CAVIAR LIPOPROTEIC COMPLEX

GENERAL

The term CAVIAR derives from the Turkish “jawiar” or javiar”.

Reference to this word is found in Cervantes’ *Quixote* when, after Sancho Panza had governed his island, the pilgrims invite him “with other enticing things …. which if they were past gnawing were not past sucking. They also put down a black dainty called, they said, cabial, and made of fish spawn, a great thirst-wakener.”

Clemencín, in his notes on Quixote, said about the above paragraph “It seems that it is a foreign word. Cabial is a kind of sausage of sturgeon spawn. To be a thirst-wakener is the same as to make thirsty or excite the desire to drink.”

It is in 16th century England, where at the same time, that Shakespeare makes reference to this in *Hamlet*, at the end of Act 2, when the Prince of Denmark, referring to a piece he had once heard him recite, tells the first player that it had “pleased not the million; **'it was caviar to the general**”. In Moratín’s Spanish version, this was translated as “Undoubtedly this was no delicacy to give to the populace.”

In some old English editions of *Hamlet*, a footnote explanation was made that caviar was an Italian delicacy made of fish spawn.

Today, the spawn of some species of ACIPENSERIDAE, and from all, the ones corresponding to STURGEON, is the only one accepted under the term caviar.

The Sturgeon or Acipenser Sturio, of the order of the Ganoids, are primitive fish characterized for their skeleton which is not entirely ossified. This is a very interesting fish because it constitutes the mid point between the fish of cartilaginous skeleton, such as sharks and rays, and those of osseous skeleton, like sardines and gilt-head bream.

In remote times they underwent great evolution, mainly in the Devonian and Carboniferous periods of the Primary Era, but most of their forms have disappeared. The approximately twenty species presently living, are but traces of a past of splendor and also in danger of becoming extinct.

In the 12th century, King Henry II of England considered that sturgeon was only worthy of being eaten at his table, and in the 14th century, King Edward II decreed that all sturgeon caught in the waters of his kingdom, would become the property of the crown.

Until relatively recent times, they abounded in our most important rivers to the point that if catches were very abundant, the fish were employed as manure for farming lands. Nevertheless, as a result of the construction of dams, the channeling of rivers and the high levels of pollution of our fresh water sources, their migration and subsistence are becoming difficult to the extent that at present they only survive in the Guadalquivir River, and have practically disappeared from the Ebro, the Guadiana and the Miño.

The Guadalquivir is the only river that is exploited industrially. The number of sturgeon has obviously decreased since the dam of Alcalá del Río began to work in 1932, which hindered them from reaching the places where they used to reproduce.

There used to be huge quantities of them in the Ebro and it is known that in the 14th century, the wife of Don Juan, first-born of Pedro IV of Aragón, ate only these fish and had them captured in such a manner that the fish would arrive alive from Tortosa to Barcelona. Towards 1935, they were already considered as practically extinct, although some specimens more than 2 meters long and weighing 80 kilograms were caught towards the end of that decade.

The Sturgeon, or Acipenser Sturio, also known in Spanish by the common names “marón” and “marión”, is known in Andalusia as “sollo”, in Galicia and Asturias as “esturión”, “gaizkata” in Basque, and as “sturió” in Catalonia and the Balearic Islands.

Females sturgeon often measure between 1.5 and 2.5 meters long and weigh between 15 and 85 kilograms. Males measure from 1 to 2 meters and weigh 45 kilograms. It is a peaceful animal, a great swimmer and has an extraordinary endurance.

Born in rivers, this fish existence takes place mostly at sea, grouped in colonies, at less than 40 miles from the coast and at depths of 20 to 100 meters. When at sea, it gathers nutritional reserves in the form of fatty deposits, given the fact that once the river spawning migration begins, it stops feeding altogether.

In our peninsula, the males reach sexual maturity at 11 years old, and the females, at 15.

In spring, sturgeons begin to push into the rivers, most likely lured by the action of the fresh water currents in the sea, which have greater intensity as a result of their stronger flow. They remain in the lower part of the rivers one or two months nourishing from the accumulated fatty reserves in their bodies, as their sexual maturation is completed.

Their going upstream is slow and they remain close to the riverbed because the ovary / testicle compresses the swimming bladder preventing it from functioning as the floating organ.

Reproduction takes place upon their reaching the spawning sites in deep spots at mid-river where they find freshwater streams flowing into the sea with a high level of aeration. As soon as the spawning has taken place, the density of the sturgeon decreases and they rise to the surface. Carried away by the river flow, they go back to the sea in an attempt to reach it soon so as to recover their energy.

The eggs are approximately 2 – 2.5 millimeters in diameter and remain attached to the riverbed by a mucosity which prevents them from being carried away by the water flow. This mucosity is essential for the aeration of the embryos and protects them from being attacked by certain harmful fungi and bacteria.

Each female lays hundreds of thousands and even millions of eggs, depending on its weight. Therefore, if we take into account that 90 eggs weigh approximately one gram:

A 30 Kg. fish	No. of eggs: 350.000	Weight: 4 Kg.
A 50 Kg. fish	No. of eggs: 750.000	Weight: 8 Kg.
A 70 Kg. fish	No. of eggs: 1.150.000	Weight: 13 Kg.
An 85 Kg. fish	No. of eggs: 1.400.000	Weight: 16 Kg.

Four to eight days after spawning, the sturgeon alevins are born. They are tiny fish that measure less than 1 centimeter and barely resemble the adults. Elongated and almost transparent, they carry a kind of bag in the abdomen which will serve them as nourishment during the first four or five days in which they remain still. After said period, the vitelline bag

is consumed by the sturgeons to its disappearance, and from then on, they are to get their own food.

Given the fact that the sturgeon is used for the elaboration of caviar, catches have to be carried out before spawning takes place; that is, as they go upstream close to the riverbed.

As we have already mentioned, in the course of migration to their spawning sites, they do not feed and would consequently not be lured by baits placed on fishing hooks. That is why they are caught by using hooks with a special disposition in such a manner that, at the slightest contact, they stir against the body that has touched them piercing it. As a result of the fish's great vitality, the wounds caused by the hooks, no matter how serious they may be, not always causes their death. This is very important, given the fact that in order to obtain good quality caviar, the fish has to arrive to the factory alive.

Caviar preparation is not too complicated. The eggs, which are not to be exposed to the sun, are passed through a sieve in order to separate the membrane remains and all foreign particles which may be present, and are afterwards washed with cold water. The remaining operations are limited to a simple salting, and in some cases, to adding vinegar.

Salt must be refined and pure, in a proportion of approximately 10 Kg. per every 100 Kg. of eggs. Once drained, they are placed in small barrels, and are kept in refrigeration chambers until their canning and sterilizing takes place under the appropriate conditions.

Marine creatures are composed of different classes of chemical elements which can be grouped as follows:

1st) ESSENTIAL BIOGENETIC ELEMENTS:
Which, in turn, are grouped into 2 categories:

a) Plastic primary elements: C, H, O and N.
b) Essential secondary elements: P, S, Na, K, Ca.

2nd) OLIGODYNAMIC ELEMENTS:
Also grouped into 2 categories:

a) Rare and essential biogenetic elements: Mg, Fe, Zn, I, Mn, and F.
b) Rare special biogenetic elements: vanadium, boron and lithium

3rd) ACCIDENTAL ELEMENTS:
The substances which participate in the composition of the cytoplasm of the cells of marine creatures, and which may be of organic or inorganic nature.

Undoubtedly, among the inorganic elements the most important one is water. Its proportion in marine creatures reaches very high values which may even exceed 95% of their total weight.

The ones of organic nature are divided into 3 different groups: Glucids, Lipids, and Proteins.

Glucids are compounds called ternary, because they are formed by only 3 elements: C, O, H. They are sugar-coated compounds with properties similar to sugar. Among the most important, worth to be pointed out are glucose, fructose, saccharose, cellulose and glycogen.

Lipids may be part of live matter under two aspects: as constituents of the live matter itself, being then called cellular lipids, or as oleic, stearic, palmitic, etc.

Among the simple lipids, we can find waxes, esters or sterols, and the so-called neutral fats, which are glycerides of fatty acids such as the oleic, stearic, palmitic, etc.

Among the complex lipids or lipoids, lecithin is worth to be pointed out.

Protides are the most important substances of protoplasm. They are composed of C, O, H, N and are thus called quaternary, although they may well eventually contain S Y P. The Protides that are part of live matter may be simple proteins such as albumin, globulin, etc., and compound proteins such as the glycoproteids.

Simple proteins can be divided by digestion giving place to the albumoses and peptones and later to amino acids.

The chemical characteristic of the amino acids enables the composition of ones with the others, giving rise to the so-called polypeptides. Thus, the possibilities of the isomers of a protein molecule formed by a hundred amino acids are centillon. This explains the possibility of the specificity of proteins. That is to say, that each species, animal or plant, has its own and characteristic proteins, which has been proven through serological analyses. Furthermore, it is even considered that there might exist an individuality in the proteins.

From the nutritional point of view, the true importance of fish rests upon its protein, vitamin and fat contents.

As regards fish fat, and without regard to the fact that this might be the one with higher energetic power, it exhibits several characteristics that make it particularly interesting.

In the first place, a series of very important non-saturated fatty acids take part in its composition, like Clupanodonic, which is among the acids that produce the classic fish smell and specially the smell of stale fish. Secondly, precisely as a result of these unsaturated fatty acids, fish fat not only stimulates the formation and deposit of cholesterol, but it also destroys the existing one. If we add to the aforesaid that it has a low sodium chloride content, it becomes clear why cardiac patients, whose blood pressure control (a problem of sodium chloride in the blood) and of arteriosclerosis (a cholesterol problem) is essential, show an interest for this type of fat.

In the specific case of the sturgeon, we have to keep in mind that every 100 grams of fish gives room to 65 calories. The chemical composition of this fish is as follows:

Proteins	11%
Fat	3,50 %
Moisture	85%

For 100 grams of fish:

Vitamin A	2.400	U.I.
Vitamin D	250	U.I.
Vitamin B_1	100	Micrograms
Vitamin B_2	82	Micrograms
Sodium	74	Milligrams
Potassium	162	Milligrams
Calcium	9,5	Milligrams
Magnesium	11,5	Milligrams
Iron	1,2	Milligrams
Phosphorus	175	Milligrams

Sulfur	196	Milligrams

In addition to being delicate and tasty, caviar is a powerful tonic for its abundance in vitamins and phosphorus, its nutritional power and easy digestibility. As a result, it has been used in Germany and Russia for the nurturing of convalescent patients.

Compared to the other fish, fresh or salted, the caviar surpasses all of them. In relation to veal meat, it contains 16 times more fat, provides three times the number of calories and besides having a greater amount of proteins, it is richer in vitamins A, B_1, B_2 and D.

Eggs of other fish species are sometimes sold as caviar, and from all of them, the most similar are codfish eggs.

Thus, the composition of fresh Caviar, salted Caviar, and Codfish eggs is:

Type	Moisture	Protein	Fat	Ash	Sodium Chloride
Fresh caviar	50%	28%	10%	8%	2%
Salted caviar	40%	33%	10%	9%	8%
From Codfish	65%	10%	3%	8%	12%

From this, we can infer the great difference existing among these types.

It is also noteworthy that codfish eggs produce approximately 1400 calories per Kilogram, fresh Caviar some 2600, and salted Caviar around 3000 calories per Kg.

The acidity of Caviar varies from 4,50 to 8,50 milliequivalents, according to the type.

Among its components, Caviar has a protein from the egg membrane, ichthulin, which is very rich in tyrosine (insoluble in water but soluble in alkaline solutions). It also contains albumin and nitrogenated extractive products, xanthic acid bases and amino acids.

It also contains vitamins A, B_1, B_2, B_6, D, E, and H.

From all the data we have just mentioned, we can infer that it would be very hard to find another living being that can gather all the nutritional elements of caviar.

USAGE AND DOSAGE

At this point, studies were began on the method to obtain a Caviar Extract that contained all the active elements in order to apply them to beauty treatments. Said extract should be a product that could be mixed with classic cosmetic elements to enable absorption of these active principles through the skin, and that would not bring up irritation or sensitization problems.

The starting point was Salted Caviar, since being canned under sterile conditions ensures a raw material under the best possible microbiologic conditions.

Thus, a hydrolization carried out by some very specific enzymes is produced. The lipid part has been micro-emulsified, yielding a preparation that we have named CAVIAR LIPOPROTEIC COMPLEX, which carries all the active principles of the Sturgeon Eggs, in such a way that they can be included in all types of cosmetic and dermatological preparations.

This complex, in its fatty part, is composed of Triglycerides, Sterols and Phospholipids, and its fatty acids are: Lauric, Myristic, Pentadecanoic, Palmitic, Palmitoleic, Hexadecadienoic, Estearic, Oleic, Linoleic, Gadoleic, Eicosapolienoic, Erucic, Docosapolienoic.

The following liposoluble vitamins are also present in the fatty part:

Vitamin A	7.500 UI/100 gr.
Vitamin D	300 UI/100 gr.
Vitamin E	0,02 Micrograms/100 gr.

In the protein part, the trace elements, Hydrosoluble vitamins and amino acids are present.

Vitamins contained:	Vitamin B_1	5 UI/100 gr.
	Vitamin B_2	20 Milligrams/100 gr.
	Vitamin B_6	0,2 Milligrams/100 gr.
	Vitamin H	0,01 Milligrams/100 gr.

It contains the following oligoelements: Magnesium, Iron, Copper, Zinc, Iodine, Cobalt, Manganese, Silicium, and Fluorine.

It contains 17 of the most important amino acids: Isoleucine, Lysine, Methionine, Cystine, Phenylalanine, Tyrosine, Threonine, Tryptophane, Valine, Arginine, Histidine, Alanine, Aspartic Acid, Glutamic Acid, Glycine, Proline, and Serine.

It is evident that all this Complex strength makes it really interesting for the treatment of alipic, aged, and dehydrated skins or skins with impurities, mostly because of its essential and sulfured amino acids.

Its content of very unsaturated oils makes it very interesting if trying to obtain extra-oiling effects.

Its vitamins and trace element contents, turn it into a first class skin and hair stimulant.

Finally, and from the point of view of its dermic compatibility, we shall say that the fact of using a product in the cosmetics industry that is apt for human consumption, is always a guarantee that it will not present dermatological problems.

Nevertheless, clinical tests have been performed with the CAVIAR LIPOPROTEIC COMPLEX in state of pureness, and it has been effectively verified that it did not present any type of problems.

What should be kept in mind is that the cosmetic product that will reach the customer is not the product in its pure state, since it will also have a series of components to give it a finishing. Consequently upon contact with the skin the complex gets to the skin in lower proportions to those tested and therefore the risk of a potential sensitization is even lower.

The recommended dosage is between 1 and 5%.

PHYSICAL – CHEMICAL PROPERTIES

Aspect: Oily, transparent and slightly opalescent liquid, of yellow-brownish color and characteristic smell. It is stabilized against staleness with BHT.

Solubility: Insoluble in water. Soluble in lipids and certain organic solvents.

Density at 20º C: between 0,910 and 0,940.
Acidity Index: Lower than 5.

Saponification Index: 180 to 200.

Iodine Index: 125 to 140.

Insaponifiable: minimum 1,5%

DERMATOLOGIC INNOCUOUSNESS:

At recommended concentrations, the formula is innocuous to the skin. Its oral LD50 on rats is over 3,000 mg./Kg., so it can be considered in the non toxic category.

STORAGE CONDITIONS

It is very important that the product be kept in sealed containers, away from direct sun light and at temperatures below 25ºC.

INCI DENOMINATION

CAVIAR EXTRACT

CTFA DENOMINATION

CAVIAR EXTRACT