

## A STUDY ON EXTRACTING VEGETABLE WAX FROM THE SEED-SHELL OF SUNFLOWER

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The vegetable wax, which melting point is rather low, is useful and not harmful to hum the skin of human beings. It can be used as good additives of cosmetics. The seed-shells were often burned when oils were made from sunflower. Usually, above 3.0 per cent of vegetable waxes were contained in the seed-shells of sunflower. Reports that how the vegetable wax was extracted were not seen yet. The ways and methods of extracting vegetable wax from the seed-shells of sunflower were tested in this study.

### Materials, Equipments and Chemical Reagents

1. Materials: seed-shells of edible sunflower.
2. Major equipments: (1) a set of equipments for extracting and filtering;  
(2) a set of frosted glass distillatory vessels.
3. Chemical reagent: (1) petroleum ether,  $C_4-C_8$ , which boiling ranges was 40-70°C;  
(2) petrol,  $C_5-C_8$ , which boiling range was 40-100°C.

### Technological Process of Extracting

Raw materials	Crush	Soak	Filter	Distil	Products
			Chemical solution		

#### Details:

Crush the seed-shells of sunflower after drying (the thinner, the better); soak in petroleum ether in proportion of 1:5 raw material/ solution for 24 hours at about 25°C; then filter them; distil for 10 minutes, the products were made when the temperature decreased at 28°C. The residues could be continuously soaked in petroleum ether. More products would be achieved from the successive extraction by the same methods above.

The technological process of extraction was the same as that tested above. Only the distillatory time was 15 minutes instead, and the distillatory temperature was not allowed over 100°C. If the temperature was higher than 116°C, the products could be decomposed and charred, and the color of the wax was turned into black. Few products could be determined from the second extraction of the residues.

#### Results

3.3 grams of products were obtained from 75 grams of raw materials soaked in petroleum ether (Table 1). Another 0.9 grams of products were extracted from the second extraction of the residues, the total grain was 4.2 grams, 5.6%. The products of vegetable wax (in which a few of fat-like substance were contained), which was milky white to light yellow in color, congealable colloid in shape. Its melting range was 28-36°C.

Table 1. The results of extracting vegetable wax in different chemical solutions

Raw material (gram)	Solution	Volume (ml)		Weight of products (gram)			
		Used	Retrieved	Primary	Second.	Total	Rate of produc.
75	Petroleum ether	400	360	3.3	0.9	4.2	5.6
40	petrol	250	226	1.5	0.5	4.0	5.0

1.5 grams of products were obtained for primary extraction from 40 grams of the raw materials using petrol as solution. 0.5 grams of the wax were received when the residues were extracted again. The total gain was 2.0 grams, 5.0%. The solution used were retrieved to decrease the cost and to improved the quality of products. 400 millilitres of used petroleum were distilled at 40-90°C. 360 millilitres of pure distilled were obtained. 226 millilitres of pure petrols were distilled from 250 millilitres of used petrols. The solution retrieved could be divided into two parts: one was from distilling the filterates, the rate of retrieving was 64%; the other was from distilling the residues which absorbed some solutions with proper water. The rate of retrieving of petroleum ether was the same as that of petrol. And retrieved solutions could be used once more.

### Discussions

1. It is obviously seen from the results that 3 kilograms of vegetable waxes can be extracted from every 100 kilograms of seed-shell of sunflower. This process worthy of undergoing in practice for its remarkable benefits.
2. Considering the cost, the type of solution should be chose. Products using petroleum ether as solution were pure. And its distillatory temperature was lower and time needed was shorter. its productive rate was slightly higher, while few amount of energies were consumed. But the productive cost was rather high for the expensive price of petroleum ether. The productive cost using petrol as solution was only ten per cent of using petroleum ether. In order to improved the quality of products and to keep the product from charring, its better to use the petrolpossessing low boiling range (40-100°C), and the distillatory temperature is not beyond 115°C.
3. The vessels for soaking must be sealed hermetically to prevent the loss of solutions. And the process of filter must be finished quickly.
4. It is necessary to study continuously the types of solution and methods of retrieving. Petrols used in this study were normal one for cars. The best type of petrol could be selected for extraction of vegetable wax.