

# **ORIGIN AND IMPACT OF AMBER ACID**

## **What is Amber Acid?**

Amber Acid is the product derived via reprocessing of natural amber. It is absolutely harmless material, having especially useful features. It looks like white crystalline powder with the taste like Lemon Acid.

## **What is origin of Amber Acid?**

During the process of evolution various simple and difficult combinations have been used by live nature for maintaining of the processes of vital-importance. It is believed that Amber Acid was likely to be suitable for the mentioned purposes and it has been used by all live organisms since time immemorial. Amber Acid even 50 million years ago participated in metabolism of live systems and significant amounts of the present material is being found accumulated in natural amber stone. Any organism today as well under unfavourable conditions significantly increases production of Amber Acid, which allows him successfully resist negative impact of surrounding medium.

50 million years ago due to cosmic cataclysms climate of the Earth significantly changed, temperature was likely to increase rapidly thus these trees of that time found themselves in extremal situation and became to produce the bigger amount of Amber Acid, which used to getting into resin, released by these trees. Other, more developed organisms probably not only produced Amber Acid, but also tried to refresh its deficiency from external sources. It is possible that namely this was the reason of liquid wood resin to attract various insects or other tiny animals. Many of these insects used to sinking within viscous liquid and remained there for ever. A lot of them are perfectly preserved till now. This enabled scientists to find out more than 3000 species of insects, lizards and fragments of plants, living in the Earth some decades million years ago.

Everyday human body produces about 200g of Amber Acid and uses it for its own needs. For healthy organism the amount of produced or acquired with food Amber Acid is sufficient. However under unfavourable conditions, when due to stress or acutely changed physical load, tension within the chain of metabolism occur, output of Amber Acid is likely to increase in line with its deficiency resulting in distress and sickness.

Consequently the situation leads to deterioration of well-being, human body fails to resist negative impact of surrounding medium, disorders occur together with interruption of functionality of different systems of human body. Thus Amber Acid comes to the rescue.

## **What is the secret Amber Acid has?**

### ***Cellular processes, which enliven everything***

Carbohydrates, fats and proteins acquired with food split into simple compounds, i.e. glucose, glycerine, fatty acids and amino acids, which during the reactions of metabolism, running at intracellular level, turns to organic acids and later oxidize to carbon dioxide and water. Glucose and glycerine at the beginning oxidizes anaerobically, i.e. without participation of oxygen, during enzymatic reactions, called glycolysis.

During such situations, when delivery of oxygen is insufficient in order to provide energy for functional load (work) activation of anaerobic glycolysis occurs and end product of glycolysis, i.e. lactic acid (lactate) accumulates within the tissues. All live cells no matter cells of animal or plant, mushroom or germs, contains special bodies few microns in diameter called Mitochondrion. Amber Acid is basically produced within Mitochondrion and applied for further reactions.

Under sufficient supply of oxygen all organic acids burn within special cellular bodies Mitochondrion, which play role of the most important energy source. Accumulation is being performed within respiratory chain, poly enzyme complex, situated in the membrane of Mitochondrion.

### ***Energy balance at the extent of cells***

The main part of sun energy, included in chemical relations used by us with food, is being released by oxidation of organic acids during cyclical serial reactions, discovered by Sir Hans Krebs. Any material of initial source (proteins, fats or carbohydrates) everyone turn into organic acids of Krebs cycle.

Krebs cycle, respiratory chain and accumulation system are situated within Mitochondrions. Mitochondrions are called energy stations of the cell. Namely within Mitochondrions burning of various types of materials is likely to occur. Mitochondrions supply ATP as universal fuel for energy for all types of activity and synthesis within human tissues. Quality and quantity of Mitochondrions, their status of functionality, interaction with glycolysis and the system of oxygen supply determine range of cell's functional activity and appropriate tissues.

### ***Involvement of Amber Acid in energy balance***

During the simple serial reaction in Mitochondrion in Krebs cycle Amber Acid is one of the intermediate products. As shown by the research results of M.N. Kondrasheva, professor of the Institute of theoretical and experimental biophysics of Russian Scientific Academy, energy capability of the process of ATP synthesis under oxidation of Amber Acid is significantly higher when under oxidation of any other substrate. Due to this reason a lot of energy-dependant, i.e. energy using processes, e.g. accumulation of calcium ions and supply of biosynthesis with hydrogen even in insulated Mitochondrion are capable of occurring only under oxidation of Amber Acid. Investigations of M.N. Kondrasheva followers have proved out that additional ways of production of Amber Acid exist in nature and by necessity are capable of activating. In particular such additional "shot" of Amber Acid with health person occurs under intensive work and during restoration after loads, when necessity to produce ATP is especially high.

Not only high generating capability of oxidation of Amber Acid force to take its priority over other substrates. The reason is that under any intensive load so called working hypoxia is being developed, when use of oxygen during reactions of energy balance exceeds capabilities of its providing for cells. Practically under all diseases of cardio-vascular system, lungs, a lot of blood disorders, intoxication, after use of alcohol and various pharmaceuticals either provision or using of oxygen is being disturbed. In other words, this is formation of hypoxia.

In the event of hypoxia respiratory chain of Mitochondrion can not intake hydrogen from any other substrate except Amber Acid. Namely under oxidation of Amber Acid hydrogen gets into significantly lower part of respiratory chain. Under such situation in the present part even under deep hypoxia capability to accept hydrogen is preserved. In this case oxidation of Amber Acid in Mitochondrion remains one of few ATP sources. Additional supply of Amber Acid can significantly contribute to vital activity of human body.

Amber Acid, which is being developed in Mitochondrion in the same place burns immediately, therefore instant stationary concentration of Amber Acid available in tissues is not exceeding 10-20 mg of the tissue mass and as a rule remains within Mitochondrion. Out of Mitochondrion and out of cell Amber Acid is practically unavailable. Out of Mitochondrion it appears during heavy anaerobiosis (total absence of oxygen) or under deep hypoxia of any part of a tissue.

Preceptorial systems of human body appearance of Amber Acid in blood circulation understand as signal, indicating that some part of human body suffers from lack of energy resources and oxygen hunger. Accordingly human body reacts towards the present signal involving shifts of neuroendocrinal and hormonal regulation, improvement of peripheral blood circulation, intensification of cardiac beat, facilitation of oxygen delivery with the help of oxyhemoglobin and other physiological and biochemical compensatory reactions. These are reactions of mobilization of energy balance. And they are likely to occur not as response towards really impending energy deficiency, but as signal that possibly there is a place for it.

Being absolutely harmless and providing positive effect even under small amounts Amber Acid may be considered as useful nutrition supplement. Use of such supplements contributes to normalization of human body's state.