

Utilization of Natural Clinoptilolite for Reducing the Risk of Gall Stones, Renal Calculus and Tumor formation

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Introduction

The present study offers a possibility to use the natural clinoptilolite (Cpt) as means for reducing the risk of gall-stones and renal calculus formation. It is based on the result of optical investigation of the central opening spherulites (Sphs) in human urine of ill and healthy organisms.

Comparative analysis of the XRD patterns of the Cpt and Sphs shows that in most cases d-spaces of the Sphs fall into intervals or coincide with the d-spaces of the Cpt. Most probably in analogy with the Cpt, the Sphs in the human organism exhibit adsorption, ion-exchange, catalytic and molecular sieve properties.

The Sphs develop and re-create normally when the symmetry and the composition of the growth environment are not influenced by endo- and exogenic factors (1). In case of intoxication of the organism (2,3) the symmetry and composition of the environment changes. Then the polymorph transformation slows down, and the central pores of the Sphs close up. The latter tighten and display not typical for them processes – capsulation, agglutination and concentric growth. In the concentric layers radial orientated crystals are created, and this is a predisposition for gall-and renal stones as well as for tumor formations.

In experiments carried out on mice, we observed that exist a certain tendency toward reduction of tumor formation in those of them orally treated with Cpt when compared to those not treated with it.

In order to reduce the risk of gall and kidney stones a peroral administration of natural Cpt is recommended, in combination with saturation of the organism with vitamin C (4,5).

Methods and materials

1. The zeolites, to which the Cpt belongs, have natural radioactivity (6,7).

In view of safety usage of the Cpt as mineral ballast food supplement, the concentration of Ra-226* in drinking water passing through Cpt rocks was examined.

2. Another two samples of Cpts (each per 200 g) were distributed into two plastic bottles of 1 ½ L. The bottles were brimful with water and well closed. The samples remained intact for a month and after that the Rn-222 concentration was measured.

3. Autoradiography

A piece of well polished Cpt rock placed between two photographic plates was left to remain in a dark place for two months, and after that the plates were developed.

4. The clinoptilolite rock from the NE Rhodopes Mountains was investigated for potential toxic, clastogenic and carcinogenic action on hybrid mice BDF1 and outbred rats of Wistar strain. A total of 330 mice and 330 rats were divided into 3 groups, each consisting of 50 male and 50 female animals. I gr.: untreated control; II gr.: only once treated locally with Cpt on 2 cm dermal incision of the right lateral region of the skin; III gr.: animals fed 5 days weekly with standard tabletted chow for laboratory animals containing 5% Cpt. Treatment with Cpt of the III gr. continued till the end of life (8,9).

5. Sphs, anisotropic and isotropic crystals of dendritic and skeleton type, cholesterol and kidney stones were investigated by X-ray structural analyses.

6. The Sph-protein content was determined by May-Grunvald staining.

7. Kidney and cholesterol stone sections, and Sph were observed directly by polarized microscope with a crossed Nicols, and a gypsum lamella.

* The natural radioactivity of the Cpt and samples of water were investigated in SU "St. Kliment Ohridski", Faculty of Physics, Dosimetry and radiation protection laboratory

I. Results and discussion

In view of peroral use of Cpt as a mineral food supplement, a number of investigations were carried out.

- 1.1. The Water from 15 roadside fountains in regions rich in Cpt rock was analyzed*. The natural radioactivity of Cpt (in Bq/kg) is 50-180 for U-238, 60 -200 for Ra-226, 120 - 170 for Th-232, and 750 - 1300 for K-40. Despite of this natural radioactivity the content of Ra-226 in drinking water percolating through Cpt rocks is lower than MDA (minimal detectable activity)- 0,07 Bq/l.
- 1.2. The measured specific radioactivity of Rn-222 in both samples of water mixed with 200 g Cpt were 2 Bq/l – for the first, and 4 Bq/l- for the second sample, instead of 34 Bq/l, and 40 Bq/l corresponding to the proved in Cpt – Ra-226 (170 Bq/kg – for the first sample, and 200 Bq/kg – for the second).
- 1.3. The results from the autoradiographic analysis is given on Fig 1, Fig.1a.

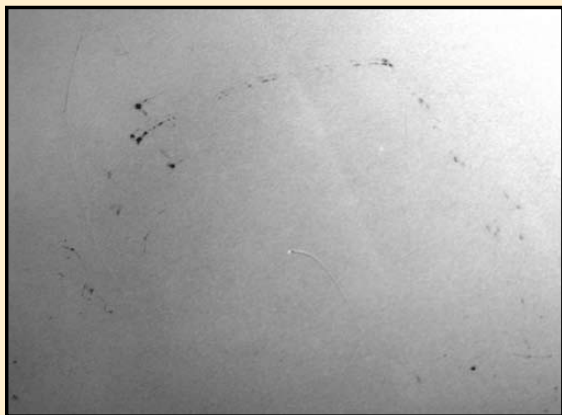


Fig. 1

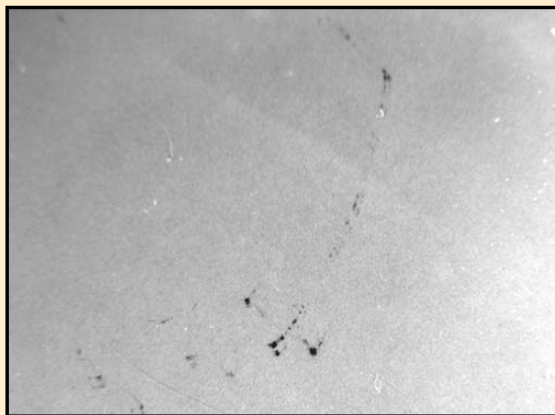


Fig. 1a

Autoradiogram of a piece of well polished Cpt lamella

It could be seen that for a period of two months the polished Cpt lamella (irrespective of the fact that natural radioactivity of Cpt surpasses 2-5 times the typical natural values) did not provoke blackening on the photographic plates. Only blackening-outline around the Cpt lamella was observed.

The results received point out that the Cpt-radioactive elements (U-238, Ra-226 , Rn-222, and Th-232) do not dissolve in water, do not exchange, and are being adsorbed by the Cpt, and strongly connected with the aluminosilicate skeleton, are excreted with the excrements.

1.4. Investigation for carcinogenic action of Cpt

The kind and incidence of all tumors in the groups are presented in Table 1. Neoplasms were established in 16 out of all 286 investigated mice: totally 11 neoplasms in the control groups from the two sexes, 2 – in the dermal treated mice with Cpt and 3 – for the mice that were treated orally with Cpt. The lymphomas were most often occurred neoplasms which affect more female mice than male.

It was deduced that Cpt (5% in chow) given orally to mice and to rats till the end of life or applied locally only once on dermal wounds does not exert carcinogenic effect in these animals.(8,9)

Table 1. Tumour incidence in hybrid mice BDF1:

Kind of tumor	Number of the tumors in the group						Number of mice with one kind of tumor
	I		II		III		
	m	f	m	f	m	f	
Lymphosarcoma	2	3	0	2	0	1	8
Reticulum cell neoplasm type B	0	3	0	0	0	0	3
Haemangioma of the liver	0	1	0	0	0	1	2
Haemangioma of the endometrium	0	1	0	0	0	0	1
Adenoma of the endometrium	0	1	0	0	0	1	2
Total number of the tumors	2	9	0	2	0	3	16
Number of mice with post-mortem examination	48	47	50	44	47	50	286

Our experiments point out that exist a certain tendency toward reduction of tumor formation especially in regards the lymphomas.

Cpt is suitable for oral taking without restriction (up to 200 g annually), as well as for dermal application there is no risk of toxicity with a short or long term effect (9).

1.5. Deformed Shperulite structures as predisposition for the formation of gall and kidney stones, as well as for tumor formation

Spherulites or their polymorphic forms of transformation (crystals of dendritic and skeleton type) are observed in biological liquids – urine, bile and blood. They contain amidine urea, phosphoric acid, glycoprotein and phospholipids. In the healthy human organism the Sph are symmetrical, have a loose structure, empty pores, and are re-created (Fig. 2 and Fig. 2a), which allows the formation of large adsorption surface. The polymorphism is a basic property of the Sph.



Fig.2
Re-created Sph after May-Grunvald staining



Fig. 2a
Sphs were observed with an analyzer

Under certain conditions (endogenic-, and exogenic- intoxication) deformed Sphs, or Sphs with high density are observed. In such cases the polymorph transformation slows down, and the central pores of the Sphs close up. The latter tighten and display not typical for them processes – capsulation, concentric growth (Fig. 3 and Fig. 4) , and agglutination (Fig. 6).

Changes in the Sphs



Fig. 3

Capsulation of the Sph

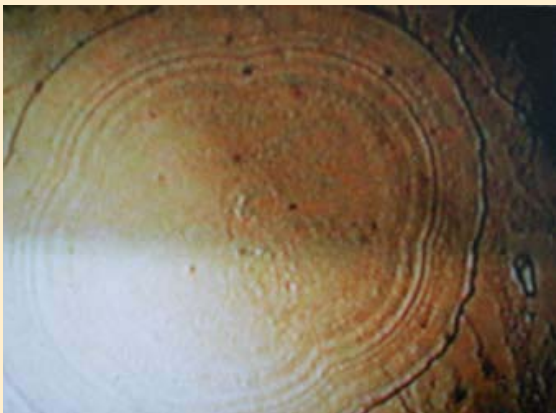


Fig. 4

Concentric growth of the Sph



Fig. 5

Sph with open pore

Sphs included in gall and renal calculus



Fig. 8

Capsulated Sphs in an uratic renal calculus.

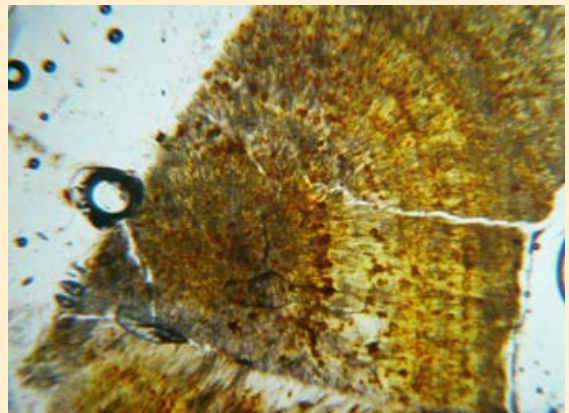


Fig. 9

Sph with radial growth in a bile stone.



Fig. 10

Sph with an open pore are observed in renal calculus



Fig. 6

Agglutination of the Sphs

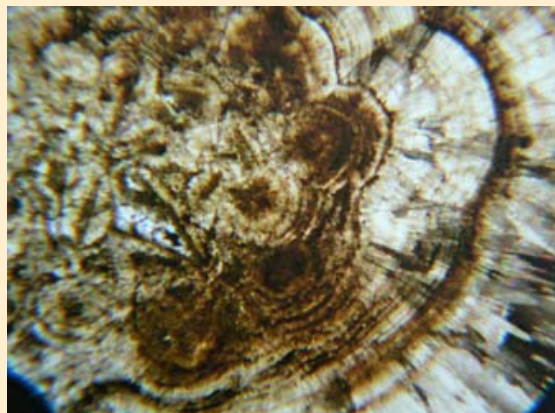


Fig. 7

Agglutinated Sphs in a kidney uratic stone.

In the concentric layer radial orientation of the crystals is formed. Under the influence of ethanol (condition in vitro) the glyco- and lipoproteins of the Sphs precipitate, their pores open up (Fig.5) , their content spreads over the surface, and they loose their ability to reproduce them selves. Solidified, and deformed Sphs are included in cholesterol crystals. All these changes of the Sphs show a predisposition toward the formation of gall-stones and renal calculus.

1.6. X-Ray analysis

The results of X-Ray analysis are presented in Table 2

Table 2. X-Ray analysis

[illegible]

				4,51	6				
				4,43	8				
								4,39	6
				4,36	15				
				4,20	6				
				4,17	5				
				4,14	6				
								4,13	8
				4,10	12				
4,09	5								
				4,08	12				
				3,98	85				
3,97	55								
								3,94	12
				3,93	45				
				3,85	12			3,88	12
				3,81	55				
								3,80	22
3,74	5								
				3,71	10				
						3,67	4		
				3,55	14			3,55	9
						3,54	2		
3,49	30	3,49	30						
				3,43	35				
				3,39	25				
		3,26	3					3,38	5
				3,23	15	3,24	18	3,27	20
				3,20	42				
						3,16	54		
3,148	100	3,148	100						
				3,13	18				
				3,07	15	3,07	100		
3,04	5								
				3,03	6				
				3,02	10				
				2,97	38				
2,96	5					2,96	2		
				2,88	5				
2,84	8	2,84	5					2,84	22
				2,79	24				
2,77	5					2,76	6		
				2,73	15				
								2,72	20
				2,66	7				
2,61	5								
				2,58	6				
						2,55	16		
				2,53	10				
				2,43	10				
2,34	5								
2,22	4	2,22	12			2,22	4		
						2,16	2		
								2,05	5
						2,01	1		
1,99	12								
								1,81	2

The results of comparative analysis of the XRD patterns in Sphs, Cpt, uratic renal stones (URS) and cholesterol-bile stones (ChBS) show that in most of the cases d-spaces of Sphs, URS and ChBS fall into intervals or coincide with the d-spaces of the Cpt. Most probably, in analogy with Cpt, Sphs in human organism exhibit adsorption, ion-exchange, catalytic and molecular sieve properties (Tabl. 2)

1.7. Creating conditions for decreasing the risk of formation of gall and kidney stones

Peroral administration of Cpt might restrict the process of Sphs agglutination, as well as cholesterol crystals formation. When falling into hydrochloric acid medium of the stomach the Cpt is deionized and

protonized (PCpt). The liberated K^+ and Na^+ fall into the duodenum and assist the process of transforming the non soluble gall acids (substitutive cholesterol) in colloidal soluble K^+ and Na^+ salts of the gall acids. The multi activated PCpt in the stomach adsorb the cholesterol and phospholipids (excreted by the bile), and excrete them by excrements.

Hypothesis

Sphs are liquid crystals with adsorption, catalytic, ion- exchange, and molecular sieve properties. They play an important biological role in the transport, detoxification and excretion of the NH_4^+ (very toxic for central nervous system).

Sphs are colloid soluble and can pass through the intestinal mucous membrane. In the presence of Cpt in the lumen of the intestines (Cpt don't dissolve in water and fates and can't

pass through the gut mucous membrane) Cpt interacts and purifies the Sphs from the NH_4^+ , and other toxic N- content products of the proteins, lipids, and purine metabolism, adsorb them and excrete them by fecals. The already purified Sphs return back to the blood stream.

The peroral administration of Cpt and ascorbic acid assists the process of transformation of the colloid soluble anisotropic Sphs (Fig. 11, Fig. 12, Fig. 12a, and Fig. 12b), into water soluble isotropic crystals of dendritic and skeleton type (Fig. 13, and Fig. 13a), which are excreted by the urine. There is a decrease in the risk for the formation of gall and kidney stones.

In order to reduce the risk of gall and kidney stones a peroral administration of natural Cpt is recommended, in combination with saturation of the organism with vitamin C.

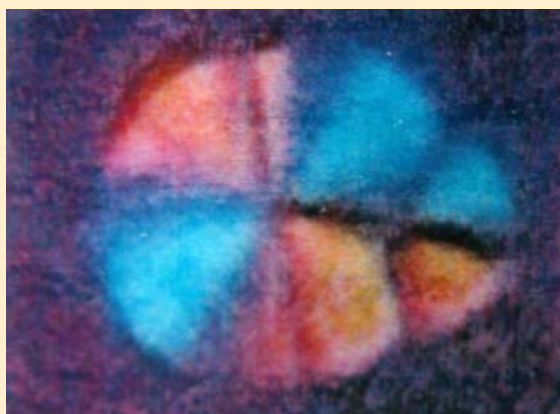


Fig. 11

Re-created Sph.



Fig.12

Unfolded Sph observed without an analyzers

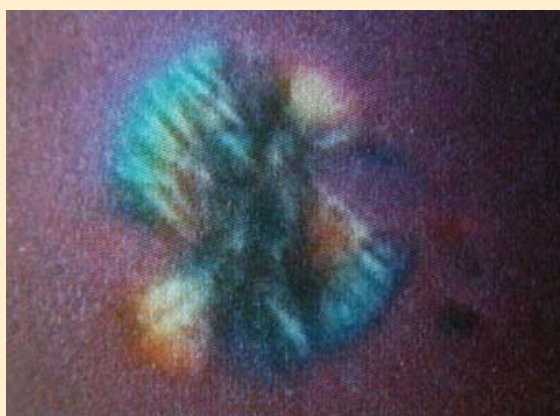


Fig.12a

Unfolded Sph observed with an analyzer



Fig. 12b

Unfolded re-created Sph observed without an analyzer



Fig. 13



Fig. 13a

Isotropic crystals of dendritic and skeleton type

Reference:

1. Izmirova N., B. Aleksiev, Patent № 63679/ 1999, BG
2. Izmirova N., P. Blagoeva, R. Atanasova, Z. Mircheva, I. Tomova, Utilization of natural clinoptilolite in case of alcohol intoxications, First Congress of Clinical Toxicology, 23-25 October 2003, Sofia, Bulgaria.
3. Izmirova N., B. Aleksiev, E. Djourova, M. Baeva, P. Blagoeva, P. Uzunov, I. Tomova, Z. Mircheva, A. Boyanova, Changes of the spherulite structures in the urine after intoxications, Second National Congress of Clinical Toxicology, 12-14 October 2006, Sofia, Bulgaria.
4. Izmirova N., Patent № 64928 / 2000, BG.
5. Izmirova N., B. Aleksiev, E. Djourova, P. Blagoeva, Z. Gendgev, Z. Mircheva, D. Pressiyanov, L. Minev, T Boshkova, P. Uzunov, I. Tomova, R. Bozhikova, M. Atanasov, M. Baeva, A. Boyanova, Method for decreasing the risk of tumor formation, Patent Reg. № 105298/ 2002, BG.
6. Izmirova N., B. Aleksiev, E. Djourova, P. Blagoeva, Z. Gendgev, Z. Mircheva, D. Pressiyanov, L. Minev, T Boshkova, P. Uzunov, I. Tomova, M. Baeva, A. Boyanova, T. Todorov and R. Petrova, Clinoptilolite and the possibilities for its application in medicine, 2001 Stud. Surf. Sci. and Catalysis 135.
7. Izmirova N., L. Minev, T. Boshkova, D. Presiyanov, P. Uzunov, B. Aleksiev, E. Djourova, I. Tomova, M. Baeva, A. Boyanova, Z. Mircheva, P. Blagoeva, Clinoptilolite- properties and possibility for application in medicine, IV Congress of Oncology, 19-20 November 1999, Sofia, Bulgaria.
8. Blagoeva P., Z. Gendgev, N. Izmirova, Tz. Mircheva, Concerning the Potential Clastogenic and Carcinogenic Action of Clinoptilolite, PP, 13th International Zeolite Conference, Montpellier, France, 8 – 13 July 2001.
9. Blagoeva P., Z. Gendgev, N. Izmirova, Z. Mircheva, Investigation for toxic, clastogenic, and cancirogenic action of clinoptilolite in mice and rats, RRR, ²FEZA Conference, Giardini Naxos – Taormina, Italy, 1 – 5 September 2002.
10. Technological documentation for production of Clinoptilolite for oral and dermal applicationn: Clinalex[®] -Cpt-food supplement; Clinalex[®] - Cpt + Vit. C- food supplement; Clinalex[®]-for dermal application, Ministry of Health, National Centre of Hygiene and Medical Ecology, let. № 5680-2696/ 17 12 2003.