THIN-LAYER CHROMATOGRAPHY OF LIPID FRACTION IN TREE NUTS SPECIES.

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INTRODUCTION

Nuts are defined as a 'super food'. This definition responds, in first term, to high caloric content of nuts and, in second term, to its composition in proteins, fats and carbohydrates. Recently, nuts have acquired a great notoriety among nutrition specialists due to this composition, specifically in fats and another components (Antioxidants, etc...).

The degree of saturation of fatty acid constituents of triacylglycerols is close to ideal intake in humans, according to nutrition specialists. In addition, other components of lipid fraction in nuts (Phytosterols, lipophilic Vitamins, etc...) are also important in human wellness.

On the other hand, many companies are dedicated to processing nuts in a wide range of treatments (heating, frying, etc...)

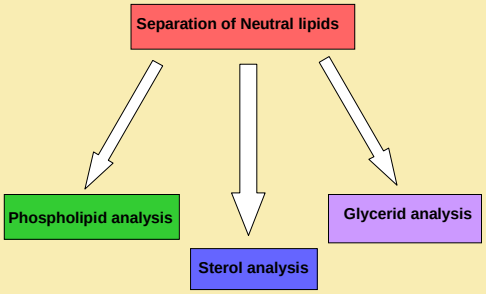
Thin layer Chromatography is the selected method to analyze the major part of components of lipidic pattern in nuts and also to detect effects of many treatments in lipid fraction of these foods.

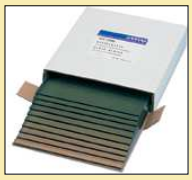
MATERIALS & METHODS

After a lipid extraction following Folch's method, it is come to analyze each component of lipid pattern. Neutral lipid separation is the first step for further TLC systems to determine Phospholipids, Sterols and Glycerids.

Selected samples are Almonds (**Al**), Walnuts (**Wl**), Hazelnuts (**Hz**), Cashews (**Ch**), Peanuts (**Pn**),commercial homogenate of peanut (**Hc**) and Pistachios (**Ps**).

Volume applied in plate is 2 µl in Neutral Lipids and Glicerids and 4 µl in Phospholipids and Sterols

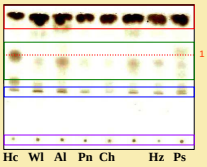




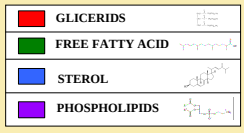
Plates selected are MERCK made of Silica Gel $60F_{256}$. Samples are applied with 2µl micro-capillaries

RESULTS

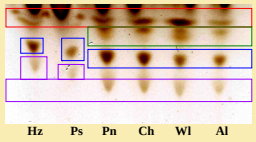
NEUTRAL LIPIDS



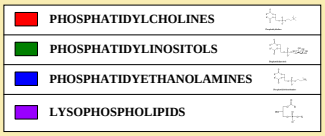
Neutral lipid separation.
Solvent:Hexane, TBME, Acetic Acid (70:30:2) Hexane
Revelation: 8% $CuSO_4$ in 10% H_3PO_4



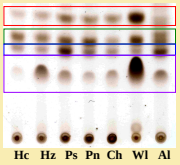
PHOSPHOLIPIDS



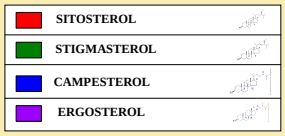
Phospholipid separation
Solvent:Chloroform, Methanol, H_2O (25:10:1)
Revelation: 8% $CuSO_4$ in 10% H_3PO_4.



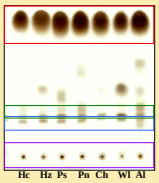
STEROLS



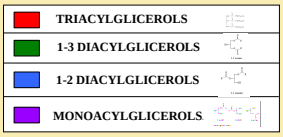
Sterol separation
Solvent:Benzene,Ethyl Acetate (5:1)
Revelation: 8% $CuSO_4$ in 10% H_3PO_4.



GLICERIDS



Glycerid separation.
Solvent: Hexane, DEE,Acetic Acid (70:30:1)
Revelation:10% $CuSO_4$ in 8% H_3PO_4



Substances are identified using appropriate patterns (not showed)

CONCLUSIONS

Thin Layer Chromatography represents a valid method to analyze lipid patterns. This methodology allows to get a general scene of lipid fraction with simplicity, speed and low costs. With these TLC analysis, we develop an 'initial pattern of lipids' to evaluate lipid response to severe treatments. HPTLC methods can increase the level of resolution and be more accurate in detection of effects in any part of lipid fraction in nuts. The simplicity of operation, the availability of many sensitive and selective reagents, the capacity to analyze the whole lipid fraction with simple solvent changes make TLC (and HPTLC) a good option to determine the presence and concentration of different lipidic compounds.

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Willian C. Christie, Lipid analysis 3rd edition. The Oily Press.

Joseph Sherma (2000) Thin-layer chromatography in food and agricultural analysis. Journal of Chromatography A, 880 (2000) 129–147