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Treatment and Valorization of Milk Thistle Oil

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ABSTRACT

This work aims to treat and recycle the milk thistle plant. It is divided into two parts: the first is devoted to the extraction of heavy oil from milk thistle seeds using two extraction methods, extraction hot and cold extraction, and the second part present a general insight into the use of straw thistle as an adsorbent of copper.

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INTRODUCTION

The Thistle - *Silybum marianum* has other names Sylibe Mary, wild artichoke, milk Notre Dame Silybe Mary, Chardon silver, marbled, white spice.

Milk thistle is a beautiful biennial plant in the family Asteraceae, with a strong taproot, long, thick, fibrous. Rod, 1 meter and is cylindrical, robust, erect, often rower. The leaves are shiny green, spiny. White mottling reminiscent of the legend of milk thistle. It bears alternate leaves, very large, without stipules, stained white along the veins, lined hard and sharp thorns. The flowers are grouped rounded capitulum, very large, placed at the end of the rod (Pénoël D.1991).

Common in warm and temperate regions, the thistle grows little over 700 meters. Culture requesting smoked and fresh soil. Rake leaves to make soups or to dry in early summer. To get the seeds, cut flower heads mature, dry them and beat them (Flora, K., 1998).

At first we treated seeds thistle two methods of extracting hot and cold in order to compare the performance obtained by these two methods in lots of ways. Then we used straw thistle as an adsorbent for the removal of copper .

- **Composition:**

The oil obtained contains in particular the following elements.

Fatty Acids:

Palmitic acid	00,12%
Stearic acid	11,12%
oleic acid	02,75%
Linoleic acid	21,15%
Linoleique	63,10%
Arachidic acid	00,30%
γ- Linolenic acid	00,05%
α- Linolenic acid	00,33%

Fractions of esters:

β-sitosterol	43,1%
δ-7Stigmastereol	26,7%
Stigmastereol	13,1%

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Amino acids per 100 grams:

aspartic acid	1800 mg
threonine	790 mg
serine	880 mg
Glutamic acid	2380 mg
proline	3370 mg
wistaria	6610 mg
alanine	2760 mg
Total cystine	190 mg
valine	760 mg
methionine	180 mg
isoleucine	400 mg
leucine	850 mg
tyrosine	150 mg
Phényllalanine	510 mg
lysine	910 mg
histidine	170 mg
arginine	1980 mg
tryptophan	50 mg

Other ingredients:

Silymarin	276 mg/l
β -carotene	4 mg/l
Vitamin E	270 mg/l

Main chemical components:

- Oil thistle contains flavonoids which are antioxidants.
- Lipids, albumin, essential oils, flavonoids.

MATERIALS AND METHODS

The heavy oil by two methods

- **The hot extraction:**

60g of the ground are introduced into a flask of 200ml seeds, followed by addition of ethanol to such fill about half of the flask, and heated for 3 hours the mixture is allowed. After filtration the filtrate is passed in the rota vapor to remove the solvent.

- **The cold extraction:**

The seeds were ground and sieved to obtain a fine powder, the extraction with ethanol was obtained by macerating 10 g of powder in 50 ml of ethanol, maintained for a week with stirring. Finally the mixture was filtered and the filtrate was passed in the vapor rotation.

The copper removal by adsorption on straw thistle

The adsorption tests were performed in static mode. Specific copper solution volumes are mixed with progressive masses straw thistle (Table below). Then the mixture was stirred for 1h. Measurements of the concentration of copper were made before and after adsorption.

tests	1	2	3	4	5
Volume of the solution of copper (ml)	200	200	200	200	200
Mass of straw (g)	0	5	10	15	20
Copper Concentration (mg / l)	371	270	227	169,6	0

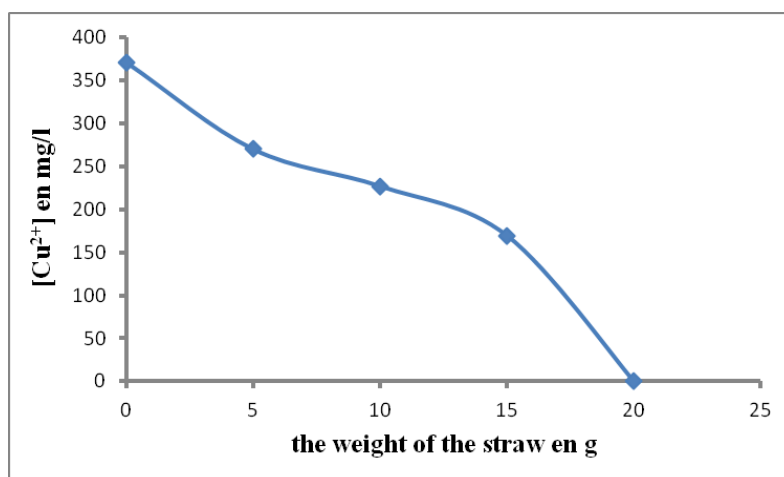
Results:

The following table shows the performance obtained by each method:

	Hot extraction	Cold extraction
Yield	13,61 %	11,3 %

From the table above, it is found that the yield obtained by hot extraction is quite large compared with that of cold extraction. This is due to thermal effects of the first method.

The evolution of the concentration of copper in terms of the mass of straw thistle is shown in the Figure below.



We note that the curve has dropped each time we add progressive masses straw thistle, so the copper concentration decreases gradually to a total elimination for a mass of 20g of milk thistle.

Conclusion:

Thus, these results show that the seeds of milk thistle give us good returns on the two methods, and the use of straw thistle may be considered as a solution for the removal of heavy metals such as copper.

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