

## A new era in the treatment of tumor and viral infections with insect extracts. New possibilities of rising human longevity

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**Abstract:** We found the presence of large amounts of protein in pupae, larvae and eggs of Lepidoptera, Coleoptera and Diptera. In biological active substances (BASa), proteins constitute up to 75%, more than in any other organisms. The proteins are the main components of insect tissues in all stages of development of insects. The structure of protein modifies at every three hours. Such processes are specific only to insects that have four stages of development: egg, larva, pupa and adult (imago).

There is too little information on the molecular structure of the insect tissues and in particular proteins. Unlike other living organisms, insects have a specific structure. For the first time we discovered the presence of the caffeic acid (polyphenolic carboxides) in the component of eggs, larvae and pupae of *Limantria dispar*, (Lepidoptera) which are inhibitors of tumor and viral formations. In insects, biological active substances exist in high concentrations in contrast with vegetables. The analyses we made with the help of electrophoresis demonstrated the presence of a protein fraction with a very small weight - 3-5 kDa, and it is situated in the lowest possible area in the electrophoreses cells. (Fig. 15-18).

**Key words:** d caffeic acid, *Lymantria dispar*, proteins, biological active substances, polyphenols, carboxyl acids.

### Introduction

One of the biggest problems of human kind is realizing? that the high number of desisted people is caused by viral infections and tumors. In the present days these affections are considered to be not treatable. Until now we are looking for measures to protect ourselves from tumors and viral infections. The treatment measures we all know are: biostatics, interferon's made in the chemical synthesis but all those are harmful to the human body. Often the existing methods lead to patience's losing their life in much pain. Here it is an idea: utilizing the tissue of insects in the process of stopping the evolution of tumors and viral infections. The idea came after the researchers spent years looking at the insect's morphogenesis, infecting them with viral infections so they can disappear without hurting the human being (eliminating the chemical insecticides). The adjustment

of some organisms' densities is a global issue because all is born wants to dominate the food chain. After 30 years of research and study of the regulating of insects density, even infecting them on purpose, I realized this. During the research I found a phenomenon, in a certain step of evolution the multiplication of viruses, the process of multiplication stops. The research done with molecular biological methods proved that in the process of morphogenesis of insects in certain stages, we can see the appearance of interferon and cytostatics and all cancels the process of multiplication in the insects tissues during their mating season. At one point I came with the idea to use the inhibitory substances from insects in order to inhibit the viral infection and tumors found in the human bodies. The carcinomas and melanomas were my target. The viral infections were stopped and so I made an important discovery. Most of my results and preparations are patented and I managed to elaborate a series of technologies to obtain interferon to stop for good the viral infections and tumors. This paper is a presentation of these amazing discoveries and some technologies that lead me to them.

## 2. EXPERIMENTAL RETAILS

The insect component at the end stage of development forms an enormous amount of keratin or chitin, which protects the insect body of adverse environmental actions. Thus, the ability to modify the protein structure and morphology of insects can be applied to humans, especially in cases of viral infection or the appearance of their tumor formation, which are subjected to change and remove the body. It is an original idea which was tested and confirmed by us.

Our proposal includes a description of the original ideas proposed during the research devoted to the influence of extracts from insect and virus on the tumor formations. I found incredible cases to stop the viral infections and tumor formations, but the mechanism of action remains unknown. At first, I did toxicity tests (Ciuhrii, 2005). When I was convinced that the insect tissues of the Orders *Lepidoptera*, *Diptera* and *Coleoptera* are not toxic to human health and the environment, I had the courage to test the insect extracts on my own body, first at the surface of the skin tissue (Fig. 1, 2, 3, 4, 6, 7), then in the interior of the body in the form of supplements, creating the first dietary supplement based on insect tissue. The results were first registered at the Ministry of Health. As a result, we found that the human tissue can be changed by the action of extracts of insects at

certain stages of development: egg, larva, pupa and imago (adults of *Lepidoptera*, *Coleoptera* and *Diptera*). We have created a number of biological preparations based on extracts of eggs, larvae, pupae and adults. In the early stages of development, when they contain active substances and in the late stages of development of insects in which inhibitory substances occur, which stop both human life processes and the synthesis of the virus and the tumor formation. Thus, in the late stages of the life cycle development of insects we have found inhibitors such as cytostatics and interferon, which can stop the process of development of tumors and pathogens. So the action of inhibitory substances from insects can be induced in the human body, in some cases, when they come to stop the formation of tumors. This idea was exposed and argued in premiere. These events have encouraged us to create a series of biological preparations which were registered and sold worldwide. We have created an online store where anyone can buy our preparations ([www.insectfarm.com](http://www.insectfarm.com); [www.insectfarm.wordpress.com](http://www.insectfarm.wordpress.com)).

The most popular prepared products by us are creams for skin care, for feet, ankles, body massage, products used for removal of warts, undesirable moles, to carcinomas and melanomas.

We now have many cases of eliminating the carcinomas and melanomas from the skin (Fig. 4, 7, 12, 14). Our products can remove hepatic viruses, herpes, skin and nose, warts, respiratory infections. (See the list of our products).

That gives us the hope to intensify the scientific research in order to understand more deeply the mechanism of action of preparations based on insect tissue. At first, I did toxicity tests for 14 years (Ciuhrii, 2002; 2005; 2008; 2009; 2010-a, b, c, d, e; 2011) for the removal of the warts on the fingers of the undersigned (Fig.1) I applied the cream directly on the wart every night before falling asleep. Within one month the wart gradually decreased in volume until it completely disappeared without leaving signs and without causing any pain. It is interesting that the lepidopteran SBA point was applied to a lipoma located on the neck of the undersigned. After 30 days of treatment the lipoma disappeared completely. I got a great case, an example of an old woman, with a giant carcinoma on the crown. She told me that she was proposed to be operated. I proposed her a treatment with an ointment made with an extract of *Lepidoptera*. After 30 days, the formation decreased obviously (Fig. 3), and then it disappeared completely.

A man was diagnosed by doctors at the hospital with a carcinoma on the back. I risked and I used a cream of lepidopteran BASs. After 30 days the formation decreased obviously (Fig. 4).

A woman with a furuncle located on the back addressed to me with the hope to help her. She was allergic to antibiotics, so the surgical operation could not be

done. We gave her our creams based on SBA extracted from beetles, (Marchiani, 1993). After 14 days the formation withdrew completely (Fig.5).

An extraordinary case was when a woman of 73 years-old with a lot of seborrheic warts throughout the body addressed to us. I counted more than 300 groups. Many of them were bleeding and the person could not sleep. I risked a lot and I started with her a specific contract for testing. I used the ointment from lepidopteran larvae for 30 days. Most of the warts disappeared (Fig. 5). I got tremendous results for removal the prostate adenoma and uterine fibroids using rectal suppositories after defecation. We eliminated cases of prostate adenoma and uterine fibroma (Fig.8).

Cosmetic preparations based on SBA action in insects are formidable, eliminating layers of dead keratinized skin. Only after a single application, the face looks much better (Fig. 10). For the first time, five years ago I tested creams to eliminate rosacea, more specific for adolescents, which disappeared completely in two weeks. (Fig.9). We recorded a formidable action to eliminate keloids that occur after rosacea (Fig.11).

Skin formation can be observed in different people that can not be liquidated without pain and without leaving undesirable traces. A man of about 35 years had a carcinoma on the forehead skin (Fig.13). I removed it with specific skin care cream in 14 days. The party has disappeared without trace and without pain.

During our work we have eliminated many diseases caused by herpes viruses (Ciuhrii, 2005), including area-zoster. The obtained images have encouraged us to improve our preparations based on extracts from certain species of insects.

Thus, at present, we believe in the effect of tissue preparations from insects, but to find scientific explanations, complicated research is necessary at the molecular level. More sophisticated devices are needed for the study of the SBA in insects in different stages of development. Until now nobody hasn't imagined that some transformations of insects can be adopted for handling vital body processes.

The insect larvae include large amounts of lipoproteins that are identical with the structure of the viral and tumor formations. Biological active substances (SBASs) of the insects are transformed into other components of lipoproteins when the pupae turn, forming adult (imago), namely, the phenomenon - the transformation of lipoproteins in other parts of the state based on the idea proposed: viral transformation and tumor formations other? structures, which are eliminated from the body without causing adverse actions.

BASs of larvae turns into other structures at the same time of the last stage of development of lepidopteran larvae. When the larvae, which includes large amounts of lipoprotein complete their cycle of development and form pupae from which the adult (imago) emerges, the composition is changing radically. Instead of lipoproteins, polysaccharides appear (chitin) or keratin (specific proteins).

The mechanism of transformation of BASs in pupae, then in imago is not yet known, but at this stage of development very complicated phenomena appear. Lipoprotein compositions are lysed to their disappearance. It would be very well if we could find the mechanism of changes at this time. We found the effect, but not yet the mechanism. Detecting the effect of certain SBA compositions in insects at various stages of development, now it means a lot. In practice there are known preparations, which have some effect, but the mechanism of action remains an enigma.

These phenomena discovered by us are a world premiere. Now there is need to involve more profound research at the molecular level to highlight the compositions that can destroy lipoprotein structures. The phenomenon observed by us can be considered as a discovery of inhibitors (interferon or herbal chemotherapy) to stop the viral infections and tumor diseases of man. Using a lyophilized powder of lepidopteran pupae reduced the viral hepatitis. viremia obvious (patent), used to stop HBs and HCV viral hepatitis. (See [www.insectfarm.com](http://www.insectfarm.com)). But how to explain this phenomenon it remains an enigma for us.

Tumor diseases and viral infections lately cause most human deaths. There have been many tests to find biological active substances in different species of plants, but in vain. So far the disease progresses rapidly, affecting seriously human health.

**Table 1.** Action of BASs extracted from insects on cultures of glioblastoma tumor

Cells. PL: *Lymantria dispar* pupae (*Lepidoptera*);

MM: *Mellollonta mellollonta* adults (*Coleoptera*);

Dm: *Musca domestica* last instar larvae (*Diptera*).

ACTION	RESULTS
<ul style="list-style-type: none"> <li>- Samples: PL, MM, Dm</li> <li>- It was used a cell line of human tumor (human glioblastoma)</li> <li>- Culture medium: DMEM+PSN+10%BFS DMEM = culture medium DULBECCO'S MODIFIED EAGLE'S MEDIUM</li> <li style="padding-left: 40px;">PSN = penicillin, streptomycin, Neomycin</li> <li style="padding-left: 40px;">BFS = bovine fetal serum</li> <li style="padding-left: 40px;">There were used doses of PL, MM and Dm of 1-50 µg/ml applied on the media with cell cultures.</li> <li style="padding-left: 40px;">After 24 hours from inoculation the following piece of observation was made at an optic microscope.</li> </ul>	<p>For PL:</p> <ul style="list-style-type: none"> <li>- The doses 1-12.5 µg/ml was not cytotoxic.</li> <li>- At 15 µg/ml began to appear morphological changes in tumor cells (the cells had a changed aspect, swollen, vacuolated)</li> <li>- The doses over 20 µg/ml are highly cytotoxic (all cells were affected, the majority died).</li> </ul> <hr/> <p>For MM:</p> <ul style="list-style-type: none"> <li>- the doses 1-15 µg/ml had no cytotoxic effect;</li> <li>- at 20 µg/ml it began to appear morphological alterations in tumor cells;</li> <li>- At doses over 30 µg/ml major alterations appeared , many cells died.</li> </ul> <hr/> <p>For Dm:</p> <ul style="list-style-type: none"> <li>- the cells had a similar behavior to those treated with MM;</li> <li>- At 20 µg/ml morphological alterations appeared.</li> </ul>
<p>Conclusion:</p> <ul style="list-style-type: none"> <li>- All samples had an antiproliferation effect on tumor cells.</li> <li>- The most efficient antiproliferation effect was shown by PL, which at doses of 15µg/ml inhibited the growth of tumor cells.</li> <li>- The samples MM and Dm inhibited the growth at doses over 30µg/ml.</li> </ul>	

**Table 2** - Biochemical composition of the insect tissues

(O-eggs; Li-larvae; P-pupae; CV- adults)

Nr. crt.	Physico – chemical assays	U.M.	O atomized	Li atomized	P atomized	O atomized	A.v.. Oven dried
1	Dry matter	%	94.03	94.09	93.00	91.72	96.02
2	Protein (nitrogen x 6.25) in g,		62.47	55.34	52.78	71.86	75.72
	Of which:	%					
	total nitrogen in g		9.99	8.85	8.44	11.9	12.11
	amino acids in g		7.75	6.87	9.08	3.07	4.38
	nitrogen		5.71	2.83	4.46	2.75	1.67
	non-precipitable with T.C.A. in g						
3	Total lipids in g	%	16.41	24.8	26.57	8.41	3.70
4	Total carbohydrates in g	%	2.82	4.92	8.44	2.44	13.71
5	Total ashes in g	%	9.85	8.93	4.37	8.69	1.53

From last instars of *Lepidoptera* and *Coleoptera* very small amounts are efficient (15µg/ml) and at 20-30µg/ml they kill all tumor cells in 24 hours.

The antimicrobial, antiviral and antimycotic substances which appear in larvae (Steiner et al., 1981; Marchini et al., 1993; Hetru et al., 1994; Chernysh et al., 1996; Holak et al., 1998; Sun et al., 1998) were named,, defensis”.

The biochemical analyses of insects at various developmental stages have revealed that they contain various amounts of proteins, lipids and carbohydrates. The largest amounts of proteins are in oven-dried *Lymantria dispar* eggs (71.76%) and in *Anoxia villosia* adults (75.72%). The pupae contain 52.78% proteins. The larvae contain 55.34% proteins (*L. dispar*). Larger amounts of carbohydrates are in coleopteran adults (13.71%). The eggs contain only 2% carbohydrates (Table 2.). The ashes content is 8-9%.

For the first time (Ciuhrii, 2002;2005;2008;2009;2010;2011), we found extremely valuable phenomena. Some normal changes of insects can be adopted to guide the human life processes. I'll give an example: larvae can transform the matrix of

human tumor formations. Thus a carcinoma or sarcoma of the human body if it is attacked by the larvae of Lepidoptera.

SBA turn into another tumor matrix structure, which is eliminated from the body as a "foreign body" without causing pain and no scarring unwanted human body. We have a particular case, when a carcinoma attacked the hand of a patient, which caused the member to be amputated, but also affected the other hand, which had to be amputated (Fig. 14). It was to be amputated the other hand too, but I intervened with new insect's preparations and I have saved the patient's hand who exists until now. This time I used the last age of lepidopteran pupae, which include large amounts of keratin. We have confirmed this effect several times (Ciuhrii, 2005, 2009), we have patented the phenomenon but the mechanism of action remains unknown. For this scientific research a deeper research with biochemical methods and molecular biology is needed.

Latest research of Lepidoptera larvae and pupae allowed us to detect the presence of polyphenolic carboxyl acid, whose presence, I think, is to promote hatching larvae or adults from pupae.

The mechanism suggests the idea of destruction of lipoprotein components similar to those present in viral or tumor formations in humans. The mechanism of action is of great importance, because we could find an opportunity to destroy the skin lipoproteins, especially in eliminating the tumor formations. We have demonstrated this process of elimination of the glioblastoma in the cell culture (Ciuhrii, 2009), when the tumor cells were destroyed with the BASs present in the lepidopteran pupae, in 10 hours. The mechanism of action is unknown, but the effect is obviously due to BASs.

These mechanisms we can research on cell cultures that exist in other institutions before ? and we'll create a specialized laboratory. But from the beginning it is necessary to investigate the insect morphogenesis in different stages of development (Fig. 1), where we discover new aspects of adult education. Some processes will suggest us new ideas for action of invertebrates, which will apply to vertebrates.

For the first time, at the beginning of 2000, we recorded a dietary supplement based on the tissue obtained from the lepidopteran larvae, which were lyophilized and then they were encapsulated in gelatin capsules and administered in cases of dystrophy, especially in children. The effect is immediately seen over 30 days. (Patent NA /00963, OSIM Romania) The patients (especially children) get an immediate higher immunity and they grow faster compared to individuals who do not take these supplements.

The insects have large amounts of specific proteins, much higher than in other organisms. Proteins constitute up to 75% by weight, fat is much less. Cholesterol does not form in the tissues of insects. Also, Carbohydrates do not form in the tissues of insects. BASs type chitin and keratin influence human aging process.

We are interested to produce large quantities of biologically active substances extracted from the insects because of keratolytic effect, that these biological processes will develop technologies that will increase the human longevity. We developed technology to eliminate the forming process of keratin, which are equivalent to the aging process. Until now we have developed about 50 parapharmaceutical prepared products and cosmetics, all registered with the Ministry of Health (see list developed preparations: [www.insectfarm.com\\_insectfarm.wordpress.com](http://www.insectfarm.com_insectfarm.wordpress.com)).

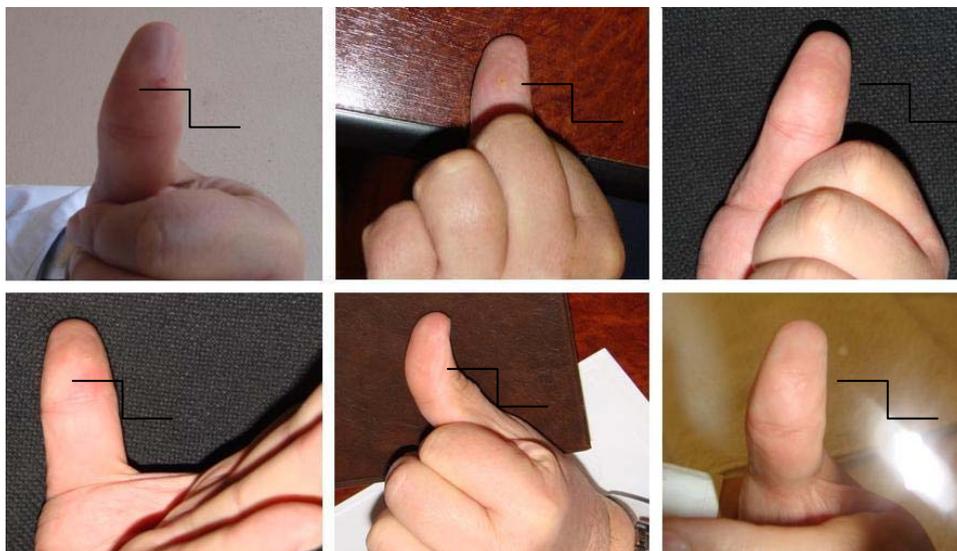
It's a fantastic idea that in the near future there will be revolutionized the pharmaceutical and food industry. If I will be understood, we will develop biological preparations and cosmetics, which will rejuvenate damaged tissues of the skin tissue, especially in the face. The insects, unlike other organisms are distinguished by the fact that they have a huge potential for propagation and transformation of tissue with a given composition in other forms.

We first have shown that the transformations of insects can be modeled on mammals, including humans. We found natural "chemotherapy" and "interferons" (Ciuhrii, 2009). So I came with the idea of transformation of unwanted formation of human, such as tumor matrix. So I prepared biological products from insect tissue to eliminate unwanted formations such as moles, seborrhoeic warts and others, which in contemporary medicine are only removed surgically and catterry. We have developed biological preparations for removal of carcinomas, melanomas and other tumors.

We developed antibacterial preparations, for inclusive acne (Fig.9, 11), considered incurable. We developed preparations to remove acne fast, without leaving undesirable traces on human skin, while you can remove and rosacea and keloids (an area where more dilated blood vessels compared to the neighboring. The idea to use insect tissues is original. I found new brand directives in pharmacology, which in future will increase longevity of human being.

I am convinced that the structure of most insect species biochemically changes at every 3-4 hours, which makes us to detect certain components at fixed intervals. For the first time, we found the polyphenolic carboxylic acid (caffeic acids) present in pupae of the last instar. I found the same acid content in eggs and larvae before hatching. Currently, we are able to determine the role of this component in the development of Lepidoptera (Fig. 17, 18).

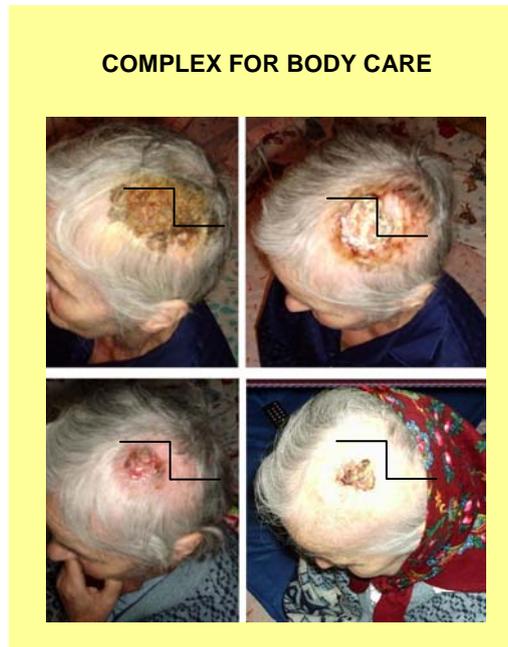
In future ,we hope to demonstrate the role of polyphenolic acid in the insect development and possible involvement of this component in eliminating the viral and tumor formations in the human body.



**Figure1.** A wart located on the left thumb. After applications of the ointment “for skin care” for 24 hours , before going to bed, the formation disappeared.



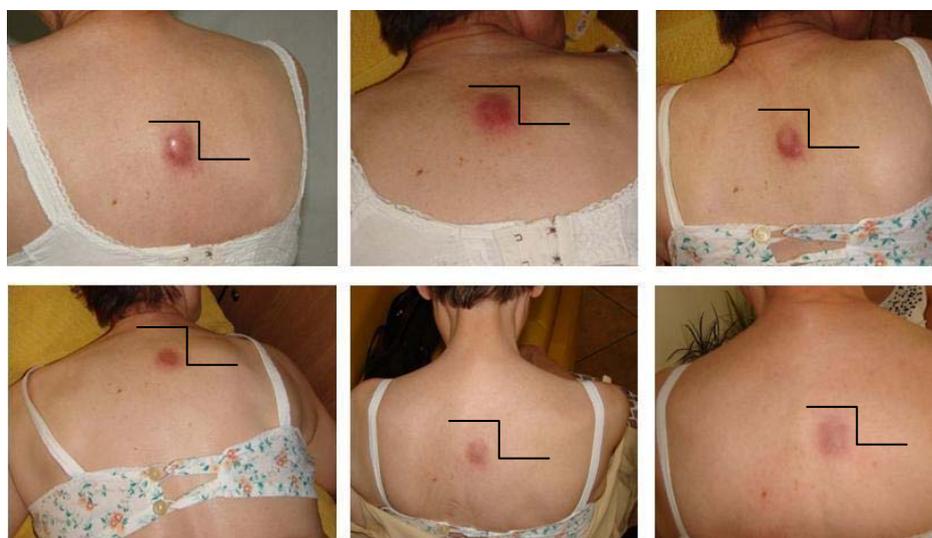
**Figure 2.** Treatment of a lipoma with keratolytic creams elaborated by the author. The lipoma was located on the neck of the author. The operation would have been hazardous because of the risk not to wound the nerves. The lipoma was removed without pain and undesired signs on skin.



**Figure 3.** - Head cutaneous carcinoma during the treatment with BASs extracted from insects.



**Figure 4.** - Cutaneous melanoma on the back of torso, before and after treatment with the cream for “skin care” and “Immune-max” capsules.



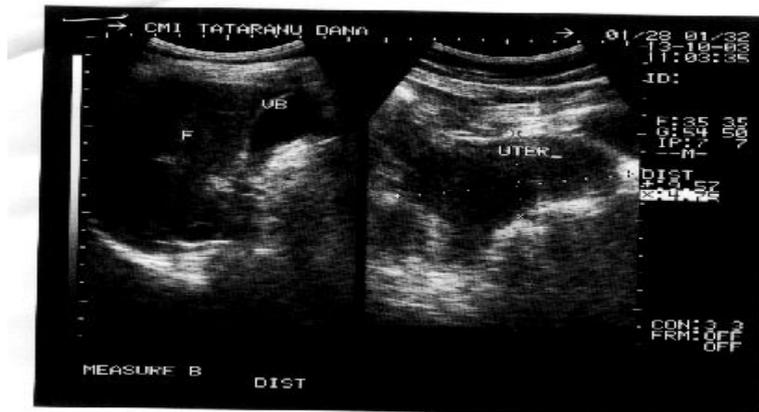
**Figure 5.** - Furuncle treated with the preparation for “skin care” in a woman, allergic to antibiotics.



**Figure 6.-** Seborrheic keratoses on the skin of an 86 years old patient during the treatment with BASs extracted from insects.



**Figure 7.** Cutaneous carcinoma on the abdomen of a 50 years old man before and after the treatment



**Figure 8.-** Ultra-sound investigation of a uterine fibroma, before and after

the administering of the preparation “Adenoprosin”.



**Figure 9.** - The face of an 18 years girl with acne rossea and keloids before and after the treatment for three months with the preparation, for teenagers



**Figure 10.** - A 62 years old woman with an aged look before and after 1 day treatment with the “eye contour” cream.



**Figure 11.** - A 17 years old young boy treated with the “cream” and “lotion for teen-agers” for 21 days. The keloids disappeared completely.



**Figure 12.** - Liposarcoma on the leg of a 67 years old patient, after 3 months of treatment.

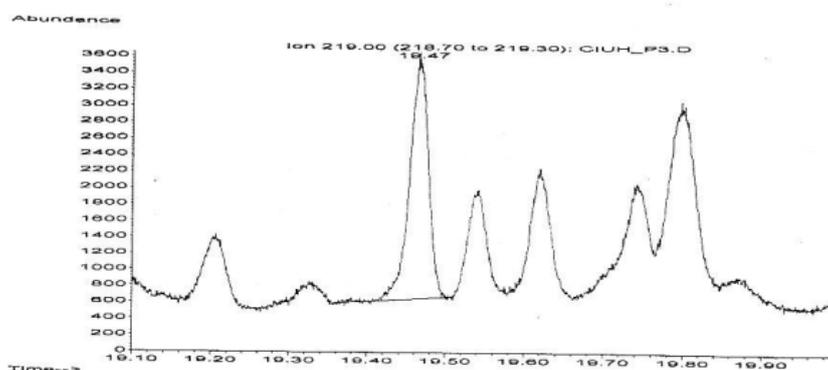


**Figure 13.** Elimination of a cutaneous carcinoma from the forehead of a patient.



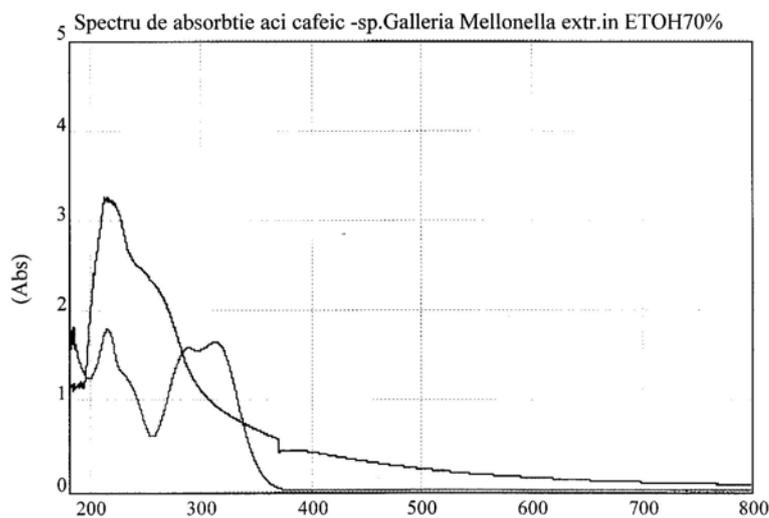
**Figure 14.** - Cutaneous carcinoma on the hand of a 69 years old patient. The left hand was amputated for the same reason and it was proposed the amputation of the right hand also. But after 3 months of treatment with the entomological product “Cream for skin care” the carcinoma disappeared.

During the analyses made on the fotospectrometric imprints from egg tissue, larvae and pupae the insects were shown peaks in the area of 300-400nm

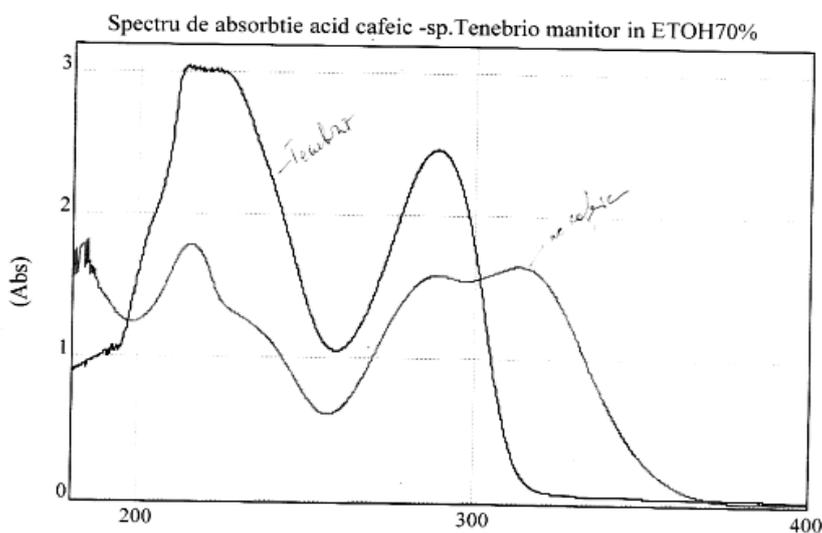


**Figure 15.** Quantity reports of components from pupae of *Lymantria dispar* L. The highest peak is represented by the caffeic acid.

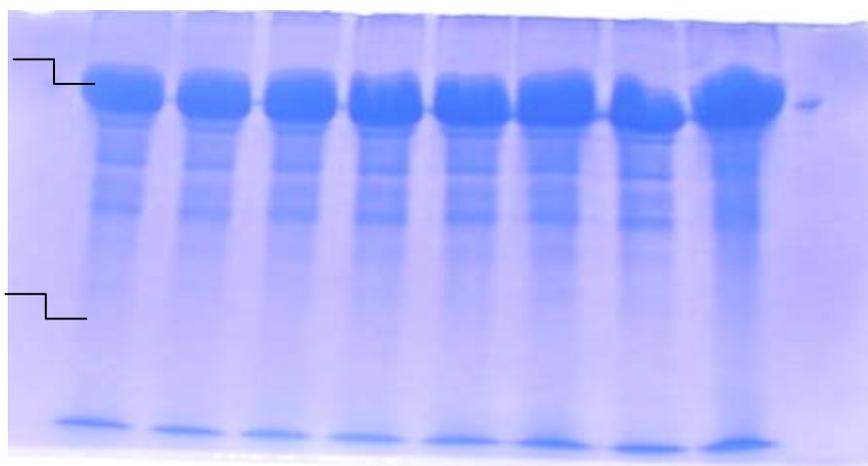
We made comparative analyses between the purified caffeic acid and the pupae suspension of *Lymantya dispar* to determine the presence of caffeic acid. The result showed us identical imprints, so we got convicted there was present caffeic acid. (Fig. 16.). The data we obtain from larvae of *Musca domestica*, showed the spectral wave on peak in the area of 300nm (figurea 17, 18).



**Figure 16** The spectral imprint is comparative between the caffeic acid and the suspension of larvae of *Lymantria dispar* L. The highest peak is represented by caffeic acid.



**Figure 17** The absorption spectrum of the suspension from *Musca domestica* deep in benzene. The high peak is shown in the area of 300nm, specifically for the polifenolic carboxid acids.



**Figure 18** - Electrophoresis imprint from the larvae of *Lymantria dispar*. The area which is on the low part of the image is considered to be the polyphenolic carboxides.

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### References

- Ciuhrii M. – Entomotherapy - a new direction in contemporary medicine. AOSR Congress, Timisoara, 2011.
- Ciuhrii. M. – Environmental Pollution and Public Health Impact of ITS. “Entomotherapy - a new direction in contemporary medicine”, Transylvania University, Brasov, 2008.
- Ciuhrii M. – Contemporary biotechnology and entomology, biotechnology development priorities in Romania. Possibilities and perspectives on the use of baculovirus in Romania in regulating insect pest density in forests, Nat. Symposium Targoviste, December, 2002.
- Ciuhrii. M – Biological preparation for treatment for hemorrhoids, prostate adenoma and uterine fibroma, preparation procedure and utilization scheme of the active substances. Patent NA/00707/25.08.2003.

Ciuhrii M. - Biologically products from insects for the treatment of autoimmune affections. Tesla fest Invention festival of innovation and creations, Novi Sad, 12-15 October, 2008.

Ciuhrii M. - "Cotemporary Entomotherapy in medicine", Congress of national pharmaceuticals Therapy and Clinical Toxicology, Targu Mures. 6-8 June 2007.

Ciuhrii M. – Entomotherapy in contemporary medicine. The 9th National Live Science and Technology Week Biomed, Israel, 2010.

Ciuhrii M. – Patents applied in the Romanian economy. International Inventors Fair, Iasi 2010.

Ciuhrii M. – Entomotherapy in cosmetics. International Exhibition of Inventions, Cluj Napoca, 2009.

Ciuhrii M. - Biologically Active Substances for human memory stimulation, obtaining and utilization procedure. 37th Salon of Inventions, Genève, 2009.

Steiner H., Hultmar K.D., Engstrom Abennich H., Boman H.G., Sequence and specificity of two antibacterial proteins involved in insect immunity. Nature Magazine, 1981, 292, 240-248.

Marchini D. Giorbano P.C., Amons R., Bernini L. E., Dallai R., - Purification and Primary structure of ceratotoxin A and B, two antibacterial peptides from the female reproductive accessory glands of the medfly *Cheratitis capitata*- *Diptera*. Insect Biochem Mol. Biol, 1993, 23 591-618.

Hetru C., Bulet P., Cociancich S., Dimarcq J.L., Hoffman D. – Peptide Antibiotics book. 2002.

Hoffman J.A., Janeway C. A., Natori S. - Antibacterial peptides/polypeptides in the insect host defenses a comparison with vertebrate antibacterial peptides/polypeptides. Insect Biochem. Mol. Biol, 1994, 131-144.

Hetru C., Hoffman D., Bulet P. – Antimicrobial peptides from insects. In: Brey PT, Hultmarc D., Hoffman J.A. - Antibacterial peptide - polypeptides in the insect Host Defence. Austin TX Landes Company 1994, 43-66.

Sun D., Ecleston E.D., Fallon A.M. – Peptide sequence of an antibiotic cecropin from the vector mosquito *Aedes albopictus*. Biochem. Biophys Res. Commun 1998, 249, 410-415.

Cherenysh S, Cociancich S, Briand J.P., Hetru C., Bulet P. – The inducible antibacterial peptides of the hemipteran insect *Palomena prasina*: identification of a novel family of prolinerich peptides and a novel insect defending. J. Insect Physiol. 1996, 42, 81-89.

Holak T.A., Engstrom A., Kraulis P. J., Linderberg G., Bennich H., Jones T.A., Gronenborn A. M., Clore G. M., - The solution conformation of the antibacterial peptide cecropin A: a nuclear magnetic resonance and dynamical simulated annealing study. Biochemistry 1998, 27, 7620-7629..