

**REPORT ON RESEARCH OF BAE SYNERGY LIQUID PREPARATION  
INFLUENCE ON MINERAL METABOLISM**

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## **Introduction**

The metabolism and energy is a basis of ability to organisms live and belongs to a number of the major specific features of the live matter distinguishing living from the lifeless. A set of fermental systems participates in metabolism provided with the most complicated regulation at different levels. In the process of substances exchange ones transform into own substances of tissue or to the terminal products which are removing from the organism. During these transformations the energy is released and absorbed.

There is a different type of exchanges:

- An organic exchange (an exchange of proteins, fats and carbohydrates);
- A mineral exchange – set of processes of absorption, distribution, assimilation and excretion of the mineral substances which are in organism mainly in the form of inorganic connections.

There are over 70 known chemical elements in the organism. 47 from them are present constantly and called biogenic. Mineral substances play the important role in maintenance of the acid-base balance, osmotic pressure, system of a fibrillation, regulation of numerous fermental systems and so forth, i.e. have crucial importance in creation and homeostasis maintenance.

Every living organism needs macro- and microelements. Macroelements are calcium, phosphorus, magnesium, strontium, barium, iron, aluminum, manganese, potassium, and sodium. Microelements are iodine, selenium, cobalt, molybdenum, boron, zinc, and some other chemical elements. All these mentioned elements participate in any living being's metabolism – both lack and excess of one or another element may cause diseases of plants and animals.

There are some functions of mineral substances:

- Plastic (calcium, phosphorus, magnesium);
- Maintenance of osmotic pressure (potassium, sodium, chlorine);

- Maintenance of buffer action of biological liquids (phosphorus, potassium, sodium);
- Detoxication (iron as a part of cytochrome P-450, sulfur in structure of glutathione);
- Conducting of the nervous impulse (sodium, potassium);
- Participation in endocrine control (iodine, zinc and cobalt are a part of hormones).

The mineral structure of the organism to a greatly depends on external factors - from a sort of a nutrition, physical activity, environmental contamination degree.

The metabolism of mineral components regulated by nervous and hormonal systems, plays great role in metabolic processes of an organism. It is necessary to notice that physiological processes depend not only on structure and concentration of separate elements, but also and from their ratio. There is strictly certain ionic balance which is kept at constant level for separate parts of organism.

Disturbance of mineral exchange in a body of person and animals is partly defined by insufficient entry and uptake of these substances, but one can be also a consequence of disturbance of endocrine system functions (a hypophysis, adrenal glands, thyroid and parathyroid glands) or insufficient entry of some vitamins and elements with nutrition.

Disturbance of mineral exchange can lead to the such serious consequences, as organism dehydration, demineralization of bones, disturbance of neuromuscular transmission, heavy forms hypovitaminosis, an asteno-neurotic syndrome and many other disturbance of live abilities. In this connection, the maintenance of correct mineral exchange is a necessary term for successful functioning of all organs and systems of organism, and also satisfactory adaptation to stressor influence of environment.

In the previous works have been shown immunomodulatory action of natural BAE Synergy Liquid (SL) preparation and consequently, there was of interest of estimate possibilities of the given preparation for maintenance of correct mineral

exchange of organism. In this work we concentrated on rats organism. As the preparation incorporates a number of minerals (Tab.1) phosphorus and cobalt have been chosen by way of observable changes in structure of blood of investigated mice.

**Table 1.** BAE Synergy Liquid content with methods of research.

<b>Determinate component</b>	<b>Name</b>	<b>Determinate contents, mg/l</b>	<b>Maximum allowable concentration, mg/l</b>	<b>Conclusion</b>	<b>Method used</b>
Si	Silicium	0,25	10	Conformity	EA
Al	Aluminium	0,03	0,5	Conformity	EA
Mg	Magnesium	1,1	40	Conformity	EA, AA
Ca	Calcium	0,45	180	Conformity	EA
Fe	Iron	0,06	0,3	Conformity	Pc, EA
Mn	Manganese	0,05	0,1	Conformity	EA, AA
Ni	Nickel	0,008	0,1	Conformity	IC, EA
Ti	Titanium	0,04	0,1	Conformity	EA
Cr	Chromium	0,02	0,05	Conformity	QC, EA
Cu	Copper	0,025	1	Conformity	EA, AA
Ag	Silver	0,01	0,05	Conformity	EA
Zn	Zinc	0,02	5	Conformity	EA, AA
Sr	Strontium	0,05	7	Conformity	EA
Na	Sodium	5500	200	Non conform	EA
Cl	Chlorine	8700		Non conform	QC, EA
SO4	Sulphate-ion	4,5		Conformity	QC, EA
Co	Cobalt	Not revealed	Consequently	<0,01	QC, EA
Mo	Molybdenum	Not revealed	Consequently	<0,01	QC, EA
V	Vanadium	Not revealed	Consequently	<0,01	QC, EA
Pb	Plumbum	Not revealed	Consequently	<0,01	QC, EA,

					AA
As	Arsenic	Not revealed	Consequently	<0,01	QC, EA
Cd	Cadmium	Not revealed	Consequently	<0,001	QC, EA
Sn	Tin	Not revealed	Consequently	<0,01	QC, EA
P	Phosphorus	Not revealed	Consequently	<0,5	QC, EA

Potassium, nitrate and nitride ions didn't determine because of small quantity of the substance.

## **I. Materials and methods.**

### ***1.1. Minerals.***

Here we will cite the data about physiological significance of required minerals.

#### ***1.1.1. Physiological value of Phosphorus.***

The significance of phosphorus for a human body is huge. Phosphorus is located in bioenvironments in the form of a phosphate-ion which is a part of inorganic components and organic biomolecules. Phosphorus is present in all tissue, is a part some proteins, nucleonic acids, nucleotides, phospholipids. Adenosine diphosphate and adenosine triphosphate phosphorus compounds are universal energy source for all live cells. The considerable part of energy formed at disintegration of carbohydrates and other compounds, accumulates in organic compounds of phosphoric acid.

Soluble salts of phosphoric acid form the phosphatic buffer system responsible for constancy of acid-base equilibrium of an intracellular liquid. Almost insoluble (calcic) salts of phosphoric acid make the mineral basis of a bone

and tooth tissue. Phosphorus plays the important role in activity of a brain, heart, a muscular tissue.

### *1.1.2. Physiological significance of cobalt.*

Cobalt – is the factor of activation of B12 vitamin, therefore this element is irreplaceable for normal course of process of blood formation. Also cobalt stimulates synthesis of proteins and muscle growth, activates some enzymes processing carbohydrates. The cobalt lack can be shown by an anaemia. The basic sources of cobalt are bread and flour products, fruits and vegetables, milk, bean.

### *1.2. The plan of experiment.*

The work was carried out on rats – Wistar line males, with weight 135-160 gram. Animals were contained in standard conditions and received a special food, free of Co and P. In the course of carrying out of experiment they have been divided on two groups: control and experimental (with 20 rats in each one). In control group animals received potable water independently from standard drinking bowl, and in experimental group they drunk the examinee preparation (BAE SL) dissolved in potable water in 1/100 proportion, also from drinking bowls.

Biochemical indicators were defined in both groups before the beginning of experiment and also for the fifth, tenth and twentieth days of experiment.

### *1.3. Methods of blood analysis*

The definition in blood serum made with help of highly informative emission spectrophotometry method with inductive connected argon plasma (Black M.S. et al., 1981).

## **II. Results of experiment**

The data of results is presented at tab. 2 and 3 and figs. 1 and 2.

**Table 2. Biochemical indicators in Control group of animals.**

№	Index	Control group, 20 animal unit			
		Before experiment	5 days	10 days	20 days
1.	Phosphorus (mcg/kg)	182±3	178±6	170±6	158±8
2.	Cobalt (mcg/kg)	0,21±0,01	0,20±0,01	0,18±0,02	0,16±0,02

**Table 3. Biochemical indicators in Experimental group of animals.**

№	Index	Experimental group, 20 animal unit			
		Before experiment	5 days	10 days	20 days
1.	Phosphorus (mcg/kg)	182±4	180±5	178±5	170±8
2.	Cobalt (mcg/kg)	0,21±0,01	0,20±0,01	0,19±0,02	0,18±0,02

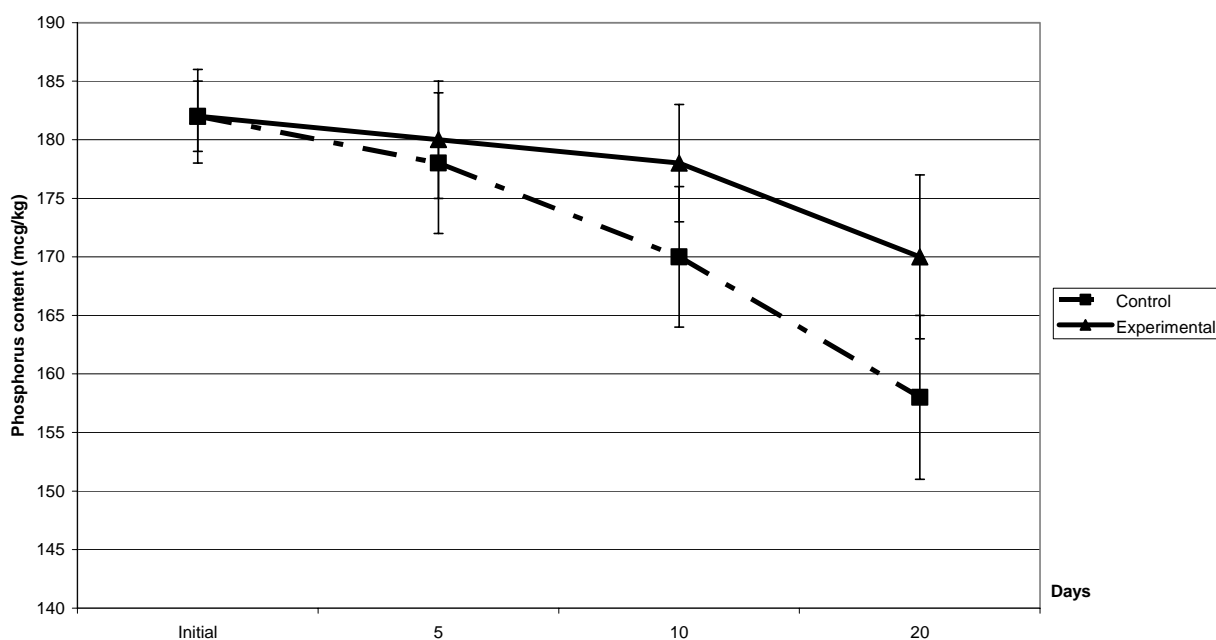


Fig.1. Dynamic of phosphor maintenance in the blood of rats for control and experimental groups.

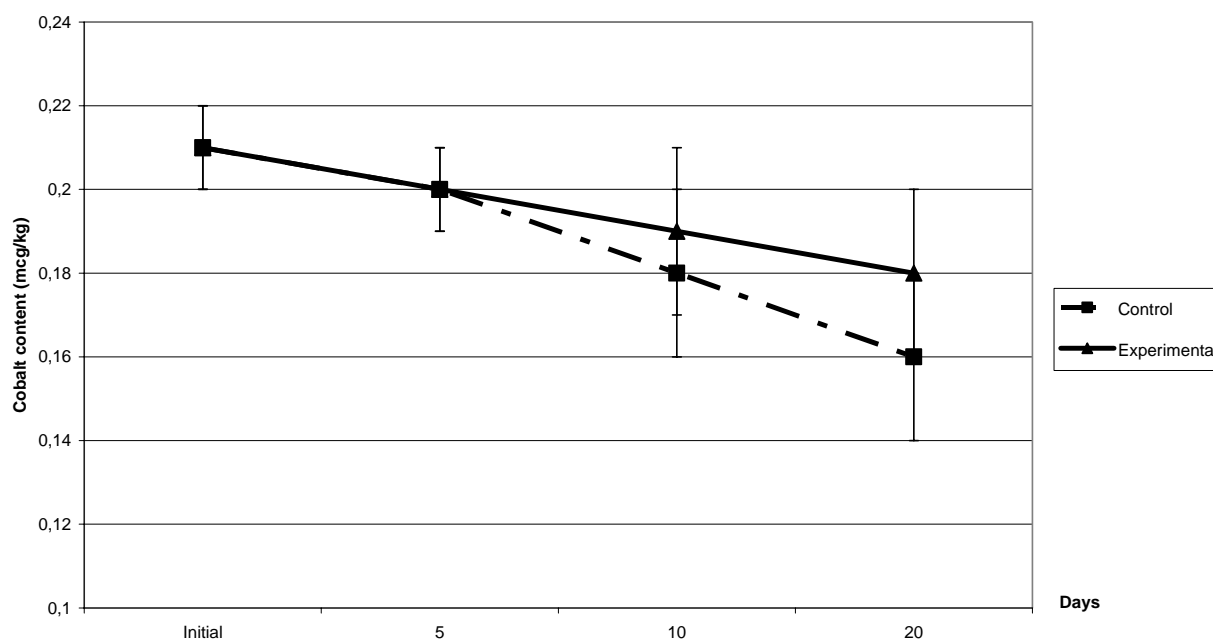


Fig.2. Dynamic of cobalt maintenance in the blood of rats for control and experimental groups.

As appears from the data resulted in tables and schedules, for two kinds of minerals we have monotonously decreasing curves. For experimental groups we have less expressed trend of curves decrease. So, monitoring of phosphorus changes, for first five days shows observe reduction by 1 %, after ten days - by 2,2 % and after twenty days by 6,6 %. The same indicators gives following values for Control group: five days – 2,2 %, ten days – 6,6 % and twenty days – 13,2 %.

For the twentieth day we have statistically significant difference on change of quantity of phosphorus in blood for observable rats.

On change of cobalt in Experimental group one had following changes, concerning next values: five days – 4,7 %, ten days – 9,5 % and twenty days – 14,2 %. For Control group correspondent values are the next: five days – 4,7 %, ten days – 14,2 % and twenty days – 23,8 %. In this case, as well as at phosphorus observation, we have statistically significant difference in the cobalt content for the twentieth day.



## **Summary**

It has been revealed that the maintenance of such Macroelements and Miroelements as phosphorus and cobalt, removes from the organism more slowly in case of BAE SL preparation consumption. These distinctions are most expressed and have statistical significance after the twentieth day of consumption of the given preparation.

Thus, in process of carried out experiment was established, that the BAE SL preparation assist to maintenance of mineral metabolism of rats.