SHEVCHENKO SCIENTIFIC SOCIETY, INC.
НАУКОВЕ ТОВАРИСТВО ІМ. ШЕВЧЕНКА В ЗДА
302-304 WEST 13TH STREET, NEW YORK 14, N.Y.

PAPERS — ДОПОВІДІ

Ч.
No. 27

Dr. Bohdan Z. Hordinsky

TERPENES IN THE TREATMENT OF CHOLELITHIASIS AND HYPERCHOLESTEROLEMIA

•

Д-р Богдан З. Гординський

ВПЛИВ ТЕРПЕНІВ НА ХОЛЕЛІТІЯЗУ І ГІПЕРХОЛЕСТЕРОЛЕМІЮ

Shevchenko Scientific Society
New York, N.Y.
1968

EDITOR

PROF. MYKOLA ZAJCEW, D.Sc.

* * *

Редактор

Проф. Д-р Микола Зайцев

Price $0.70

TERPENES IN THE TREATMENT OF CHOLELITHIASIS AND HYPERCHOLESTEROLEMIA

Printed in U.S.A.

Svoboda, 81-83 Grand Street, Jersey City, N.J. 07303

TERPENES IN THE TREATMENT OF CHOLELITHIASIS AND HYPERCHOLESTEROLEMIA

DR. B. Z. HORDINSKY
Drake, North Dakota

Volatile oils occur widely in plants. Chemically, volatile oils contain the hydrocarbon Terpene ($C_{10}H_{16}$), or some polymer of this. Because of their spasmolytic, antiseptic, choleretic, and expectorant action, volatile oils have been used for centuries in various diseases. Although their field of application has been reduced through new drugs, mainly antibiotics, they have not lost their importance altogether.

Gallbladder diseases are the main conditions in which treatment with essential oils has been used for a long time, but a moderate amount of success was only possible with high dosages. This frequently caused nausea, vomiting, and irritation of the kidneys.

The terpenes are excreted by the kidneys, having been esterified in the liver with glucuronic and sulfuric acids.

It was found that the terpenes produce an extraordinary choleretic effect. Romani and Keller showed that terpenes have a lipotropic action, they protect the hepatic cells against fatty degeneration produced by excessive dosages of cortisone. Savini, of the Pharmacological Institute of the University of Paris showed that intraduodenal administration of terpenes resulted in prolonged and significant increase in bile secretion. Similar results were described in a study published in 1963 by Traissac, Savini, Romani, Charbonnier, Perissat, and Keller.

Since the bile acids are derived from choresterol, it is clear that an increased rate of synthesis of bile acids must involve the simultaneous degradation of cholesterol.

The paper presented below reports observations on serum cholesterol and serum bile acids in patients treated with volatile oils.

METHODS AND MATERIAL:

The patients were divided into three groups:

Group No. 1: Consisted of 10 healthy individuals who served as control.

Group No. 2: Included 20 patients with various degrees of Atherosclerosis, with elevated serum cholesterol.

Group No. 3: Incorporated 10 patients with gallstones diagnosed by X-ray.

Biochemical tests were performed using the following methods:

Serum Cholesterol	L. L. Abell & al.[2]
Cholate & Chenodeoxycholanate	Osborn & Wotton[3], using Beckman DU Spectrophotometer with spectral fluorescence attachment.
Total Lipids	M. Brandstein & al.[4]
Alkaline Phohphatase	M. M. Kaser & al.[5]
SGO Transaminase	R. J. Henry & al.[6]
SGP Transaminase	R. J. Henry & al.[7]

Volatile oils were given to the patients: three drops four times daily, before meals and at bedtime, for three months.

Composition of Volatile oils:*

Dissolved in 43 gms. Olive Oil

Menthol	32 grm.
Menthone	6 gms.
Pinene (Alpha & Beta)	17 gms.
Borneol	5 gms.
Camphene	5 gms.
Eucalyptol	2 gms.

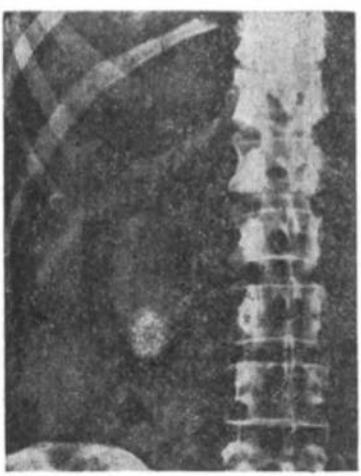
* We wish to thank Rowa Ltd. Bantry Co., Cork, Republic of Ireland for supplying us with a group of volatile oils in purified (free from toxic substances[10]) form under the trade name Rowachol.

RESULTS:

The main results appear at the tables & figures.

Tables I, II, III.
Figure I.

PATIENT No. 40: A 44 year old woman had many gallstone attacks. X-rays showed one large stone. After three months of treatment with volatile oils, the X-ray was negative, SGP Transaminase decreased from 42 Units to 29 Units, Alkaline Phosphatase from 7.1 Units to 4.8 Units, and Choresterol from 376 mg% to 304 mg%.



Picture I

Picture II

PATIENT No. 36: A 70 year old woman had many gallstone attacks was advised to have surgery; but because of coronary heart disease, the surgery was postponed. X-rays of the gallbladder showed many stones. After three months of treatment with volatile oils, her coronary condition improved and her gallbladder X-ray was negative. Table No. 2 shows a distinct biochemical improvement.

Picture III

Picture IV

PATIENT No. 35: A 29 year old woman had typical gallstone attacks, and X-rays showed three stones. She refused surgery and took volatile oils for three months. She felt well and didn't return for further observation. Six months later she became ill, vomited, and had considerable pain. She decided to have surgery and took the X-rays, which had been taken nine months earlier, to a surgeon who performed a cholescystectomy. The surgeon found no gall stones in the gall bladder. The cause of the symptoms was early pregnancy.

PATIENTS No. 31, 32, 34, 38, and 39: Despite decrease in cholesterol Total Lipids, Alkaline Phosphatase, and SGP Transaminase, there was no change in the size of stones showed on X-ray examination.

PATIENT No. 37: A 70 year old woman had a stone in the common bile duct. A surgeon removed the gall bladder; but due to cardiovascular collapse, didn't remove the stone from the common duct. Instead, he inserted a T-tube. The amount of bile was measured daily, ranging from 170 cc. to 400 cc. in 24 hours. After five drops of volatile

oils four times daily, the amount of bile increased to 700 cc. to 800 cc. daily. The increase of the bile flow lasted only as long as volatile oils were given. This experiment was performed three times, always with the same results. After three months the patient was referred to the surgery department of the University of Minnesota and her stone was removed.

DISCUSSION

Volatile oils in purified form free from toxic substances, under the trade name Rowachol, were given to 3 groups of patients for a period of 3 months. Total cholesterol, total lipids, cholate, chenodeoxycholanate, Alkaline Phosphatase, SGOT, and SGPT were taken before and after treatment.

The observation of these patients leads us to to conclusion, that the administration of volatile oils in the given composition and dosage for a period of 3 months, clinically improved the patients in group II and III and caused marked decrease in serum cholesterol, total lipids, and bile acids. In group III alkaline phosphatase, SGOT and SGP Transmaminase were also decreased.

The volatile oils cause the increase of bile flow. Besides the volatile oils are mild desinfectants. They change the intestinal flora and in this way a large proportion of bile acids escapes the enterohepatic cycle and is lost in feces.

The bile acids are produced in the liver from the cholesterol. In human bile, the predominant bile acids are: cholic, chenodeoxycholic, and deoxycholic acid, all in conjugated form. Cholic and chenodeoxycholic acids are called primary bile salts, since they are manufactured as end products by the human liver. Deoxycholic acid is a bacterial metabolite of cholic acid that is reabsorbed from the intestinal tract and re-excreted by the liver. Bergstrom and Danielson showed that when enterohepatic circulation of the bile salts is interrupted by formation of an external

fistula, the synthesis of bile salts increases 12 times the normal rate. Administration of Neomycin will cause 3 to 5 times increase in fecal excretion of bile salts and decrease of serum cholesterol. It is possible that essential oils, which have bacteriocidal and bacteriostatic properties inhibit the production of deoxycholic acid and thus the body uses more cholesterol for production of bile.

Increase production of the bile acids forces to mobilize the cholesterol from the places where it is available. This, of course, will include the gall stones.

SUMMARY

Forty individuals were divided into three groups. The first group consisting of healthy individuals served as a control. The second group had elevated cholesterol and various degrees of atherosclerosis. The third group had gall stones. All three groups were treated for three months with volatile oils. Detailed results on biochemical tests performed have been presented.

REFERENCES

1. Bender, Sheldon R., et al: Cholesterol Metabolism: Mechanisms and Treatment. An Exhibit Presented at the 110 Annual Meeting of the AMA, June 25-30, 1961, New York, N.Y.
2. Abell, Liese L., et al: Standard Methods of Clinical Chemistry, Academic Press Inc., New York, 26-34, 1958.
3. Osborn, E. C.; and Wotton, I.D.P. Serum Bile Acid Level in Hypercholesterolaemic Patients, J. Clin. Path. 17, 156-159, 1964.
4. Brandstein, M.; Castellano, A.: A Simple Method for Determination of Total Lipids in Serum, J. Lab. & Clin. Med. 57 (2), 300-305 Feb., 1961.
5. Daser, M. M., et al: Standard Methods of Clinical Chemistry, Academic Press Inc., New York, N.Y. 122-132, 1958.
6. Henry, R. J., et al: Revised Spectrophotometric Methods for the Determination of Glutamic-Oxalacetic Transminase, Glutamic Pyruvic Transminase, and Lactic Dehydrogenase. Am. J. of Clin. Path 34 (4), 381-398, Oct. 1960.
7. Henry, R. J., et al: Ibidem.
8. Seitz, W.; and Brand, V. V.: Die Hemmung der Synthese von Fettsauren und Cholesterin in der Leber Durch Gallen-sauren., Klin. Wochenschrift, 38, 11, 522-553, June, 1960.
9. Seitz, Walter; and Brand, V. V.: Einfluss der Gekoppelten Gallen-sauren auf die Synthese von Fettsauren und Cholesterin in der Leber., Klin. Wochenschrift, 39, 17, 891-895, Sept., 1961.
10. Geinitz, W.; and Graeber, F.: Aertzl. Forsch. 11, 1-266, 1957.
11. C. Bruce Taylor M.D. et al: Human Serum Cholesterol Synthesis measured with Deuterium label. Archives of Pathology. Volume 81, number 3, March 1966, page 213-231.

TABLE I

GROUP No. 1: BEFORE TREATMENT

No.	Age	Sex	Total Cholesterol	Cholate (3, 7, 12 Trihydroxy-cholanate)	Chenodeoxycholanate (3, 7 Dihydroxycho-lanate)	Total Lipids
1.	29	M	186 mg%	2.6 mg%	3.6 mg%	635 mg%
2.	43	M	163 mg%	3.0 mg%	4.1 mg%	670 mg%
3.	52	M	192 mg%	1.6 mg%	2.8 mg%	640 mg%
4.	19	F	215 mg%	2.2 mg%	5.5 mg%	810 mg%
5.	26	F	188 mg%	3.1 mg%	4.0 mg%	716 mg%
6.	33	M	239 mg%	3.2 mg%	4.4 mg%	906 mg%
7.	26	M	179 mg%	1.8 mg%	3.4 mg%	801 mg%
8.	28	M	208 mg%	3.3 mg%	3.9 mg%	871 mg%
9.	29	F	214 mg%	3.1 mg%	4.3 mg%	913 mg%
10.	33	M	160 mg%	2.9 mg%	3.3 mg%	604 mg%

GROUP No. 1: AFTER TREATMENT

No.	Age	Sex	Total Cholesterol	Cholate (3, 7, 12 Trihydroxy-cholanate)	Chenodeoxycholanate (3, 7 Dihydroxycho-lanate)	Total Lipids
1.	29	M	162 mg%	2.1 mg%	3.2 mg%	602 mg%
2.	43	M	176 mg%	2.4 mg%	4.0 mg%	621 mg%
3.	52	M	158 mg%	1.4 mg%	2.0 mg%	588 mg%
4.	19	F	205 mg%	1.9 mg%	3.1 mg%	796 mg%
5.	26	F	170 mg%	2.9 mg%	3.6 mg%	693 mg%
6.	33	M	200 mg%	2.6 mg%	3.9 mg%	810 mg%
7.	26	M	169 mg%	1.7 mg%	2.9 mg%	733 mg%
8.	28	M	192 mg%	3.1 mg%	3.8 mg%	846 mg%
9.	29	F	210 mg%	2.8 mg%	4.1 mg%	900 mg%
10.	33	M	158 mg%	2.0 mg%	3.2 mg%	581 mg%

TABLE II

GROUP No. 2: BEFORE TREATMENT

No.	Age	Sex	Total Cholesterol	Total Lipids	Cholate (3, 7, 12 Trihydroxycholanate)	Chenodeoxycholanate (3, 7 Dihydroxycholanate)	Degree of Atherosclerosis
11.	57	M	342 mg%	1230 mg%	1.6 mg%	2.9 mg%	Moderate
12.	41	M	333 mg%	1100 mg%	1.5 mg%	5.3 mg%	Slight
13.	63	M	300 mg%	1160 mg%	0.9 mg%	1.3 mg%	Slight
14.	71	F	563 mg%	1816 mg%	4.0 mg%	6.8 mg%	Advanced
15.	56	M	443 mg%	1420 mg%	6.2 mg%	9.6 mg%	Moderate
16.	67	F	619 mg%	1912 mg%	2.8 mg%	5.1 mg%	Advanced
17.	80	M	353 mg%	1206 mg%	1.2 mg%	5.0 mg%	Moderate
18.	69	M	394 mg%	1490 mg%	3.1 mg%	6.4 mg%	Slight
19.	51	M	363 mg%	1220 mg%	1.3 mg%	4.4 mg%	Slight
20.	63	M	469 mg%	1627 mg%	4.3 mg%	6.2 mg%	Moderate
21.	59	M	342 mg%	1380 mg%	2.9 mg%	6.6 mg%	Slight
22.	72	F	326 mg%	1410 mg%	1.9 mg%	2.7 mg%	Slight
23.	62	M	442 mg%	1660 mg%	4.2 mg%	6.6 mg%	Advanced
24.	58	M	351 mg%	1342 mg%	4.8 mg%	5.3 mg%	Moderate
25.	47	M	423 mg%	1529 mg%	3.7 mg%	5.8 mg%	Slight
26.	55	F	413 mg%	1811 mg%	2.8 mg%	3.6 mg%	Slight
27.	64	F	393 mg%	1422 mg%	2.2 mg%	4.6 mg%	Moderate
28.	67	M	369 mg%	1341 mg%	4.3 mg%	6.1 mg%	Advanced
29.	56	M	457 mg%	1731 mg%	2.9 mg%	4.3 mg%	Advanced
30.	76	F	323 mg%	1564 mg%	3.5 mg%	5.2 mg%	Advanced

TABLE II

GROUP No. 2: AFTER TREATMENT

No.	Age	Sex	Total Cholesterol	Total Lipids	Cholate (3, 7, 12 Trihydroxycholanate)	Chenodeoxycholanate (3, 7 Dihydroxycholanate)	Degree of Atherosclerosis
11.	57	M	272 mg%	1016 mg%	1.5 mg%	2.5 mg%	Moderate
12.	41	M	255 mg%	958 mg%	1.5 mg%	4.4 mg%	Slight
13.	63	M	211 mg%	940 mg%	0.8 mg%	1.5 mg%	Slight
14.	71	F	367 mg%	1260 mg%	3.6 mg%	4.6 mg%	Advanced
15.	56	M	262 mg%	1180 mg%	4.1 mg%	5.5 mg%	Moderate
16.	67	F	510 mg%	1608 mg%	2.1 mg%	3.9 mg%	Advanced
17.	80	M	257 mg%	997 mg%	1.3 mg%	4.1 mg%	Moderate
18.	69	M	310 mg%	896 mg%	2.8 mg%	5.0 mg%	Slight
19.	51	M	278 mg%	1004 mg%	1.2 mg%	3.4 mg%	Slight
20.	63	M	367 mg%	1319 mg%	4.0 mg%	5.2 mg%	Moderate
21.	39	M	333 mg%	1300 mg%	2.4 mg%	4.1 mg%	Slight
22.	72	F	212 mg%	1110 mg%	1.6 mg%	2.9 mg%	Slight
23.	62	M	319 mg%	1292 mg%	3.1 mg%	4.9 mg%	Advanced
24.	58	M	348 mg%	1318 mg%	4.2 mg%	5.0 mg%	Moderate
25.	47	M	366 mg%	1312 mg%	2.3 mg%	4.9 mg%	Slight
26.	55	F	341 mg%	1221 mg%	2.1 mg%	3.6 mg%	Slight
27.	64	F	349 mg%	1203 mg%	2.3 mg%	3.8 mg%	Moderate
28.	67	M	312 mg%	1160 mg%	3.4 mg%	4.9 mg%	Advanced
29.	56	M	401 mg%	1205 mg%	2.7 mg%	3.3 mg%	Advanced
30.	76	F	194 mg%	982 mg%	2.9 mg%	3.9 mg%	Advanced

TABLE III

GROUP No. 3: BEFORE TREATMENT

No.	Age	Sex	Total Cholesterol	Total Lipids	Cholate (3, 7, 12 Trihydroxych.)	Chenodeoxycholanate (3, 7 Dihydroxych.)	Alk. Phasphatase Bodansky U.	SGOT Wroblewski U.	SGPT Units
31.	62	M	240 mg%	836 mg%	2.4 mg%	4.2 mg%	3.6	20	21
32.	44	F	298 mg%	905 mg%	3.3 mg%	5.8 mg%	2.4	23	29
33.	55	F	310 mg%	940 mg%	2.6 mg%	4.3 mg%	4.2	18	18
34.	64	M	221 mg%	896 mg%	1.3 mg%	2.9 mg%	5.3	21	36
35.	29	F	287 mg%	963 mg%	3.5 mg%	4.0 mg%	3.8	12	14
36.	70	F	406 mg%	1420 mg%	3.6 mg%	7.1 mg%	26.1	36	48
37.	70	F	311 mg%	1174 mg%	4.0 mg%	5.2 mg%	12.0	34	52
38.	63	M	344 mg%	1006 mg%	2.1 mg%	3.5 mg%	4.4	22	28
39.	69	F	239 mg%	934 mg%	1.9 mg%	3.2 mg%	6.8	19	36
40.	44	F	376 mg%	1289 mg%	3.8 mg%	5.5 mg%	7.1	29	42

GROUP No. 3: AFTER TREATMENT

No.	Age	Sex	Total Cholesterol	Total Lipids	Cholate (3, 7, 12 Trihydroxych.)	Chenodeoxycholanate (3, 7 Dihydroxych.)	Alk. Phosphatase Bodansky U.	SGOT Wroblewski U.	SGPT Units
31.	62	M	295 mg%	849 mg%	2.3 mg%	4.0 mg%	3.5	19	18
32.	44	F	259 mg%	809 mg%	2.9 mg%	3.9 mg%	3.2	23	24
33.	55	F	246 mg%	821 mg%	2.3 mg%	3.6 mg%	3.5	20	16
34.	64	M	188 mg%	678 mg%	1.3 mg%	2.5 mg%	3.0	22	25
35.	29	F	201 mg%	798 mg%	3.3 mg%	3.9 mg%	2.9	17	14
36.	70	F	353 mg%	1138 mg%	3.1 mg%	4.2 mg%	18.0	30	33
37.	70	F	244 mg%	947 mg%	3.5 mg%	4.1 mg%	7.3	23	24
38.	63	M	189 mg%	853 mg%	1.9 mg%	3.2 mg%	4.9	21	28
39.	69	F	178 mg%	902 mg%	2.0 mg%	3.0 mg%	3.9	22	22
40.	44	F	304 mg%	996 mg%	3.2 mg%	3.6 mg%	4.8	23	29

FIGURE I

MEAN DECREASE IN VALUES AFTER THREE MONTHS TREATMENT WITH VOLATILE OILS

	Group I	Group II	Group III
Cholesterol	7.41%	21.80%	16.20%
Total Lipids	5.16%	24.14%	15.17%
Cholate	14.55%	16.97%	9.47%
Chenodeoxycholanate	14.00%	21.58%	21.22%
Alk. Phosphatase			48.74%
SGO Transaminase			5.98%
SGP Transaminase			28.09%

ISSUES OF "PAPERS" PUBLISHED:

1. **Bohachevsky Daniel, J. U. Dr.:** Problems of Ukrainian Learning Abroad. (In Ukrainian)
   Lew Vasyl, Ph. D., Prof.: Folklore in the Almanac "Rusalka Dnistrova" (In Ukrainian). (1958)
2. **Ostapiak Mykola, Prof.:** Isolating the Virus of Asian Influenza from Samples of Gargling the Throat and Autopsy Material (In Ukrainian). (1958)
3. **Smal-Stocki Roman, Ph. D., Prof.:** The Impact of the "Sputnik" on the English Language of the U.S.A. (1958)
4. **Bohachevsky Daniel, J. U. Dr.:** The Ideological Fundamentals of "The November Awakening" (In Ukrainian). (1959)
5. **Jaszczun Vasyl, Ph. D.:** Religious and Moral-Ethical Tenets of Taras Shevchenko (In Ukrainian). (1959)
6. **Smal-Stocki Roman, Ph. D., Prof.:** J.S.C. De Radius, an Unknown Forerunner of Comparative Slavic Literature. (1959)
7. **Nazarko Ireneus, OSBM, Ph. D.:** Metropolitan Julian Sas-Kuilovsky (1826—1900). (1959)
8. **Smal-Stocki Roman, Ph. D., Prof.:** Shevchenko and the Jews. (1959)
9. **Mackiw Theodore, Ph. D., Prof.:** Mazepa (1632-1709) in Contemporary German Sources. (1959)
10. **Vytanovych Illja, Ph. D., Prof.:** Social and Economic Tendencies in State Policies of Ivan Mazepa (In Ukrainian). (1959)
11. **Luciw Luke, Ph. D.:** Academician Prof. Stephen Smal-Stockyj (In Ukrainian)
    Wozniak Michael, Acad., Prof.: Stephen Smal-Stockyj and Franko (In Ukrainian). 1959)
12. **Manning Clarence A., Ph. D., Prof.:** The Role of Mazepa in Eastern Europe. (1960)
13. **Kamenetsky Ihor, Ph.D.:** Origins of the New British Imperialism. (1960)
14. **Krawciw Bohdan:** Fedkovych in the Latest Literary Publications (In Ukrainian). (1961)
15. **Pavlovych Petro:** The Shevchenko Heritage and M. Kotsiubynsky (In Ukrainian). 1961)
16. **Smal-Stocki Roman, Ph. D., Prof.:** Discrimination and Bias in Two UNESCO Publications (1961).

17. **Pap Michael S., Ph. D., Prof.:** Ukraine's Struggle for Sovereignty, 1917-1918. (1961)

18. **Smal-Stocki Roman, Ph. D., Prof.:** The Hetman Mazepa Traditions of the Ukrainian National Government of 1917-23. (In Ukrainian). (1961)

19. **Lysiak Roman, M.D.:** Role of Non-Tyroxive Protein-Bound Iodine in Idiopathic Erythema Multiforme. (1961)

20. **Kovaliuk Jeanette-Yaroslava, B.A.:** Shevchenko and Pan-Slavic Ideas. (1962)

21. **Holiat Roman S., Dr.:** Short History of the Ukrainian Free University (1964)

22. **Sokolyshyn Alexander, Dr.:** The Appearance of the Apostol and the Primer 390 Years Ago in Lviv — Western Ukraine (In Ukrainian). (1964).

23. **Collection of Papers, honoring Prof. C. A. Manning** (1964).

24. **Smal-Stocki Roman, Ph.D., Prof.:** Beginning of Fight for Rebirth of Ukrainian Statehood. (1967).

25. **Ostapiak Mykola, Prof.:** The Synthesis of Prof. Volodymyr Brygider's Scientific Work. (In Ukrainian). (1968).

26. **Kysilewskyj Constantine, Ph.D., Prof.:** Peculiarities of the Shashkewych's Language. (In Ukrainian). (1968).