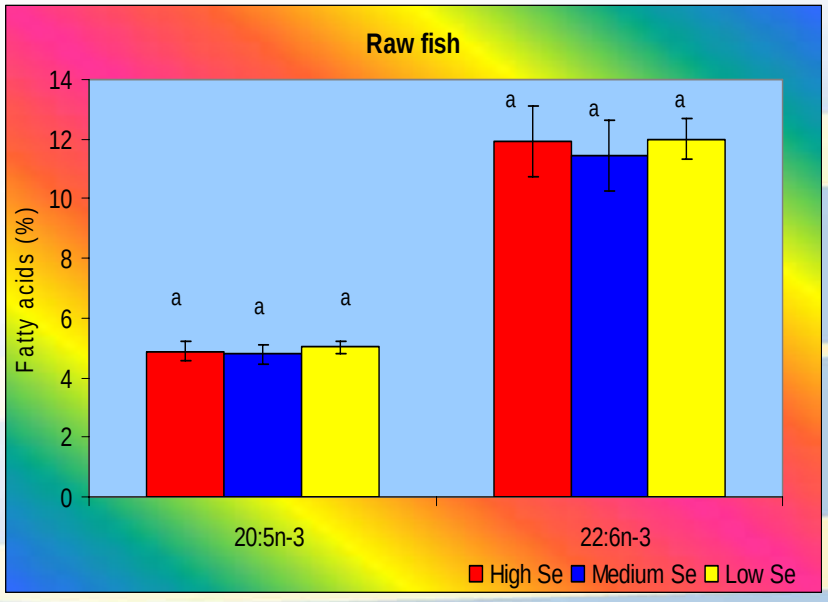
Results

Effect of selenium supplementation

Fatty acids





Selenium supplementation did not influence significantly the distribution of the main fatty acids

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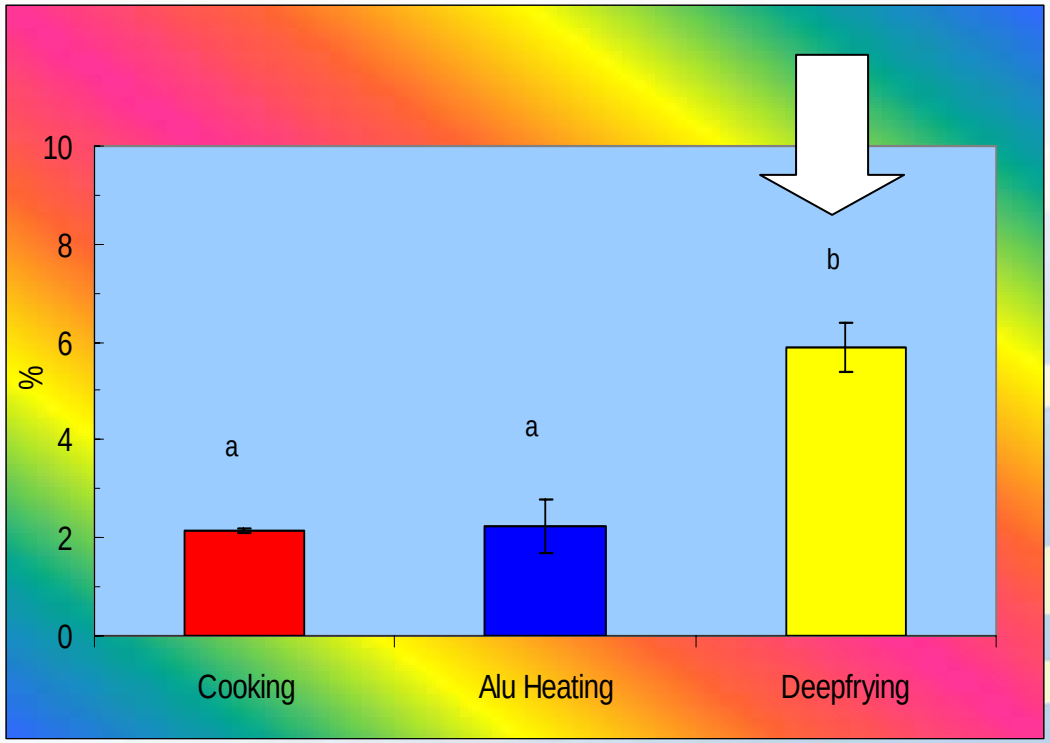
Results

Effect of culinary treatment (Fish with highest selenium level)

- **Fat content**



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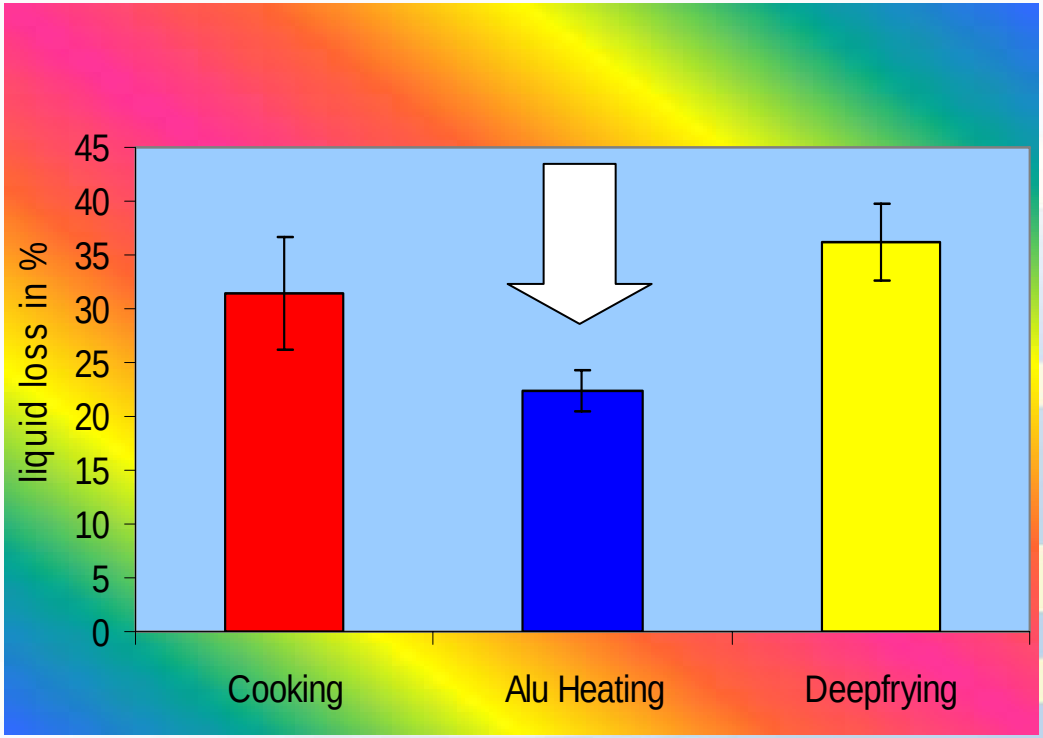
Results

Effect of culinary treatment

- **Drip losses**



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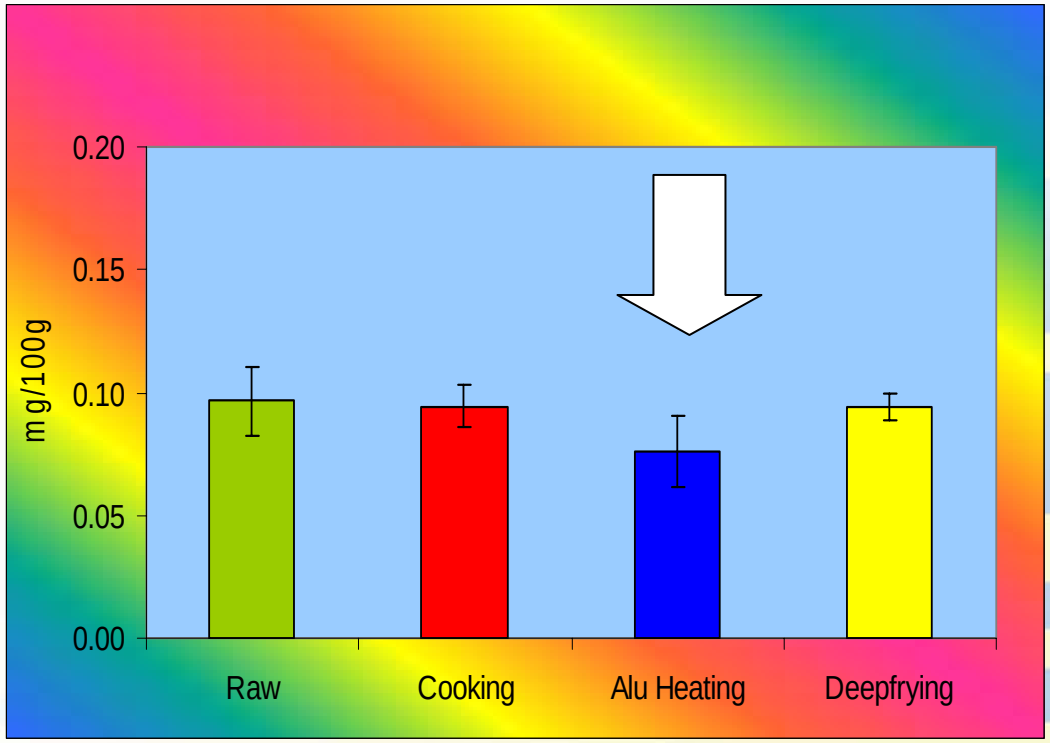
Results

Effect of culinary treatment

- **Selenium level**



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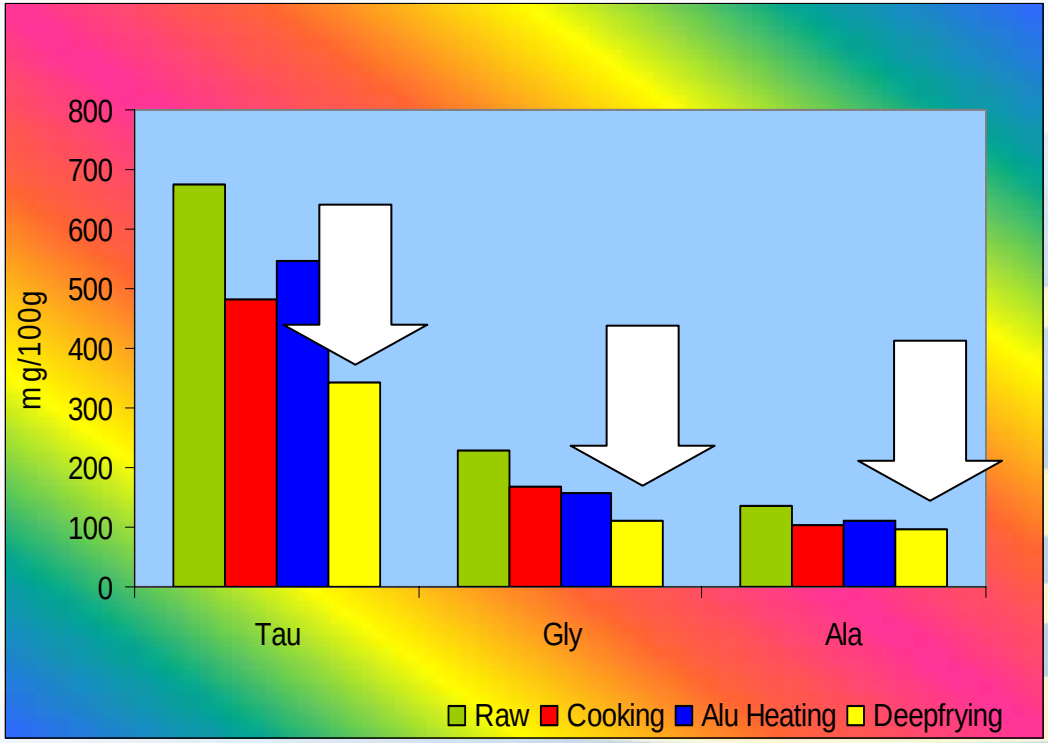
Results

Effect of culinary treatment

- **Free amino acids level**



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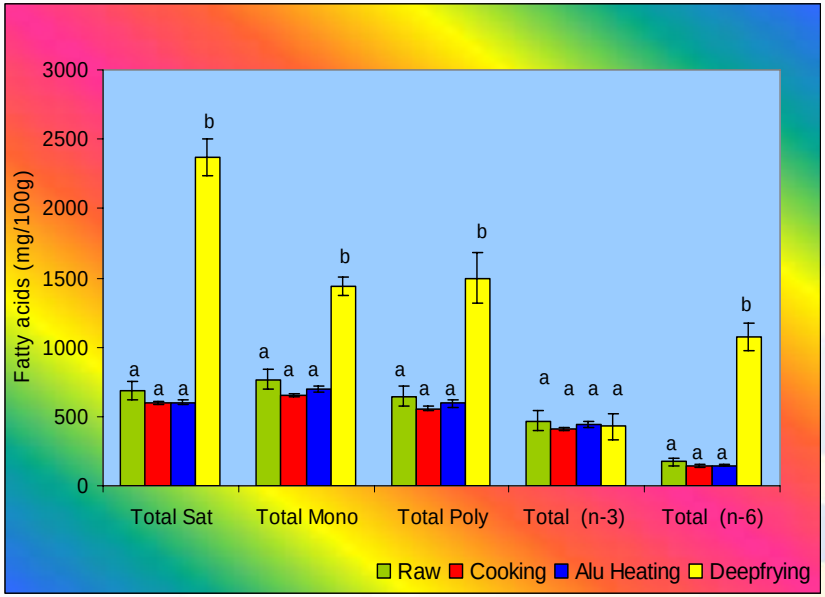
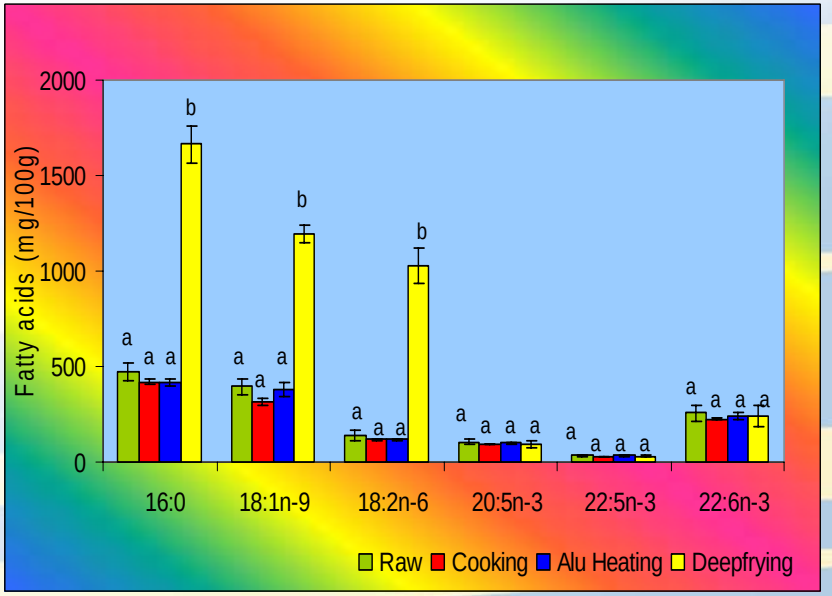
Results

Effect of culinary treatment

- **Fatty acids level**





- **Frying -** different from the other treatments, due to oil absorption

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Results

Retention/Incorporation Factors Calculation

Retention/Incorporation Factor = NC/NR * Cooking yield (%)

NC - Nutrient in 100 g cooked product
NR - Nutrient in 100 g raw product

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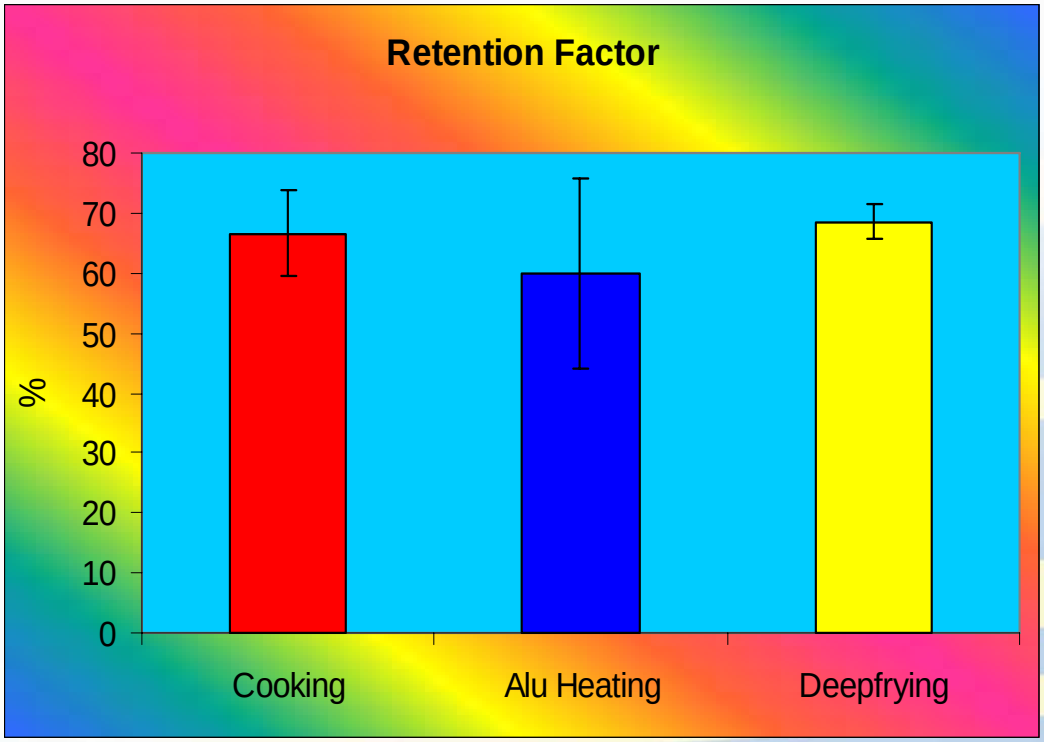
Results

Effect of culinary treatment

Selenium



Selenium retention not different among culinary treatments

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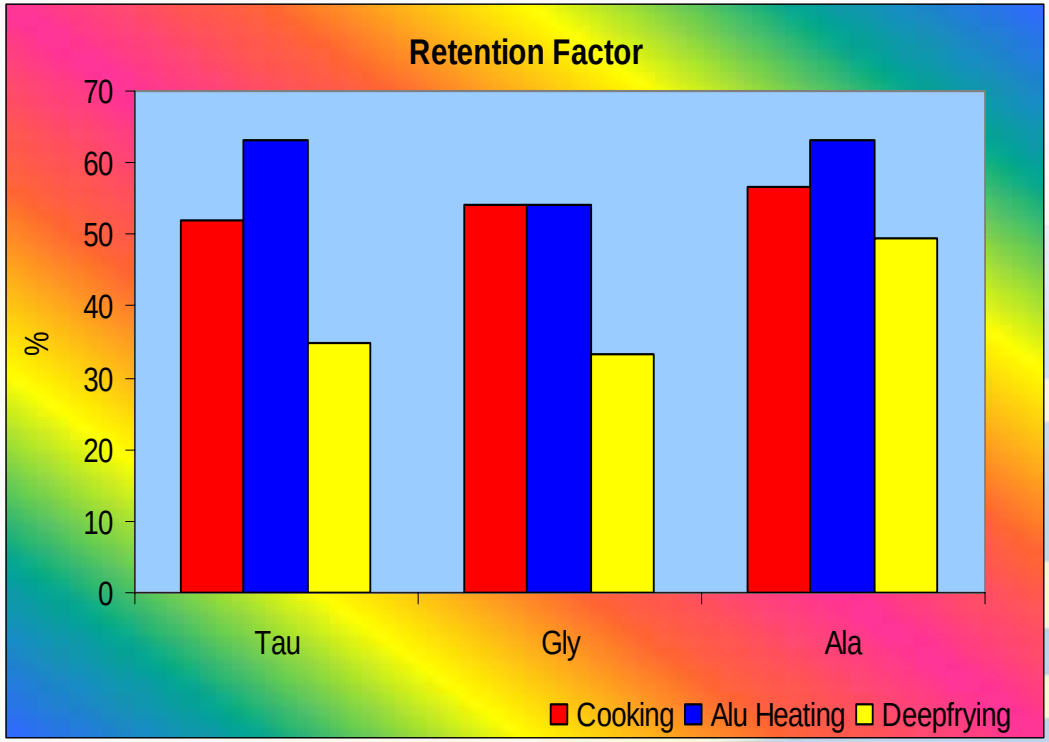
Results

Effect of culinary treatment

Taurine

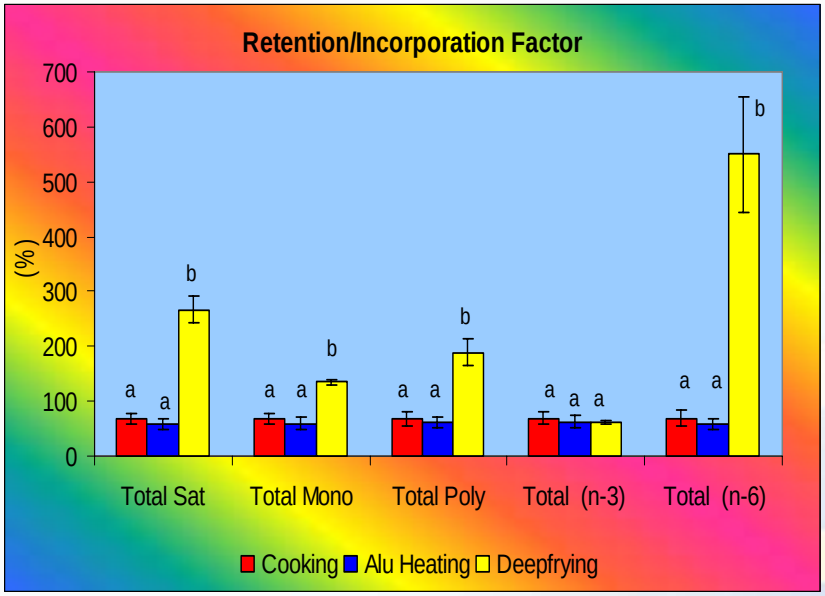


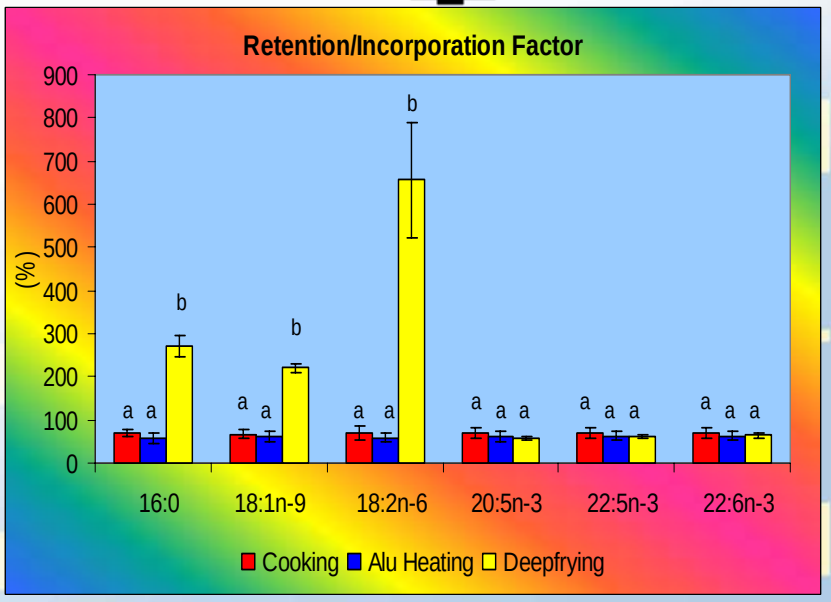
- **Aluminium heating** - the process with the highest taurine retention factor
- **Deep frying** - the lowest retention factor for free amino acids

Results

Effect of culinary treatment

Fatty acids





- **Cooking and Aluminium heating** - not different
- **Deep frying** - higher retention factors for all fatty acids with exception of n-3 fatty acids

Results

Selenium

Selenium (mg/150 g catfish fillet)	
Cooking	0.144
Aluminium heating	0.117
Deep frying	0.144

For defence against oxidative stress and regulation of thyroid hormone action and the reduction of oxidation status of vitamin C, a recommended dietary allowance of 0.055 mg was recommended for adults.

Results

Taurine

Aminoacids (mg/150 g catfish fillet)	Taurine	Glycine	Alanine
Cooking	720.9	252.6	158.0
Aluminium heating	817.5	236.0	165.2
Deep frying	513.1	164.2	146.6

Taurine important in membrane stabilisation and as antioxidant in the prevention of cardiovascular disease.

Not available values for taurine daily intake.

Results

Fatty acids

EPA +DHA (mg/150 g catfish fillet)		TI
Cooking	464.9	0.34
Aluminium heating	460.1	0.32
Deepfrying	541.9	0.92

For cardiovascular health a minimum intake of 500 mg/day of EPA plus DHA is recommended (ISSFAL-Recommendation for intake of PUFA in Health Adults, June 2004).

TI – Thrombogenecity index (14:0+16:0+18:0)/((0.5*MUFA)+(0.5*PUFA n-6) +(3*PUFA n-3)+(PUFA n-3/PUFA n-6))

Conclusions

Influence of Se feed supplementation

Free amino acids:

- The richest selenium feed the highest taurine, glycine and alanine levels in catfish.

Fatty acids:

- Selenium supplementation seems do not interfere in fatty acid PUFA n-3 profile.

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Conclusions

Influence of culinary treatment:

Frying

- Decrease of free aminoacids (Tau, Gly, Ala)
- Highest fat content
- Highest level of saturated and n-6 PUFA (frying oil).
- High thrombogenecity index
- Selenium level not affected

Conclusions

Influence of culinary treatment:

Cooking and aluminium heating

- Free amino acids (Tau, Gly, Ala) not affected
- Low fat content
- Fatty acid profile similar in both treatments
- Low thrombogenecity index
- Selenium level not affected

- A catfish fillet of 150 g is enough for the daily intake of selenium, PUFA n-3 and taurine.

Have a good meal with catfish

Thank you for your attention

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