CHAPTER 14

OLEIN*

§ 1. COMPOSITION

Human fat olein prepared without heating:

	BY WEIGHT		BY VOLUME	
Oxygen……..	9.987	100	1	
Carbon……...	78.566	786.7	10.28	10
Hydrogen……...	11.447	114.6	18.39	17.89

§ 2. PHYSICAL PROPERTIES

557. It is colorless and has the aspect of an oil. At 4°C below zero, it is still liquid and it is not until several degrees lower that it starts to congeal into a mass of needles. *In vacuo*, it volatilizes without decomposition. Its density is 0.913 at a temperature of 15°C.

558. It is colorless and almost odorless. It has a sweetish taste that is not unpleasant when it is fresh.

§ 3 CHEMICAL PROPERTIES THAT ARE OBSERVED WITHOUT THE OLEIN BEING ALTERED

559. 100 parts of boiling alcohol with a density of 0.816 (g/mL) dissolve 3.2 parts of olein. On cooling, the solution deposits part of the olein.

560. The olein has no effect whatsoever on colored reagents. It does not neutralize alkaline bases.

---

* Lard olein obtained by alcohol extraction

	BY WEIGHT		BY VOLUME	
Oxygen…….	9.548	100	1	
Carbon……..	79.030	807.7	10.81	10
Hydrogen……..	11.422	119.6	19.17	17.73

Mutton olein obtained by alcohol extraction

	BY WEIGHT		BY VOLUME	
Oxygen……..…….	9.556	100	1	
Carbon……..….	79.354	830.41	10.85	10
Hydrogen……..….	11.090	116.05	18.60	17.14

§ 4. CHEMICAL PROPERTIES THAT ARE OBSERVED WHEN THE OLEIN IS ALTERED

561. When heated in contact with air, either in a retort or open to the air, it behaves more or less like the stearins.

562. Caustic potash converts the olein into glycerin and palmitic and oleic acids. The glycerin is more abundant than the glycerin obtained from the stearin. This is the opposite for the acids, and the mixture of these acids melts at 34.5°C instead of 51 to 53°C like the mixtures obtained from the stearins. This is because there is a higher concentration of oleic acid in the olein than in the stearins.

Effect of sulfuric acid of 66 degrees on olein and in contact with air

563. An amount of 200 mg of human fat olein was put in a tube with an internal diameter of 10 mm with 2 g of sulfuric acid at a temperature of 18°C. At the moment of contact, the olein turns an orangey red color. After two hours, the olein forms a reddish layer on the surface of the acid, and part has dissolved since the acid is colored. When agitated, the two layers mix and seem to dissolve. The materials have a noticeable smell of sulfur dioxide. After twenty-four hours, the liquid is orangey red and seems to be homogenous. More sulfur dioxide has been formed than by the treatment of the stearin by sulfuric acid (538). After a week, the color is deeper and there are some droplets in the atmosphere of the tube that are purple colored. An amount of sulfur dioxide has been formed that readily colors litmus paper.

564. When the tube is exposed to 100°C, the color of the solution becomes somewhat deeper. Otherwise, it is similar to the sulfuric acid solution of mutton tallow stearin except that it is slightly less deeply colored, evolves more sulfur dioxide without effervescence and is less viscous.

565. At temperatures above 100°C there is effervescence, liberation of sulfur dioxide and hydrogen sulfide and the olein is reduced to carbon.

Effect of nitric acid

566. When cold, 2 g of human fat olein and 200 g nitric acid reading 32° on the hydrometer do not react noticeably. After prolonged contact for fifteen hours, an evolution of substantial amounts of nitrous vapors can be observed after heating for an hour. By operating as described (46), a slightly yellow residue weighing 1.7 g is obtained; it can be separated into an *aqueous extract* A and an *alcoholic extract* B.

A. Aqueous extract

567. It yields *acid crystals* and a yellow mother liquor that is not astringent and does not form a precipitate with limewater.

Acid crystals

568. They are similar to those obtained with stearic acid (48).

B. Alcoholic extract

569. On evaporation to dryness, it leaves a residue of 17 mg. If this is dissolved again in cold alcohol and water is added, an *oil* and an *aqueous liquid* are obtained.

1. Oil

570. It seems to me to be similar to the oil obtained with stearic acid; it is bitter, yellow, reddens litmus paper and is soluble in alcohol and aqueous potash.

2.Aqueous liquid

571. It contains the same substances as aqueous extract *A*.

§ 5. OCCURRENCE

572. It occurs in human fat, lard, jaguar fat, goose fat, etc.

§ 6. PREPARATION

573. (See Book III, Chapter 3.)

§ 7. NOMENCLATURE

574. The word *olein* comes from the Latin *oleum*, "oil". I have given it this name because it is a liquid at ambient temperature and as I have mentioned earlier (7), this is what characterized an oil before my work. I formerly called it *elaïn*.

§ 8. HISTORY

575. I discovered it in 1813 but its description was not presented at the Academy until April 4, 1814. On September 19 of the same year, I announced that olein and stearin existed in the fat of men, women, sheep, cattle and bovine butter and that in the latter there is also a most remarkable odorous principle. Also in the same year I announced at the Société Philomathique[1] that I had separated two substances from olive oil, each with a different melting point, by means of cooling and soaking up the liquid with the filter paper.

[1] The Société Philomathique in Paris was founded in 1788. It still exists and even has a website: www.philomathique.org.