

Assets of Sheep's dock

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Background:

Since the ancient times the Mongolians have consumed the sheep dock as a meal, and also widely used in the practice of traditional medicine.

Although the chemical composition of the fat in the dock has been widely studied, nowadays there are almost no research devoted to experiments and the use of fat in modern medicine and pharmacy practice.

So today, when there is a widespread tendency to use drugs and organic substances of natural origin, it is highly required to identify readily available and cheap raw materials with excellent medical quality and nutrition, with a high content of bioactive substances that could replace expensive materials.



Why sheep's dock? What is it?

➤ Mongolian common nomadic sheep



➤ Australian common sheep



Let's look at the tails of these sheep. The color of the wool and heads are different but one significant difference is their sizes of the tails, or referred as dock for sheep because they are not actually tails.

We conclude this difference in size of dock of Mongolian sheep is due to the climate which ranges from -30°C to 35°C . An adaptation to survive in cold weather.

Purpose:

We aim to explore and identify the opportunity to use the fat of the Mongolian sheep's dock in the practice of using it as nutrition and raw material for cosmetic products and pharmaceuticals.

By identifying its components, we found it is applicable for these usages mentioned above, but this raw organic material is not well-known around the world today. Our another aim is to introduce and share what we learned about this material.

Methods:

The main raw material is sheep's dock fat and was prepared as follows: the sample was selected from sheep docks sold in the food market that have been licensed by the veterinary and hygiene authority. Then the material was finely diced into three parts; the core, middle and tip, and melted at 70-80 degrees Celsius temperature in a water heater in order to produce liquid fat of the sheep's dock fat.

Physical-chemical analysis of the sheep dock fat was determined by various methods, Huebl's method to determine iodine value, chromatography to determine saturated and unsaturated fats; and with help from Mongolian National University of Medical Sciences, microbiological analysis and heavy metals were determined according to atom absorption spectrophotometric method in the corresponding standards MNS4496: 1997, MNS4499: 1997.

Preparation:

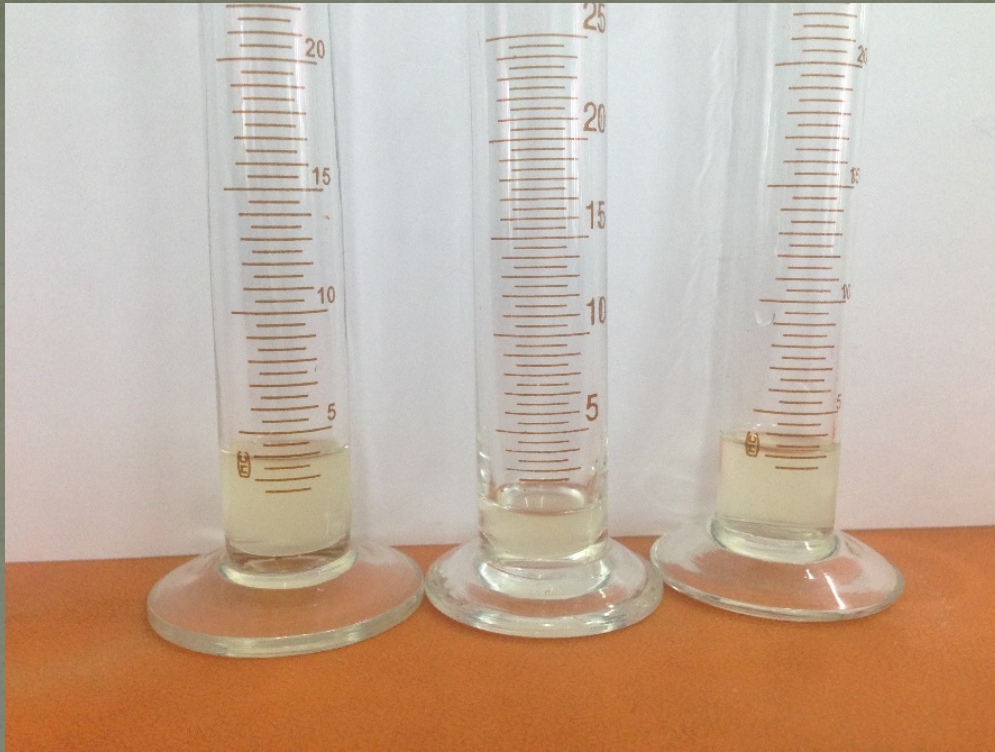
- Raw sheep's dock



- Recording sample mass for further calculations



- Producing liquid fat from raw material



➤ Liquid fat from raw material
(from three different parts)

➤ Testing different proportions of dock
fat oil into coconut oil to obtain
product.



Properties of the material:

Table.1.1. Yield of liquid fat

Part of the raw material	Yield of liquid fat from raw material
The core	73.6%
Middle	78.4%
The tip	81.7%

Table.1.2. Physical and chemical properties of sheep's dock fat

Analysis indicators	Liquid fat from raw material
Color	Yellowish white
Stability	Oil-like (in room temperature)
Odor	Specific weak odor
Specific weight, g/cm ³	0.9063±0.201
Acid value, mg/g	0.72±0.016
Ether value, mg/g	372.8±0.324
Saponification value	183.4±7.83
Peroxide value, g	1.5±0.11

Table.1.3. Iodine value (By Huebl's method)

Part of the raw material (liquid fat)	Iodine value
The core	71.74
Middle	73.23
The tip	75.87

Table.1.4. Proportion of fatty acids in dock fat (by chromatography)

Type of fatty acid	Proportion	Ratio approx.
Polyunsaturated fats	3.7%	0.4
Monounsaturated fats	38.5%	4
Saturated fats	57.65%	6

Fat	Iodine value
Tung oil	163 – 173
Linseed oil	136 – 178
Poppseed oil	133 ~133
Grape seed oil	124 – 140
Walnut oil	120 – 155
Soybean oil	120 – 136
Sunflower oil	118 – 144
Wheat germ oil	115 – 134
Canola oil	110 – 126
Corn oil	109 – 133
Cottonseed oil	100 – 117
Rice bran oil	95 – 108
Rapeseed oil	94 – 120
Kapok seed oil	85 – 100
Peanut oil	84 – 106
Castor oil	82 – 90
Olive oil	80 – 88
Jjoba oil	80 ~82
Palm oil	44 – 51
Cocoa butter	35 – 40
Butter	26 – 40
Palm kernel oil	16 – 19
Coconut oil	7 – 10

How about harms in it?

In order to be used as a raw material for medicine and pharmacy practice, it must meet with the safety requirements of the world's pharmacopoeia.

Table.2.1. Microbiological indicators of sheep dock fat

Analysis indicators	Requirements	Sheep dock fat
Number of bacteria, 1g	Not exceed than 10^4	Not Revealed
Fungus, mold, 1g	Not exceed than 10^2	Not Revealed
Enterobacteriaceae, 1g	Not exceed than 10^2	Not Revealed
E.coli, 1g	Should not revealed	Not Revealed
Salmonella, 1g	Should not revealed	Not Revealed
Ps.aureginosa, 1g	Should not revealed	Not Revealed
St.aureus, 1g	Should not revealed	Not Revealed

Result of microbiological analysis of sheep tail fat fully corresponds with the requirements.

Table.2.2.Heavy metal content in sheep dock fat

Heavy metals	Allowed maximum level	Results of analysis
Lead, mg/kg	0.1	0.005
Cadmium, mg/kg	0.001	0.0008

Content of heavy metals lead and cadmium, which are considered the most toxic elements, are under acceptable level for usage.

Our test product:

- Mixture of sheep's dock fat and coconut oil (65% coconut oil and 35% sheep dock fat, proportion by mass)
- Lower viscosity than cream but yet higher than oil.
- Melts just as it touches skin.
- Most of the odor is from the coconut oil, except slight odor of the sheep's dock fat.
- No preservatives needed.
- Vitamin E can be added since it is fat-soluble and good for skin care.



Conclusions:

The Mongolian sheep's dock, with the analysis showing positive results, proves itself that it can be used as a pharmaceutical for manufacture of variable medicines as it contains no toxins. We tested that it can be used for manufacture of cosmetic products by making our own cosmetic product. And it can be used in food industries due to its high level of unsaturated fats.

We consider this as one of the most versatile organic materials available to use and economical solution for most crucial industries, which are food, medical and cosmetics industries.

For our further research, we would develop stabilizing methods to increase the viscosity of the oil and ways to remove this specific odor of dock fat. Also, we would look for opportunities to test the material in pharmacy product.

Thank you for your attention!
Have a good day :)