

USSR/Medicine - Diphtheria, Bacilli 1 Mar 50  
Cultures

"Variation in the Chemical Composition of Diphtheria Bacteria in Relation to the Age of the Culture,"  
A. N. Belozerskiy, V. B. Korshagin, T. I. Smirnova,  
Sci. Res Inst of Bot, Moscow State U imeni M. V.  
Lomonosov

"Dok Ak Nauk SSSR" Vol LXXI, No 1, pp 89-92

Conducts analysis of diphtheria bacteria after 1, 2, 5, and 10 days' cultivation and tabulates amount of various constituents present at each time. Primary interest is in nature of volutin, which is present

165740

USSR/Medicine - Diphtheria, Bacilli 1 Mar 50  
(Contd)

In large amounts in young culture but is reduced and finally disappears with age. Concludes it is a pentosopolynucleotide of yeast type. Submitted 12 Dec 49 by Acad A. I. Oparin.

165740

BELZERSKIY, A. N.

Belozerskiy, A. N., and Proskuryakov, N. I.: Prakticheskoe rukovodstvo po biokhimii rastenii (Practical Handbook of Plant Biochemistry). Moscow: Soviet Sci. 1951. 387 pp.

①

BELOZERSKIY, A. N., PROSKURYAKOV, F. I.

Botanical Chemistry

"Practical manual of plant biochemistry." Reviewed by V. L. Kretovich. *Biokhimiya* 17, No. 1, 1952

Monthly List of Russian Accessions, Library of Congress, June 1952. Unclassified

CA

Antigen fractions of bacteria of the intestinal group.  
 A. N. Belozorukh and G. N. Zaitseva (M. V. Lomonosov  
 State Univ., Moscow). *Doklady Akad. Nauk S.S.S.R.* 84,  
 760-72 (1952).—A study of the antigen fractions of in-  
 testinal bacteria group (Flexner and Shiga dysentery) re-  
 vealed a new antigen fraction of polysaccharide-protein  
 type, which was isolated by White's technique (*J. Pathol.*  
*Bacteriol.* 32, 85 (1929)). The fraction was found to be  
 heterogeneous and was fractionated by successive partial  
 pptn. with 68% EtOH, half-satn. with  $(NH_4)_2SO_4$ , ad-  
 justment to pH 4.5, pptn. with acidified  $Me_2CO$ , and finally  
 dialysis and digestion with pepsin and trypsin. The last  
 stage breaks up a strong saccharide-protein complex, while  
 the earlier stages of sepn. liberate free polysaccharide,  
 loosely bound polysaccharide, and protein fractions. The  
 Flexner and the Shiga organisms yield such fractions that  
 are rather close in compn.: free polysaccharide (60-72%  
 reducing sugars, 2.88-2.67% N, traces of P); labile poly-  
 saccharide (66.5-70.9% reducing sugars, 2.3-2.9% N,  
 0.8-1.1% P); the saccharide-protein complex (42-6% re-  
 ducing sugars, 5.3-5.8% N, 0.8-0.98% P). The Flexner

bacterial product yields the final polysaccharide from the  
 protein complex after digestion with pepsin, while the Shiga  
 product requires combined action of pepsin and trypsin.  
 A study of the polysaccharides of the 2 species by chro-  
 matography in 40% BuOH—10% AcOH—50% H<sub>2</sub>O with  
 aniline phthalate developer in aq. BuOH showed that: the  
 Flexner type contains appreciable amts. of glucose and  
 rhamnose but little uronic acids, and some 30% glucosamine;  
 the polysaccharide from the protein complex also has a  
 moderate concn. of uronic acids and some xylose. The free  
 and the labile polysaccharides are identical with the poly-  
 saccharide from the complete antigen and appear to be  
 degradation products of the latter arising from manipula-  
 tions in White's method of isolation. The Shiga type  
 presents a similar picture; here the free and labile poly-  
 saccharides and the polysaccharide of complete antigen are

Soil Biol. Inst.

one

Some properties of deoxyribonucleic acid (DNA) from different sources. M. P. Linnikova, N. S. Demjanovskaya, and A. N. Bespoyasnykh. Doklady Akad. Nauk S.S.S.R. 83, 119-21 (1953). -- DNA isolated from *Actinomyces globisporus* treated with  $K_2Fe(CN)_6$  or with 2%  $H_2Na$ , as oxidizing and reducing agents, resp., showed different properties. Some of the specimens were derived also from organisms treated with  $H_2O_2$  at pH 5-8.2. Specimens of *A. globisporus* subjected to oxidation failed to give DNA reaction either by Dische or Verotti methods, or in other cases showed only a very weak green color which was not detected quantitatively. Action of a reducing agent on the organism either resulted in the appearance of a very weak DNA test or to its substantial increase over the control. DNA from the thyroid gland is not affected in this respect by oxidizing agents (Dische test), but similar oxidation of DNA prepn from wheat germ gave a 60-70% decrease in detectable DNA; the same occurred on oxidation of the bacterial mass from dysentery organisms. The oxidation appears to be irreversible and the nature of oxidation products is unknown. The strengthening of the DNA tests after reduction appears to speak for the presence of DNA precursors in the test objects.

G. M. Kosolapoff

BELOZERSKIY, H. N.

USSR

Comparative biochemical studies of actinophage-sensitive and -resistant forms of *Actinomyces globosporus atropomyces*. A. N. Belozerskiy, M. P. Znamenskaya, Ya. I. Rautenshtein, M. S. Odintsova, G. V. Prouyakova, and N. A. Rodionova (Inst. Biochem. and Inst. Microbiol., Acad. Sci. U.S.S.R., Moscow). *Biokhimiya* 19, 236-45 (1954).—The protein constituents of *Actinomyces* vary widely in relation to their amino acid content and generally present a picture similar to that of higher organisms. The following amino acids were identified: aspartic and glutamic acids, serine, glycine,  $\alpha$ -alanine, threonine, tyrosine, tryptophan, cysteine, methionine, valine, leucine, isoleucine, phenylalanine, proline, arginine, histidine, and lysine. Deoxyribonucleic acid in *Actinomyces* is more mobile and less aggregated than in higher plants or animals and explains why it is so easily extd. from the mycelium. In the process of mycelial development of *Actinomyces* the nucleic acids undergo some regular qual. changes as in the case of bacteria and other low forms of living organisms. No quant. differences were discerned in the content of the nucleic acids in the phage-susceptible and phage-resistant *Actinomyces*. However, a difference is discernible in the amino acid content of the two. This is especially true of the dicarboxylic and oxamino acids. The phage-resistant *Actinomyces* are characterized by a greater catalase activity, which is more stable in the presence of inhibitors. The phage resistance of *Actinomyces* appears to be basically related to changes in the enzyme complexes, which appear as a result of the interaction between the *Actinomyces* and the phage.

B. S. Levine

USSR.

Deoxyribonucleic acid of *Actinomyces globisporus streptomycial* in the process of its development. N. S. Pomyanovskaya and A. N. Belozerskii (A. N. Bakh Inst. Biochem., Acad. Sci. U.S.S.R., Moscow). *Biokhimiya* 19, 688-92 (1964).—In certain stages and under certain conditions of development of *A. globisporus streptomycies* deoxyribonucleic acid (I) cannot be found in the mycelia of I and of thymine dure. In the absence in the mycelia of I and of thymine there is present an apparently new base, X, having a max. absorption band in the ultra violet spectral region of 280 mμ. With the reappearance of thymine this new base X disappears.

B. S. Levine

BELOZERSKIY, A.N.

[Metaphosphates and nucleic acid complexes of yeast and the chemical nature of volutin; reports and papers of the Third International Congress of Biochemistry, Brussels, 1-6 August, 1955]. O metafosfatno-nukleinovyykh kompleksakh drozhzhei i o khimicheskoi prirode volutina; soobshcheniia i doklady na III Mezhdunarodnom biokhimicheskom kongresse, Briussel', 1-6 avgusta 1955 g. Moskva, Izd-vo Akad.nauk SSSR, 1955. 20 p. [Parallel texts in Russian and French]. (MIRA 11:6)  
(YEAST) (VOLUTIN)



DEBZERSKIY, A. N.

7016. Identity of the chemical structure of the nuclear material of plant and animal cells. A. N. Belozerskiy and G. I. Abelev. *Vestn. Mosk. Univ.* 1955, 105-108. *Nefesni 24* and *Khim.* 1958, Abstr. No. 15471. A structural nucleoprotein was separated from wheat embryos by Mirsky's method. Like the corresponding nucleoprotein from animal cell nuclei it is a complex of DNA (25-29%), histone (25-30%) and protein of a higher type (not less than 40%). Mirsky's data for thymus nucleoprotein are DNA 24-40%, histone 40% and higher protein approx 10%. It is premature to relate nucleoprotein composition with functions of the cell nuclei. (Russian) T. R. Parsons

BELOZERSKIY, V. N.

1965. Immunological study of albuminous fractions of directly changed bacteria of typhoid group. V. D. Ivanov, I. G. Kudjal, A. G. Skavronskaya, A. S. Spirin, and V. N. Belozerskiy. *Zh. Mikrobiol.* 1955, No. 6, 26-30. *Abstracts of Soviet Science*, 1956, Abstr. No. 12339. Using immunological methods a close connection was demonstrated between certain strains of *Salmonella typhi* and *Salmonella paratyphi* and the antigenic structure of *S. typhi* and *S. braconii*. The antigenic structure and characteristics of all are peculiar to *S. typhi*. The antigenic part of its content of albuminous fractions is very similar to that of DNA and RNA. This makes the immunological relationship between the proteins of the natural and the antigenic structure of the genetic relationship of *S. paratyphi* to the typhoid group of bacteria for the latter located in the results of immunological studies of *S. alatyphi*. A most pronounced antigenic similarity is observed between *S. paratyphi* and the *S. typhi* strains. It is noted that the Brazilian typhoid. The chemical composition and antigenic structure of the paratyphi are very similar but not identical to the corresponding characteristics of the paratyphi Brazilian typhoid. The formation of antigenic relationships in the process of species-producing changes of bacteria of the typhoid group is in the direction of nucleoproteins containing mainly DNA. (Russian)

G. C. BARBARA

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BELOZERSKIY, A.N.

Unity of chemical structures of nuclear material of plant and animal cells. A. N. Belozerskiy and G. I. Abelev. *Vestnik Moskov. Univ.*, 10, No. 6, Ser. Pis. Mat. i Estestvozn. Nauk No. 8, 100-8 (1955).—Structural nucleoprotein extd. from wheat germ by repeated treatment in the cold with *M* NaCl, cytoplasmic ribonucleoproteins extd. by means of 0.14*M* NaCl and nucleoproteins extd. by means of *M* exant. Treatment of the 1st with 0.2*N* NaOH, were the ext. with NH<sub>4</sub>OH yielded about 33% histone which contained 18.5% N, 0.26% P, and no tryptophan; this shows that the structural nucleoprotein of wheat germ contains a protein of the histone type. The residue treated with CHCl<sub>3</sub> gave fairly pure deoxyribonucleic acid (DNA) and a protein contg. about 0.5% P and over 1% tryptophan. This arginine, lysine, histidine, tryptophan, diamino and mono-diamino acids were detd. The 2 forms of protein showed distinct differences: in histone, lysine predominated over arginine. The wheat germ structural nucleoprotein thus contained 25-30% histone, 25-30% DNA, and 18-20% protein of the higher order. Fish sperm contains about 40% DNA and only 10% of protein of higher order. Apparently the content of histone depends on the content of DNA and the content of higher protein can vary within wide limits. Thus, the presence of but one protein in the nucleus is in error (cf. Mirsky, *C.A.*, 42, 3834).

G. M. K.

MP

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BELOZERSKIY, A.N.,

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"Biochemistry of metabolism". N.M.Sisakian. Reviewed by  
A.N.Belozerskii. Biokhimiia, 20 no.4:511-512 J1-Ag '55.  
(METABOLISM) (SISAKIAN, N.M.) (MLRA 8:12)

BELOZERSKIY, A. N.

✓ A comparative biochemical and immunological study of the directed mutability in some bacteria from the intestines. A. N. Belozerskiy, A. S. Spirin, D. G. Kudat, and A. G. Skavronskaya (Moscow State Univ.). *Biokhimiya* 20, 688-85 (1955).--Studies were conducted with (1) *Escherichia coli*, strain CM, grown in glucose-free Tyrode medium in the presence of heat-killed *Salmonella paratyphi*; (2) *S. breslau* No. 70; (3) *Alkaligenes* 11-IV-4 which was evolved from *E. coli* CM by culturing the latter in the presence of heat-killed *S. breslau* No. 70; and (4) *S. paratyphi* mutant 12-IV-4 evolved from culturing *Alkaligenes* *S. breslau* No. 70. All medium in the presence of heat-killed *S. breslau* No. 70. All 4 types of bacteria were grown in parallel series on portions of the same batch of the same type of culture medium at 37° for 20 hrs. Growth was washed off with saline, washed again with saline, alcohol and ether, and vacuum dried. The chem. characteristics of the corresponding bacterial masses were established by analyzing them for total N, total P, for purine base N, pentoses, reducing substances (after 4 hrs. hydrolysis with 1N HCl), for total nucleic acids, deoxyribonucleic acid, ribonucleic acid, protein and polysaccharides. *E. coli* grown on synthetic medium in the presence of heat-killed *S. breslau* No. 70 undergoes basic mutation changes which are reflected in its chem. compn. and immunological (antigenic) properties. *Alkaligenes* evolved from *E. coli* acquires a chem. and immunological entity all

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1/2

7/2/55

(OVER)

BIO-SOIL FACULTY OF MOSCOW STATE UNIVERSITY AND INST. OF EPIDEMIOLOGY AND MICROBIOLOGY OF THE ACADEMY OF MEDICAL SCIENCES USSR

### A Comparative biochemical...

its own. The new strain which is evolved from the newly developed *Akkaligenes* strain, when again grown in the presence of heat-killed *S. breslau* No. 70 is a paratyphoid type of mutant, the chem. and immunologic characteristics of which are partly those of the original *S. breslau* and partly those of the *Akkaligenes*. The chemo-immunological analysis of the fractions indicated a phylogenetic connection between the experimentally evolved types and the original cultures. The nature of the chemical and immunological changes which had taken place present evidence of the complex structure of the protoplasm of the intestinal microorganisms under study. Among the protein complexes of the bacterial cells are found two specifically distinct components, one labile which changes from one biological form to another within narrow specific ramifications and a protoplasmic component more stable and equally specific within the ramifications of a broader systematic group. B. S. Levine

2  
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BELOZERSKIY, A.N., professor, doktor biologicheskikh nauk.

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Problems of proteins. Nauka i shizn' 22 no.5:5-8 My '55  
(MIRA 8:6)

1. Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova  
(Proteins)(Nucleic acids)

BELOZERSKIY, A. N., KUDLAY, D. G., TIMAKOV, V. D., SKAVRONSKAYA, A. G., SPIRIN, A. S.

"An Immunological Study of Protein Fractinn of Transformed Bacteria of the Enteric Group." Proceedings of Inst. Epidem and Microbiol im. Gamaleya 1954-56.

Laboratory of Microbiology, Timakov, V. D. professor, Active Member, Academy of Medical Sciences USSR, head, Inst. Epidem and Microbiol im. Gamaleya  
AMS USSR

SO: Sum 1186, 11 Jan 57.



*BELUZERSKIY, A. N.*

*Med* ✓ Beluzerskii, A. N., and Proskuryakov, N. I.: Praktikum  
der Biochemie der Pflanzen. Translated from Russian by  
Johanna Drahowski. Berlin: Deut. Verlag Wissenschaft.  
1956. 310 pp.

2

PEARSE, A.G. Everson; VENKSTERN, T.V. [translator]; BAYEV, A.A. [translator]  
BELOZERSKIY, A.N., redaktor; ENDEH, M.G., redaktor; GERASIMOVA, Ye.S.,  
"tekhnicheskii redaktor

[Histochemistry, theoretical and applied. Translated from the  
English] Gistokhimiia; teoreticheskaiia i prikladnaia. Perevod s  
angliiskogo T.V.Venkstern i A.A.Baeva. Pod red. i s predisl.  
A.N.Belozerskogo. Moskva, Izd-vo inostrannoi lit-ry, 1956. 488 p.  
(Physiological chemistry) (MLRA 10:1)

*BELOZERSKIY, A.N.*

USSR / Microbiology. General Microbiology.

F-1

Abs Jour : Ref Zhur - Biol., No 2, 1958, No 5064

Author : Spirin, A.S., Belozerskiy, A.N.

Inst : Not given

Title : The Composition of Nucleic Acids in Experimental Variability of Intestinal Bacteria.

Orig Pub : Biokhimiya, 1956, 21, No 6, 768-775

Abstract : A determination was made of the composition of RNA and DNA in *Bacterium coli commune* CM, Bact. breslau 70, alkali-producer 11-UV-4, obtained from intestinal bacilli by cultivation with heat-killed Breslau bacteria. The composition of nucleic acids (NA) was determined by paper chromatography with subsequent UV-spectrophotometry of eluates in one batch directly in the tested material without a preliminary ~~sepa~~

Card : 1/3

*Inst. Biochem. im. A.N. Bakh, AN-USSR,  
and Biokhimiya Faculty, Moscow Univ.*

RNA, alike in all four forms, which were

Card : 2/3

USSR / Microbiology. General Microbiology.

F-1

· ABs Jour : Ref Zhur - Biol., No 2, 1958, No 5064

: The established composition of NA in the intestinal bacillus differed from NA composition established as a result of investigations by Chargaff and co-workers. The author assumes that there is a connection between DNA and specificity of protein synthesis and is inclined to admit that there is no direct genetic connection between DNA and RNA.

Card : 3/3

✓ Modern concepts of the structure of nucleic acids and their specificity. A. N. Belozerskii and A. S. Spirin. *Uspehi Sovetskoi Biol.* 41, 144-60(1958).--The authors review the available information on the structure of ribo-

nucleic and deoxyribonucleic acids, the problem of heterogeneity and specificity of the nucleic acids, and indicate the problems still awaiting solution. A need for reliable and exact methods is indicated by contradictory results obtained in various laboratories. Several types of specificity of nucleic acids are reviewed: species specificity; organ or tissue specificity; age specificity (qualitative change in composition of nucleic acids with age); organ specificity (differences in nucleic acid found in various parts of the same cell); and, finally, molecular specificity (several different nucleic acids, each with a narrow function, located in the same portion of a cell). To all of the different types of nucleic acid various authors ascribe functional specificity. The definition of these functions, however, remains obscure.

J. A. Stekol

BELOZERSKIY, A. N.

USSR/ Microbiology. Antibiosis and Symbiosis.  
Antibiotics

F-2

Abstr Jour: Ref Zhur - Biol., No 6, 1958, 24134

Author : Belozerskiy, A. N., Aseeva, I. V., Moroz, A. P.  
Inst : Not given  
Title : A Comparative Study of the Content of Nucleic  
Acids in Cultures of Some Bacteria Sensitive and  
Resistant to Grisemin and Streptomycin.

Orig Pub: Dokl. AN SSSR, 1956, 109, No 1, 149-151

Abstract: A study was conducted on the change of chemical composition and the speed of growth of staphylococcus aureus and B. coli in the process of acquiring resistance to grisemin and streptomycin. Generation of resistance to these antibiotics was accompanied by a decreased quantity of RNA (determined by pentoses) in bacterial cells, by retarding

Card 1/2  
Moskovskiy gosudarstvennyy universitet im M. V. Lomonosov i Institut epidemiologii im N. F. Gamaleya Akdemii meditsinskikh nauk SSSR. Predstavleno Akademiku A. I. Oparinyam.

USSR/ Microbiology. Antibiosis and Symbiosis.  
Antibiotics

F-2

Abs Jour: Ref Zhur - Biol., No 6, 1958, 24134

Author : Belozerskiy, A. N., Aseeva, I. V., Moroz, A. P.

Inst : Not given

Title : A Comparative Study of the Content of Nucleic  
Acids in Cultures of Some Bacteria Sensitive and  
Resistant to Grisemin and Streptomycin.

Orig Pub: Dokl. AN SSSR, 1956, 109, No 1, 149-151

Abstract: A study was conducted on the change of chemical composition and the speed of growth of staphylococcus aureus and B. coli in the process of acquiring resistance to grisemin and streptomycin. Generation of resistance to these antibiotics was accompanied by a decreased quantity of RNA (determined by pentoses) in bacterial cells, by retarding

Card 1/2

Moskovskiy gosudarstvennyy universitet im M. V. Lomonosov i Institut epidemiologii im N. F. Gamaleya Akdemii meditsinskikh nauk SSSR. Predstavleno Akademiku A. I. Oparinym.

USSR/ Microbiology. Antibiosis and Symbiosis.  
Antibiotics

F-2

Abs Jour: Ref Zhur - Biol., No 6, 1958, 24134

Abstract: the cycle of culture development and, in connection with this, lower yields of bacterial mass. The cycle development is retarded to such an extent that in cells of a 48-hour culture of B. coli, resistant to grisein, there was found more RNA than in the culture of a sensitive variant of the same age. The quantity of RNA regularly decreased with the age of the culture, while the quantity of DNA essentially did not change during the period of the entire development cycle.

Card 2/2



**Antibiotic grisino (griseimine) and its producers.** N. A. Krasil'nikov, A. N. Belozerskiĭ, Ya. I. Rautenshtein, A. I. Korenyako, N. I. Nilitina, A. I. Sokolova, and S. O. Uryson (A. N. Bakh Biochem. Inst., Acad. Sci. U.S.S.R., Moscow; *Doklady Akad. Nauk S.S.S.R.* 111, 1117-20, 1956). --*Actinomyces griseus* grown in seroseum or brown soils often yields an antibiotic substance, also produced in cultures on Czapek medium or potato agar. The mold is best in media rich in proteins with max. yield in 200 hr. Culture being attained in 4-5 days at 25 C°. The best medium is try meat powder, 1% glucose, and chalk, as well as dried bak. matter with glucose and chalk. The antibiotic is soluble in HCl. The salt treated with 10% sodium acetate, CH<sub>3</sub>COONa, H<sub>2</sub>O, diluted with 40% NaOH, and precipitated with 10% NaOH, pH 5.0, except in water, is soluble in 10% NaOH. The parent is insoluble in water, 10% NaOH, and 10% NaCl. The final salt has activity of several units/mg. against *Staphylococcus aureus* and 2000 against *Escherichia coli*. The material of the active principle contains N and gives pos. tests in biuret, ninhydrin, aldehyde, and glucosamine reactions. The various specimens obtained contain 14.5% total N, with 59-46% of this being van Slyke group N before hydrolysis. The base is composed of 20% N and 80% amino N. N of base is 28.2% and 28.2% of total N. The substance is thus mainly a base of the 20% N. A wide variety of grasses and cereals, legumes and animal toxicity ranging from 100 to 1000 mg/kg. Preliminary tests of use of the antibiotic as a feed additive in stock agriculture. Current publications on this work (Moroz, C.A. 59, 884) name this antibiotic griseimine, the present authors refer to it as grisino (griseimine).

BELOZERSKIY, A. N.

Comparative study of the composition of nucleic acids in cultures of the colon bacteria of various ages. A. S. Spirin, A. N. Belozerskii, and A. Pretel-Martines. (A. N. Bekh Biochem. Inst., Moscow). *Doklady Akad. Nauk S.S.S.R.* 111, 1297-9 (1950).—No differences are found in ribonucleic acid compn. of *Escherichia coli* of various ages. Deoxyribonucleic acid also shows no change from 10 to 30 hrs. of age of the culture. The total content of ribonucleic acid declines from a 10-hr. culture to 30-hr. culture by nearly 50%; at the same time the deoxyribonucleic acid content remains substantially const. G. M. Kozlov

BELOZERSKIY, A. N.

"On the Species Specificity of the Nucleic Acids in Bacteria," a paper presented at the International Symposium on the Origin of Life, Moscow, 19-24 Aug 1957.

ZNAMENSKAYA, M.P.; BELOZERSKIY, A.N.

Some derivates of gramicidin C. Antibiotiki 2 no.1:36-40 Ja-F '57.  
(MIRA 12:11)

1. Institut biokhimi imeni A.N. Bakha AN SSSR.  
(ANTIBIOTICS, related cpds.  
gramicidin C, derivatives)

И. В. АСЕЕВА, А. Н. БЕЛОЗЕРСКИЙ, проф.

Effect of light and starvation on the biosynthesis of nucleic acids  
in wheat seedlings. Vest. Mosk. un. Ser. biol., pochv., geol., geog.  
12 no. 4:17-23 '57. (MIRA 11:5)

1. Kafedra biokhimii rasteniy Moskovskogo gosudarstvennogo universi-  
teta.  
(Plants--Metabolism) (Nucleic acids) (Plants, Effect of light on)

BELOZERSKIY, A.N.; KULAYEV, I.S.

Polyphosphates and their significance in the development of *Aspergillus niger* [with summary in English]. *Biokhimiia* 22 no.1/2:29-39 Ja-F '57.  
(MLRA 10:7)

1. Biologo-pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta im. M.V.Lomonosova.

(ASPERGILLUS, metabolism,

niger, polyphosphates, role in develop. (Rus))

(PHOSPHATES, metabolism,

polyphosphates in *Aspergillus niger*, role in develop. (Rus))

~~BELOZERSKIY, A.N.~~  
KULAYEV, I.S.; ~~BELOZERSKIY, A.N.~~

P32 in the study of the physiological role of polyphosphates in the development of *Aspergillus niger* [with summary in English]. *Biokhimiia* 22 no.3:587-596 My-Je '57. (MIRA 10:11)

1. Biologo-pochvennyy fakul'tet Moskovskogo universiteta im. M.V. Lomonosova.

(*ASPERGILLUS NIGER*, metabolism, polyphosphates, radiophosphorus in determ. of physiol. role in develop. (Rus))

(*PHOSPHATES*, metabolism, *Aspergillus niger*, radiophosphorus in determ of physiol. role of polyphosphates in develop. (Rus))

USSR/Microbiology. General Microbiology. System-  
atics, Morphology. Cytology.

F-1

Abs Jour : Ref Zhur - Biol., No 14, 1958, No 62199

doubts as to the accuracy of their relation to this family. By analogy, considerable differences in DNA composition between *Bacterium morganii* and *P. vulgaris* affirms that the relation of *Bact. morganii* to *G. Proteus* is scarcely strictly proven. RNA nucleotide composition possesses a considerably less expressed specificity of species and quite certain, although insignificant differences, uncovered only in distant species. Similarly, between the RNA and DNA compositions there is a known correlation, which expresses itself in the increase of the relationship guanylic acid + cytidylic acid/ adenylic acid + uridylic acid in RNA by the transition from species with a less significant guanine + cytosine/ adenine + thymine in DNA to species

Card : 2/3

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USSR/Microbiology. General Microbiology. Systematics F-1  
Morphology, Cytology.  
"APPROVED FOR RELEASE: 06/06/2000" CIA-RDP86-00513R000204520004-4"

Abs Jour : Ref Zhur - Biol., No 14, 1958, No 62199

with more significance for this relationship. Studies of RNA and DNA nucleotide composition, together with special microbiological tests, can be used to solve problems about the systematic location of this or other bacterial species.  
-- T.I. Tikhonenko

Card : 3/3



*Be/ozerskiy, A. N.*

ZNAMENSKAYA, M.P.; BELOZERSKIY, A.N.; BAVRILOVA, L.P.

Some data on the formation of complexes of reserve proteins with nucleic acids [with summary in English]. *Biokhimiya* 22 no.5: 765-775 S-O '57. (MIRA 11:1)

1. Institut biokhimi im. A.N.Bakha Akademii nauk SSSR, Moskva.  
(NUCLEOPROTEINS,  
form from reserve proteins & nucleic acids (Rus))

USSR / Microbiology. General Microbiology. Physiol- F-1  
ogy and Biochemistry.

Abs Jour: Ref Zhur-Biol., No 16, 1958, 71901.

Author : Belozerskiy, A. N.; Zaytseva, G. N., Cavrilova,  
L. P., Mineyeva, L. V.

Inst : Not given.

Title : Chemistry of Azotobacter. I. Nitrogenous Sub-  
stances of Azotobacter.

Orig Pub: Mikrobiologiya, 1957, 26, No 4, 409-417.

Abstract: The quantity of protein compounds in an Azoto-  
bacter cell (A. agile, A. vinelandii, A. chroo-  
coccum were investigated) changes during the  
development cycle from maximal in the latent  
phase to minimal at the end of the log phase;  
it did not depend essentially on the source of  
the nitrogen. The RNA quantity, being minimal

Card 1/2

BELOZERSKIY, H. V.

KRASIL'NIKOV, N.A.; BELOZERSKIY, A.N.; RAUTENSHTEYN, Ya.I.; KORENYAKO, A.I.;  
NIKITINA, N.I.; SOKOLOVA, A.I.; URYSON, S.O.

The antibiotic grisein (grisein) and its producers [with summary  
in English]. Mikrobiologiya 26 no.4:418-425 J1-Ag '57. (MIRA 10:12)

1. Institut mikrobiologii AN SSSR i Institut biokhimii im. A.N.Bakha  
AN SSSR, Moskva.

(ANTIBIOTICS,

grisein, prod. organisms (Rus))

USSR / Microbiology. General Microbiology. Physiol- F-1  
ogy and Biochemistry.

Abs Jour: Ref Zhur-Biol., No 18, 1958, 71902.

Author : Zaytseva, G. N.; Belozerskiy, A. N.

Inst : Not given.

Title : Chemistry of Azotobacter. II. Amino-acid Comp-  
osition of Azotobacter Agile Depending on the  
Age of Culture.

Orig Pub: Mikrobiologiya, 1957, 26, No 5, 533-540.

Abstract: 19 amino acids were identified and quantitatively  
determined in the composition of A. agile pro-  
teins; in addition, a series of unidentified com-  
pounds were found in the chromatograms which gave  
a color reaction with ninhydrin. The basic mass  
of the Azotobacter proteins are mixed proteins  
of a non-alkaline character. The amino acid

Card 1/3

USSR / Microbiology. General Microbiology. Physiol- F-1  
ogy and Biochemistry.

Abs Jour: Ref Zhur-Biol., No 16, 1958, 71902.

Abstract: amino acid composition of the protein of A. agile  
cultures which fixed atmospheric nitrogen and  
were cultivated in ammonium nitrogen. -- T. A.  
Kalininskaya.

Card 3/3

USSR / Microbiology. General Microbiology: Physiology F  
and Biochemistry.

Abs Jour: Ref Zhur-Biol., No 2, 1959, 5445.

Abstract: preliminary separation of the preparations).  
No changes were found in the RNA composition  
of the cells of *A. agile* in the latent, logar-  
ithmic, and stationary phases of growth on a  
medium with ammonia and molecular nitrogen.  
The composition of the total RNA of three Azo-  
tobacter species was similar; the differences  
discovered did not exceed the average error of  
the method. The ratio of guanine / cytosine /  
adenine / thymine in DNA of *A. agile*, *A. vine-*  
*landii* and *A. Chroococcum* was, respectively,  
1.21-1.23, 1.28, and 1.34-1.35, which served the  
authors as a basis for drawing conclusions as to  
the possible specificity of the DNA studied. --  
T. I. Tikhonenko.  
Parts I, II - see RZhBiol., 1958, No 71901-71902.

Card 2/2

Comparative Studies on the Ribonucleic Acid Composition in the  
Different Species of Bacteria. PA - 3169

composition of DNA differed widely. On the other hand, the nucleotide composition of RNA is very similar even in the case of widely differing types. Thus it may be concluded that with respect to DNA, even in the case of an investigation of summary composition, there are numerous stages, which, however, cannot be said with respect to RNA. (1 Table, 1 Slavic Reference).

ASSOCIATION: Institute for Biochemistry "A.N.BAKH" and Faculty of Soil Biology  
of Moscow State University "M.V.LOMONOSOV".  
PRESENTED BY: OPARIN, A.I., Member of the Academy, on 15.1.1957  
SUBMITTED: 11.1.1957  
AVAILABLE: Library of Congress

Card 2/2

AUTHORS  
TITLE

*BELOZERSKIY, A. N.*

Belozerskiy, A.N., Naumova, I.B.,

20-5-29/54

On the Polysaccharide Fractions of Actinomyces Globisporus Streptomycini Kras.

PERIODICAL  
ABSTRACT

(O polisakharidnykh fraktsiyakh Actinomyces globisporus streptomycini Kras)

Doklady Akademii Nauk SSSR, 1957, Vol 115, Nr 5, pp 957-960 (U.S.S.R.)

Thus far the existence of the mentioned carbohydrates in the actinomyces, especially the ones named above, has not been very carefully dealt with in scientific literature. According to some writers these actinomyces do not contain cellulose and chitin. Some writers discovered that there were no major accumulations of polysaccharides, others again are of the opinion that the cell membrane of the str. fradiae also contained muco-polysaccharide besides the proteins. No other writers succeeded in finding reducing substances after a hydrolysis of the mycelium of the actinomyces mentioned in the title through acids of different concentration. The authors of this treatise describe the insulation and the fractions of the mentioned actinomyce; they obtained these fractions in the investigation of the "superfluous" phosphor of the fraction insoluble in acids. The stem LS-1, namely a 2 day old myzel, was sowed on a soya-substratum with glucosis. In table 1 the quantitative content of phosphor in every fraction is expressed in percents of the dry substance of the mycelium. This shows that more than 70% of the mycelium-phosphor belongs to the phosphor of the fraction insoluble in acids. The phosph-

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On the Polysaccharide Fractions of Actinomyces Globi- 20-5-29/54  
sporus Streptomycini Kras.

or of the fraction insoluble in acids is largely presented by orthophosphate. The nucleic acids, calculated according to the amount of phosphorus, show nearly three times the amount found with the spectroscopy. Therefore the first fraction contains other compounds with phosphorus of a non-nuclear nature. The amount of "excess" phosphorus is quite high (44% of the phosphorus contents in mycelium). The authors tried to explain the structure of these compounds, which are responsible for the "superfluous phosphorus". It could not have been polyphosphate, phosphoroproteids, phytine, nor glycerophosphate. After a number of experiments it was possible to isolate all the "excess" phosphorus in corresponding fractions in connection with the polysaccharides. This method is described. Table 2 shows the results which characterize the 2 preparations from 2 fractions. Both fractions react positively to carbohydrate: molar with anthrone, tryptophan and carbazole. These results show clearly that the preparations obtained contain polysaccharides. The nitrogen which they also contain should obviously be considered the same as that of amino-sugar. The phosphorus, however, is not that of nucleic acids, which is completely absent in the preparations. Phosphorus of both fractions is difficult to hydrolyze. About half the amount of phosphorus was present in a phosphomonoether compound; the other half was even more strongly bound. A quantitative-chromatographic analysis shows that the purified polysaccharides of fraction I and II differed in their composition. In

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On the Polysaccharide Fractions of Actinomyces Globi- 20-5-29/54  
sporus Streptomycini Kras.

fraction I: galactose, glucose, arabinose, mannose and xylose. The existence of rebose in fraction II is connected with the existence of small amounts of ribonuclein-acid. Furthermore the chromatogram shows that the homonymous kinds of sugar in the 2-polysaccharides differ largely in their quantity. Thus glucosis prevails in one polysaccharide, mannose in the other. The discovery of the latter is interesting, as it can point out a mannose reaction in this organism. Under certain circumstances this again can be combined with the formation of mannosidostreptomycin. The question whether phosphor is present in both polysaccharides has to be dealt with separately. There is 1 figure, 3 tables, 6 Slavic references.

ASSOCIATION Moscow State University im. M. V. Lomonosov  
(Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova).  
PRESENTED By A. I. Oparin, Academician, June 15, 1957  
SUBMITTED June 13, 1957  
AVAILABLE Library of Congress.  
Card 3/3

BELOZERSKIY, A. N.

"The Composition of nucleinic acids secreted by micro-organisms and plants."

report presented at the 10th All-Union Conf. on Highly Molecular Compounds,  
Biologically Active Polymer Compounds, Moscow, 11-13 June 1958. (Vest.Ak  
Nauk SSSR, 1958, No. 9, pp. 111-113)

LI DIN KHO [Li Ting-huo]; BELOZERSKIY, A.N.

Phosphorus compounds and nucleic acids in wheat seed during the  
process of maturation. Vest. Mosk. un. Ser. biol., pochv.,  
Geol., geog. 13 no.2:15-28 '58. (MIRA 11:9)

1. Moskovskiy gos. universitet, Kafedra biokhimi rasteniy.  
(Wheat) (Phosphorus metabolism) (Nucleic acids)

*Spirin, A.S., Belozerskiy, A.N., Kudlay, D.G., Skavronskaya, A.G., Mifereva, V.G.*  
SPIRIN, A.S.; BELOZERSKIY, A.N.; KUDLAY, D.G.; SKAVRONSKAYA, A.G.; MIFEREVA, V.G.

Changes in the composition of nucleic acids during the formation of  
saccharolytically inert forms of enteric bacteria [with summary in  
English]. Biokhimiia 23 no.1:154-163 Ja-F '58. (MIRA 11:3)

1. Institut biokhimii im. A.N.Bakha AN SSSR, Biologo-pochvennyy  
fakul'tet Moskovskogo universiteta i Institut epidemiologii i  
mikrobiologii im. N.F.Gamaleya AMN SSSR, Moskva.

(NUCLEIC ACIDS, metabolism,

Enterobacteriaceae, eff. of form. of saccharolytic inert  
strains (Rus)

(BACTERIA,

Enterobacteriaceae, eff. of form of saccharolytic inert  
strains on nucleic acid metab. (Rus)

BUKHOVICH, Ye., BELOZERSKIY, A.N.

Formation of polyphosphates in yeast cell [with summary in English]  
Biokhimiia 23 no.2:254-260 Mr-Apr '58 (MIRA 11:6)

1. Biologo-pochvennyy fskul'tet Moskovskogo universiteta im.  
M.V. Lomonosova.

(PHOSPHATES, metabolism

polyphosphate synthesis in yeast cells (Rus))

(YASTS, metabolism

polyphosphate synthesis (Rus))

BELOZERSKIY, A.N.

"Fundamentals of plant biochemistry" by V.L. Kretovich. Reviewed  
by A.N. Belozerskii. Biokhimiia 23 no.2:339 Mr-Apr '58 (MIRA 11:6)  
(PLANT PHYSIOLOGY)  
(KRETOVICH, V.L.)

BELOZERSKIY, A.N.; URYSON, S.O.

Nucleoprotein composition of cell nuclei in certain plants [with  
summary in English]. Biokhimiia 23 no.4:568-573 Jl-Ag '58.

(MIRA 12:3)

1. Institute of Biochemistry, Academy of Sciences of the U.S.S.R.,  
Moscow.

(NUCLEOPROTEINS, metab.  
plants (Rus))

(PLANTS, metab.  
nucleoproteins (Rus))



BELOZERSKIY, A.N.; ZAYTSEVA, G.N.; TYULENEVA, N.P.

Chemistry of Azotobacter. Report No.4: Amino acid composition of three Azotobacter species cultured on different sources of nitrogen nutrition [with summary in English]. Mikrobiologiya 27 no.1:7-11 Ja-F '58. (MIRA 11:4)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova, Biologo-pochvennyy fakul'tet.  
(AZOTOBACTER, metab.  
amino acids of 3 species cultured with different nitrogen sources (Rus)  
(AMINO ACIDS, metab.  
Azotobacter, 3 species cultured with different nitrogen sources (Rus)

BELOZERSKIY, A.N., IMSHENETSKIY, A.A., ZAYTSEVA, G.N., PEROVA, K.Z.

Comparative morphology and biochemistry of mucoid and matt and dull cultures of *Azotobacter chroococcum* [with summary in English]. *Mikrobiologiya* 27 no.2:150-156 Mr-Apr '58 (MIRA 11:5)

1. Institut mikrobiologii Akademii nauk SSSR i Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.  
(AZOTOBACTER, culture  
chroococcum, comparative morphol. & biochem. of  
slimy and dull cultures (Rus))

ZAYTSEVA, G.N., BELOZERSKIY, AN.

Chemistry of Azotobacter. Report No.5: Studying phosphorus compounds of Azotobacter agile and their relation to the age of the culture and the source of nitrogen nutrition. [with summary in English]. Mikrobiologiya 27 no.3:308-315 My-Je '58 (MIRA 11:9)

1. Biologo-pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta im. M.V. Lomonosova.

(AZOTOBACTER, metabolism.

agile, phosphates (Rus))

(PHOSPHATES, metabolism

Azotobacter agile (Rus))

ZAYTSEVA, G.H., BELONERSKIY, A.N.

Chemistry of Azotobacter. Report no.4: Carbohydrate composition of Azotobacter agilis 22-D as related to the age of the culture [with summary in English]. Mikrobiologiya 27 no.4:416-421 J1-Ag '58 (MIRA 11:9)

1. Biologo-pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta im. M.V. Lomonosova.

(AZOTOBACTER, metabolism

agilis, carbohydrate composition in relation to age of culture (Rus))

(CARBOHYDRATES, metabolism

Azotobacter agilis composition in relation to age of culture (Rus))

BELOZERSKIY, A. N.

AUTHORS: Belozerskiy, A. N., Shugayeva, N. Y.,  
Spirin, A. S. 20-119-7-3060

TITLE: The Deoxyribonucleic Acid Composition of Different  
Species of Actinomycetes (Sostav denoksimonukleino-  
kislot u razlichnykh vidov aktinomitsetov)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 2,  
pp 330-332 (USSR)

ABSTRACT: The study of the nucleotide composition of these acids  
(DNA) in other organism, especially in bacteria, and in  
the solution of several problems of the peculiarity  
of species of these compounds (refs 1-4). However, the  
limits of this specificity are not yet determined. It is not  
yet clear in how far the composition of DNA differs in  
biologically and systematically related types (refs 1,4).  
In the present work the composition of deoxyribonucleic  
acid is studied within a rather limited group of micro-  
organisms, as mentioned in the title. Because the question  
of the peculiarity of species of DNA, its similarity or  
differences in the systematics of the mentioned organisms  
might be of help. The methods of investigation were

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The Deoxyribonucleic Acid Composition of Different Species of Actinomycetes

26-119-1-39-60

described earlier (refs 4,5). On Table 1 data on the composition of DNA are given for 6 types of Actinomycetes as well as for Mycobacterium tuberculosis (stock F73) and for M.diphtheriae. These data are the means of 5-7 single determinations. The value of the variation coefficient for single types is discussed. The only primary index of the specificity of DNA which sums up all possible deviations in the relation of nitrogen bases is the value

$$\frac{G + Ts}{A + T}$$

In the case of all Actinomycetes it was > 2.0. These data confirm that the Actinomycetes have highest nitrogen base GTs type of DNA (ref 4). In this connection they occupy the most extreme position among the various types of bacteria. The strong difference between the DNA composition of the Actinomycetes and the Mycobacterium tuberculosis indicates that the first and the acid proof bacteria

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The Desoxyribonucleic Acid Composition of Different  
Species of Actinomycetes

20-119-2-39/60

represent two different rather isolated groups of the species of the Actinomycetes (class Actinomycetales according to Vaksmán). However, the relatively high value of the relation  $(G + Ts) / (A + T)$  as compared to other bacteria agrees with the fact that these micro bacteria belong to the same systematic category as the actinomycetes (refs 6,7). On the other hand, the comparison of the DNA of the Actinomycetes and the *M. tuberculosis* with the DNA of *M. diphtheriae* leads to the conclusion that the latter type does not belong to the class of the Actinomycetes and even less to the species of the Mycobacterium. It must be placed to an independent family of the order Eubacteriales (ref 7). In the individual types of Actinomycetes the DNA composition is closely related so that they form a group which is perhaps systematically close. Statistically the 4 types of Actinomycetes can absolutely not be distinguished. Thus, no characteristic types exist in the case of types of one and the same species as to the DNA composition. The authors gave the explanation earlier (ref 4): The mentioned differences concern only single

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The Desoxyribonucleic Acid Composition of Different  
Species of Actinomycetes

20-119-2-39/60

molecules or even their sections while the main mass remains identical. The differences are too slight to be detected by the applied methods. As far as the two other species of Actinomycetes (Proactinomyces and Micromonospora) are concerned, a difference from the Actinomycetes can be observed inspite of the close relation as to the DNA composition. However, it is too small to draw final conclusions from it.

There are 1 table and 7 references, 3 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)  
{ Institut biokhimii im. A. N. Bakha Akademii, nauk SSSR  
{ Institute for Biochemistry imeni A. N. Bakha AS USSR)

PRESENTED: November 25, 1957, by A. I. Oparin, Member, Academy of  
Sciences, AS USSR

Card 4/4



AUTHORS: Kulayev, I. S., Belozerskiy, A. N. SOV/20-120-5-42/67

TITLE: An Electrophoretic Investigation of Polyphosphate Ribonucleic Complexes Obtained From Aspergillus niger (Elektroforeticheskoye izucheniye polifosfatno-ribonukleinovykh kompleksov iz Aspergillus niger)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 120, Nr 5, pp. 1080 - 1083 (USSR)

ABSTRACT: In previous papers (Refs 1-3) two different polyphosphate fractions were found in the mentioned fungi species; a) a fraction which is soluble in acids, and b) a fraction which is not soluble in acids. The first is apparently in a free state in the cells, whereas the latter is connected with any cell components. According to the evidence obtained in the laboratory of the authors they are bound to the ribonucleic acid (RNA) by forming the complexes mentioned in the title. In the present paper the authors tried to solve the problem of the existence of such complexes in a new way: they investigated the electrophoretic homogeneity of the latter. Table 1 gives the analytical data which characterize the isolated preparation of the mentioned

Card 1/3

An Electrophoretic Investigation of Polyphosphate  
Ribonucleic Complexes Obtained From Aspergillus niger

SOV/20-120-5-42/67

complex. There is no doubt that it is of polyphosphate nature. The authors succeeded under the given experimental conditions in separating a mechanical mixture of polyphosphate and RNA with different ratios of the components. An experiment with the polyphosphate ribonucleic complex from Aspergillus niger under the same conditions proved its electrophoretic homogeneity (Fig 2c). From the above mentioned it can be concluded that the electrophoretic mobility of the complex approaches rather closely that of RNA. However, it is shifted to a certain extent towards the direction of the polyphosphate. Thus the results obtained in the paper largely confirm the conception concerning the existence of polyphosphate ribonucleic complexes in the cells of low organisms (among them also A.niger) as actually existing compounds. Professor S.Ye. Bresler and V.D. Uspenskaya collaborated in this paper. There are 3 figures, 1 table, and 13 references, 4 of which are Soviet.

Card 2/3

An Electrophoretic Investigation of Polyphosphate  
Ribonucleic Complexes Obtained From Aspergillus niger

30V/20-120-5-42/67

ASSOCIATION: Institut biokhimii im. A.N.Bakha Akademii nauk SSSR (Institute of Biochemistry imeni A.N.Bakh, AS USSR) Moskovskiy gosudarstvennyy universitet im.M.V.Lomonosova (Moscow State University imeni M.V.Lomonosov)

PRESENTED: February 24, 1958, by A. I. Oparin, Member, Academy of Sciences, USSR

SUBMITTED: February 21, 1958

1. Fungi--Chemical analysis 2. Fungi--Properties 3. Phosphates  
--Determination 4. Ribonucleic acid--Determination 5. Complex  
compounds--Analysis

Card 3/3

SOV/20-122-3-53/57

AUTHORS: Belozerskiy, A. N., Corresponding Member, Academy of Sciences, USSR, Naumova, I. B.

TITLE: On the Polysaccharide Fractions of Actinomyces Rimosus and Actinomyces Aureofaciens (O polisakharidnykh fraktsiyakh Actinomyces rimosus i Actinomyces aureofaciens)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 3, pp 441-444 (USSR)

ABSTRACT: In the most recent times informations were published concerning the chemical composition of the cell walls of some actinomycetes (Refs 1,2). These walls are of mucopolysaccharide character. Besides amino acids mainly amino sugars were observed. In some actinomycetes arabinose galactose and small amounts of mannose glucose, and rhamnose were found. In the present paper the authors extended their earlier work (Ref 4) to the fungi mentioned in the title which produce chloro-tetracycline and oxy-tetracycline. At the Vsesoyuznyy nauchnoissledovatel'skiy institut antibiotikov (All-Union Scientific Research Institute for Antibiotics) the stem T-118 of the species of fungus mentioned first in the title, 48 hours old, and stem 11, 120 hours

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SOV/20-122-3-33/57

On the Polysaccharide Fractions of *Actinomyces Rimosus* and *Actinomyces Aureofaciens*

old of the second species were obtained. Processing of the mycelium and the isolation of the polysaccharide fractions were carried out according to the method described in reference 4. Table 1 reveals the chemical characteristics of the mentioned fractions. It can be seen from it that A. aureofaciens contains 2 such fractions. The first fraction contains 54,4% of reducing agents and a small amount of phosphorus. The entire nitrogen of this fraction belongs to the hexosamine. In the second fraction only 19,1% of reducing agents are contained, on the other hand, however, it contains much more accompanying substances under the form of proteins. Also A. rimosus contains 2 polysaccharide fractions: I - with 22,5% of reducing agents and nitrogen as in the preceding species of fungus. Nitrogen of the II fraction belongs to a considerable extent to the proteins. It can be seen from a comparison of the chromatograms that the polysaccharide fractions of both species of fungus is characterized quantitatively by one and the same complex of sugars. They show, however, important quantitative differences. It can be seen from table 2 that in the polysaccharide of the I fraction of A. aureofaciens

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On the Polysaccharide Fractions of Actinomyces Rimosus and Actinomyces  
ureofaciens

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galactose and glucose predominate. In the polysaccharide of the II fraction mannose clearly predominates. In the case of A. rimosus a great amount of galactose and mannose is contained in the I fraction as well as of sugar as yet not identified. A successful quantitative determination of individual sugars of the II fraction could not be achieved. The chromatogram shows that it consists mainly of mannose and of the sugar not identified. In contrast to fraction I glucose content is small. In the fractions of the species of fungus investigated no such amounts of phosphorus were observed as was the case with A. globisporus Str. (up to 8,5%) (Ref 4). There are 1 figure, 2 tables, and 12 references, 6 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: June 3, 1958

Card 3/3

BELOZERSKIY, A. N. and SPIRIN, A. S.

"A Correlation between the Compositions of Deoxyribonucleic and Ribonucleic Acids." Nature. Vol. 182 No. 4628, p. 111, 1958.

Inst. of Biochemistry im. A. N. Bakh Acad. Sci. USSR, Moscow.

BEMOZERSKIY, Andrey Nikolayevich; OPARIN, A.I., akademik, otv.red.;  
POTEKHINA, N.A., red.isd-va; MARKOVICH, S.G., tekhn.red.

[Nucleoproteids and nucleic acids in plants and their  
biological significance] Nukleoproteidy i nukleinovye  
kisloty rastenii i ikh biologicheskoe znachenie. Moskva,  
Izd-vo Akad.nauk SSSR, 1959. 45 p. (MIRA 12:6)  
(Nucleic acids) (Nuclein) (Botanical chemistry)



KONAREV, V.I., prof., otv. red.; BELOZERSKIY, A.N., red.; GENKEL', P.A.,  
prof., red.; SERGEYEV, L.I., prof., red.; MAZILKIN, I.A., kand.  
biolog.nauk, red.; KHANISLAMOV, M.G., kand.sel'skokhoz.nauk, red.;  
POROYKOV, Yu.D., red.; VALEYEV, G.G., tekhn.red.

[Biology of nucleic acid metabolism in plants; reports at the joint  
scientific session of Nov.25-28, 1958] Biologiya nukleinovogo  
obmena u rastenii; doklady ob'edinennoi nauchnoi sessii, 25-28  
noyabrya 1958 g. Ufa, 1959. 181 p. (MIRA 13:6)

1. Akademiya nauk SSSR. Bashkirskiy filial, Ufa. Institut biologii.  
2. Chlen-korrespondent AN SSSR (for Belozerskiy). 3. Institut biologii  
Bashkirskogo filiala Akademii nauk SSSR (for Konarev, Mazilkin,  
Khanislamov).

(PLANTS--METABOLISM)

(NUCLEIC ACIDS)

ZAYTSEVA, G.N.; BELOZERSKIY, A.N.

Electrophoretic study of protein components of Azotobacter as related to the species and age of culture and the source of nitrogen nutrition [with summary in English]. Biokhimiia 24 no.1:133-143 Ja-F '59.

(MIRA 12:4)

1. Faculty of Biology and Soil Sciences, Moscow State University.  
(AZOTOBACTER, metab.

proteins, electrophoresis, eff. of species, culture age & nitrogen sources (Rus))

(PROTEINS, metab.

Azotobacter, electrophoresis, eff. of species, culture age & nitrogen sources (Rus))

KULAYEV, I.S.; BELOZERSKIY, A.N.; MANSUROVA, S.E.

Polynhosphate metabolism in submerged cultures of *Penicillium*  
*chrysogenum* Q-176. *Biokhimiia* 24 no.2:253-262 Mr-Apr '59 (MIRA 12:7)

1. Biochemical Institute, Academy of Sciences of the U.S.S.R.,  
and Faculty of Biology and Soil Sciences of the State University,  
Moscow.

(PENICILLIUM) (PHOSPHORUS METABOLISM)

SPIRIN, A.S.; GAVRILOVA, L.P.; BELOZERSKIY, A.N.

Nature and methods of quantitative estimation of the "hyper-chromic effect" of nucleic acids. Biokhimiia 24 no.4:600-611  
Jl-Ag '59. (MIRA 12:11)

1. Institut biokhimii im. A.N.Bakha Akademii nayk SSSR i  
biologo-pochvennyy fakul'tet Gosudarstvennogo universiteta  
im. M.V.Lomonosova, Moskva.  
(NUCLEIC ACIDS chem.)

ZAYTSEVA, G.N.; BELOZHERSKIY, A.N.; NOVOZHILOVA, L.P.

Phosphorus compounds of *Azotobacter vinelandii* during the development of the culture. *Biokhimiya* 24 no.6:1054-1065 N-D '59.

(MIRA 13:5)

1. The Faculty of Biological and Soil Sciences, the State University, Moscow.

(PHOSPHATES metab.)  
(AZOTOBACTER metab.)

ZAYTSEVA, G.N.; BKLOZERSKIY, A.N.; AFANAS'YEVA, T.P.

Chemistry of Azotobacter. Part 7: Studies on polysaccharides in three Azotobacter species and their relation to culture medium composition and nitrogen source [with summary in English]. Mikrobiologiya 28 no.1: 58-63 Ja-F '59. (MIRA 12:3)

1. Biologo-pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta imeni M.V. Lomonosova.

(AZOTOBACTER, metabolism,  
polysaccharides, eff. of nitrogen source & medium  
content in various species (Rus))

(POLYSACCHARIDES, metab.  
Azotobacter, eff. of nitrogen source & medium content  
in various species (Rus))

IMSHENETSKIY, A.A.; PEROVA, K.Z.; ZAYTSEVA, T.A.; BELOZERSKIY, A.N.

Transmission of streptomycin resistance in staphylococci by means of desoxyribonucleic acid. Mikrobiologiya 28 no.2: 187-190 Mr-Apr '59. (MIRA 12:5)

1. Institut mikrobiologii i Institut biokhimii AN SSSR.  
(STREPTOMYCIN, eff.  
on Micrococcus pyogenes, transfer of resist.  
with desoxyribonucleic acid (Rus))  
(MICROCOCCUS PYOGENES, eff. of drugs on,  
streptomycin, transfer of resist. with  
desoxycibonucleic acid (Rus))  
(DESOXYRIBONUCLEIC ACID,  
on Micrococcus pyogenes, transfer of streptomycin-  
resist. (Rus))

ZAYTSEVA, G.N.; BELOZERSKIY, A.N.; BYKHOVSKIY, V.Ya.

Chemistry of Azotobacter. Report No.8: study of free amino acids and mononucleotides in Az. agile 22-D and their relation to the age of the culture and sources of nitrogen nutrition. Mikrobiologiya 28 no.5:675-682 S-0 '59. (MIRA 13:2)

1. Biologo-pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta im. M.V. Lomonosova.  
(AZOTOBACTER chem.)  
(AMINO ACIDS chem.)  
(NUCLEOSIDES AND NUCLEOTIDES chem.)



17(3)

SOV/20-124-4-59/67

AUTHORS:

Gavrilova, L. P., Spirin, A. S., Belozerskiy, A. N., Corresponding Member AS USSR

TITLE:

Spectrophotometric Study of the Effects of pH and Ion Strength on the Stability of High Polymer Ribonucleic Acid in Solution  
(Spektrofotometricheskoye izucheniye vliyaniya pH i ionnoy sily na stabil'nost' vysokopolimernoy ribonukleinovoy kisloty v rastvore)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 4, pp 933-936 (USSR)

ABSTRACT:

Ribonucleic Acid (RNA) in vitro is extremely unstable. Even its simple preparative production from cell organisms results in a higher or lesser degree of degradation (Ref 1). Nor do any of the subsequently suggested production methods (Refs 2-7) furnish any evidence for the fact that the spontaneous losses in infective power occurring in this process (in this particular case the infective power of RNA from the tobacco mosaic virus - TMV) or a direct degradation of the polynucleotide are conditioned by the chemical instability of the polymer concerned, subject to certain conditions. On the one hand ribonuclease traces may occur in RNA preparations and cause the fermentative degradation of RNA in the course of incubation. On the other hand it is not known whether the spontaneous loss in infective power of virus RNA is caused by the one or the

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Spectrophotometric Study of the Effects of pH and Ion Strength on the Stability of Higher Polymer Ribonucleic Acid in Solution

other type of degradation or whether it is governed by entirely different mechanisms. In order to find out whether a progressive spontaneous degradation of polynucleotides takes place in the solutions of high molecular RNA, the authors employed spectrophotometric criteria. After all, the decomposition of the nucleic acids is accompanied by an intensification of their ultraviolet absorption (the "hyperchromic effect", Ref 8). In the case of the instability of the inter-nucleotide bonds of the polynucleotide, the ultraviolet absorption must increase progressively. High molecular RNA and TMV were used as materials. They were obtained by means of several re-precipitations of the leaf juice of mosaic-diseased tomato plants with ammonium sulfate, and by means of threefold preparative ultra-centrifuging. This procedure ensured the high purity of the TMV preparations, including, it seems, also that of ribonuclease admixtures. The RNA obtained therefrom possessed biological activity and infective power (about 1% of a virus quantity of equal weight), immediately after production. It did not contain any virus particles. It thus constituted a native RNA preparation. For experiments with long incubation periods, buffer solutions with ion strengths ( $\mu$ ) of 0.01 to about 1 and different

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## Spectrophotometric Study of the Effects of pH and Ion Strength on the Stability of Higher Polymer Ribonucleic Acid in Solution

pH were used. The RNA content of the solution was about 20-25 $\mu$ g/ml. Incubation takes place in a thermostat at 37° (with chloroform as an antiseptic). Table 1 shows the results: (1) The higher the ion strength of the buffer, the lower is the absorption of the RNA solution. This phenomenon was fully reversible and was by no means linked to the decomposition or denaturation of RNA. Infective power and high molecular weight remained unchanged. (2) Between pH 5.4 and 7.4 no absorption changes take place after 20 days of incubation, this phenomenon being independent of the ion strength of the solvent. Thus the ribopolynucleotide is stable over this pH range. The loss in infective power is not accompanied by any noticeable changes in ultraviolet absorption. (3) On an incubation between pH 5.0 and 8.5 a certain tendency towards an absorption increase emerges. This RNA instability is marked only in solutions of high ion strength ( $\mu$ -1). With pH 9.0, and even more so with pH 9.5, RNA is progressively decomposed at any ion strength. It can be concluded from the experiments that the spontaneous loss in infective power, on the 2nd-4th days of incubation, does not in any way affect the absorption value of RNA. Probably this process is not a consequence of the instability of the inter-nucleotide bonds.—There are 1 table and 11 references.

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Spectrophotometric Study of the Effects of pH and Ion Strength on the Stability of Higher Polymer Ribonucleic Acid in Solution

ASSOCIATION: Institut biokhimii im. A. N. Bakha Akademii nauk SSSR  
(Institute of Biochemistry imeni A. N. Bakh of the Academy of Sciences, USSR) Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosov (Moscow State University imeni M.V. Lomonosov)

SUBMITTED: October 25, 1958

Card 4/4

17(3)

AUTHORS:

Bukhovich, Ye., Belozerskiy, A. N.,  
Corresponding Member, AS USSR

SOV/20-124-5-53/62

TITLE:

Some Data on the Mechanism of Synthesis and on the Utilization of Polyphosphates in Yeast Funguses (Nekotoryye dannyye o mekhanizme sinteza i ispol'zovaniya polifosfatov v drozhzhakh)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 5, pp 1147-1149 (USSR)

ABSTRACT:

The synthesis of acid-soluble as well as acid-insoluble polyphosphates forms a uniform process in some microorganisms (Refs 1-5). In the course of this synthesis first insoluble polyphosphates are produced from orthophosphate, and from them acid-soluble polyphosphates form. Intermediate members of the synthesis of acid-insoluble polyphosphates are some acid-proof phosphorus compounds of the acid-soluble fraction (Refs 3,4). The synthesis of these compounds is possible in the presence of 2,4-dinitrophenol (DNPh) if the synthesis of polyphosphates themselves as well as other phosphorus compounds of yeast is completely inhibited. For the purpose of intensifying these investigations the authors tried to investigate the mechanism of the transition of stable

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Some Data on the Mechanism of Synthesis and on  
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acid-soluble phosphorus forms into polyphosphates. For this purpose a high amount of  $P^{32}$  was introduced into the fraction of stable acid-soluble phosphorus of the yeast fungus in the presence of DNPh. DNPh was then washed out and the course of the following distribution of  $P^{32}$  between the individual fractions of the phosphorus compounds was observed. First, the factory-made yeast was subjected to a long-term reduction of phosphorus (Ref 3). It was then used as starting material for the enrichment with phosphorus at a temporary presence of DNPh and  $P^{32}$  in the nutrient medium. For this purpose the yeast was transferred to a nutrient medium containing orthophosphate, mineral salts, saccharose, vitamins (Refs 6,7), and  $4 \cdot 10^{-4}$  M DNPh. After 15 minutes 0.5 mCi/liter of  $P^{32}$  were added. One hour later the yeast was centrifuged and put into a nonradioactive medium with DNPh where it remained for 1 hour and 15 minutes. In this way, the yeast was enriched with phosphorus in the presence of DNPh for 2.5 hours totally. Thus, a material was obtained containing  $P^{32}$  mainly in the fractions of the stable acid-soluble phosphorus.

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The results of determination of the individual phosphorus forms (according to Ref 3) including those of the unstable phosphorus of the adenosin-triphosphoric acid (ATPh) are shown in table 1. These results showed again that in the presence of DNPh  $P^{32}$  can be absorbed by the orthophosphate fraction and the fraction of stable acid-soluble phosphorus although  $P^{32}$  absorption is completely inhibited in all other fractions of the phosphorus compounds of yeast. The activity of stable acid-soluble phosphorus decreases to zero immediately after the removal of DNPh. Simultaneously the specific activity of unstable acid-soluble phosphorus increases jump-like. The orthophosphate and the unstable ATPh phosphorus of the original yeast and of that enriched with phosphorus showed a relatively weak specific activity. After the transference of the yeast into a medium without phosphorus the specific activity of the ATPh immediately increased to the degree of activity of polyphosphates. This fact may indicate a direct transference of the polyphosphate phosphorus in the living cell into the adenylic system and that it can be used for various following synthetic reactions.

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Some Data on the Mechanism of Synthesis and on  
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Besides, the possible direct participation of polyphosphates in some synthetic processes apparently cannot be denied. An assumed scheme of the polyphosphate metabolism is given in conclusion. There are 1 table and 15 references, 7 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: October 31, 1958

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7(3)

AUTHORS:

Spirin, A. S., Gavrilova, L. P., SOV/20-125-3-55/63  
Belozerskiy, A. N., Corresponding Member, AS USSR

TITLE:

On the Problem of the Macromolecular Structure of Native  
High-polymeric Ribonucleic Acid in Solution (K voprosu o  
makromolekulyarnoy strukture nativnoy vysokopolimernoy  
ribonukleinovoy kisloty v rastvore)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 3, pp 658-661  
(USSR)

ABSTRACT:

There are but very few data in publications concerning the  
problem mentioned in the title, despite considerable achieve-  
ments in the study of desoxy ribonucleic acid (DNA). This is  
explained by the exceptional difficulty confronting the  
production of the acid mentioned in the title (RNA). At an  
earlier time, the authors reproduced (Ref 3) the experiments  
made by other scientists (Refs 1, 2) and in the present paper  
they describe the further progress made in the field under  
discussion (Refs 4-11). Figure 1 illustrates data on the  
comparative spectrophotometric titration of the native  
(infectious) RNA and of a denaturated DNA of the tobacco

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On the Problem of the Macromolecular Structure of  
Native High-polymeric Ribonucleic Acid in Solution

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mosaic virus. The intensification value of the absorption of ultraviolet rays by nucleic acids serves as a direct measure of the number of burst hydrogen bonds (Refs 7, 9, 10). It may be seen from figure 1 that in the case of the native DNA no important variations of the said values occur in the entire pH range from 7 to 3. Only at  $\text{pH} < 3$  an unusually rapid jump of the absorption value of the native DNA takes place. This is explained by the fact that the macromolecule of the native DNA is built according to the type of the 2 rigidly and orderly coupled chains. These chains are kept together by means of specific hydrogen bonds, in which all  $\text{NH}_2$  groups of adenine and cytosine residues in position 6 of the ring (Ref 12) participate. Only the guanine- $\text{NH}_2$ -group in position 2 can remain more or less free. It has the least  $\text{pK}_a$  value (= 2.75) (Refs 9, 10). From the results obtained it follows that the spectrophotometric behavior of the native RNA does not show any similarity with that of the native DNA. On the contrary, the behavior of the former is in every way similar to that of denaturated DNA. This is indicative of the fact that there is no orderly and specific secondary structure (structure of

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hydrogen bonds) in the native RNA. Spectrophotometric data lead to the conclusion that the macromolecule of native RNA is not built according to the type of a rigid 2-chain structure of native DNA, but is most likely to be a simple polynucleotide chain, which conglomerates to an irregular ball in the solution. Such a ball is subject to all rules of the flexible polyelectrolyte and is changed under the action of various circumstances without losing its infection power. There are 2 figures, 1 table, and 15 references, 2 of which are Soviet.

ASSOCIATION: Institut biokhimii im. A. N. Bakha Akademii nauk SSSR (Institute of Biochemistry imeni A. N. Bakh of the Academy of Sciences, USSR) Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: January 9, 1959

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17 (3)

AUTHORS:

Uryson, S. O., Belozerskiy, A. N.,  
Corresponding Member, AS USSR

SOV/20-125-5-52/51

TITLE:

The Nucleotide Composition of the Desoxyribonucleic and Ribonucleic Acids of Some Higher Plants (Nukleotidnyy sostav dezoksiribonukleinovykh i ribonukleinovykh kislot nekotorykh vysshikh rasteniy)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 5,  
pp 1144-1147 (USSR)

ABSTRACT:

The problems mentioned in the title are thoroughly investigated with respect to the specificity of the nucleic acids only what regards bacteria and animals. From the data given in publications concerning higher plants (Refs 1-3) no conclusions can be drawn to the specificity of the composition of the two acids mentioned in the title (DNA and RNA). The present paper deals with the investigation of the total nucleotide composition of plant species which belong to systematic groups which are too remote from one another. Furthermore was interesting whether 5-methyl cytosine is by all means bound to form an ingredient of the DNA of various plant species (Refs 1, 3). Seeds of 7 plant species of 6

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different families, 3 classes, and 2 types served for the investigation. The embryos of the following objects: Pinus cembra, Triticum sp. and the germs of 2 other objects (beans - Phaseolus peanut - Arachis hypogaea) were taken. 3 species were used as entire seeds: poppy (Papaver), pumpkin (Cucurbita pepo), and onion (Allium cepa). The initial material pulverized to fine flour was decreased by an alcohol-ether mixture (3:1) and then by dry ether, finally dried in the vacuum desiccator. The determination method of the compounds mentioned in the title was used with the method of reference 4 as base with additions and modifications especially concerning chromatographic separation (rechromatography). This was necessary since the hydrolysates were contaminated by various admixtures. 2 different mixtures of solvents were used: 1) An acid mixture (68 % isopropyl alcohol in 2N HCl (Ref 3)). Thus 5 nitrogen bases could be separated; 2) a weakly alkaline mixture (50 parts n-butanol and 10 parts 0.1N NH<sub>4</sub>OH) (Ref 1) which could separate 4 bases. On the one hand the results could be precisely defined by the use of 2 mixtures,

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on the other hand 5-methyl cytosine could be reliably identified and determined. Paper sections which contained cytosine and methyl-cytosine were cut out from complete chromatograms produced with the first mixture and the latter transferred by means of water to a clean sheet of paper to a point and chromatographed anew in the second mixture (Ref 5). Table 1 shows the determination results of the total composition of the DNA of 7 plant species. Striking is in the first place the similarity of the total composition of the DNA of all investigated plants. The value of the specificity coefficient  $\frac{G+Ts+MTs}{A+T}$  lies between 0.580 and 0.955. The DNA of all investigated types belonged to the AT-type, the DNA of all samples contained 5-methyl cytosine (G = guanine, Ts = cytosine, MTs = methyl cytosine, A = adenine, T = thymine). The nucleotide composition of the RNA was determined by means of the method of the horizontal electrophoresis (Ref 7). Table 2 gives the quantitative composition of the nucleotides of the RNA. It belongs on the strength of these data to the GTs-type and is in the case of almost all plant species equal. The RNA

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of the higher plants is rather similar to that of the bacteria (Ref 8). If it has a specificity, it is due to the sequence of the alternation of the nucleotides in the chain of the RNA molecule. The reason of the low variability of the DNA in higher plants, compared with bacteria, has hitherto not been found. Their specificity is in the case of higher organisms apparently due as well to the structure of the nucleotide chain in the molecule. There are 2 tables and 8 references, 4 of which are Soviet.

ASSOCIATION: Institut biokhimii im. A. N. Bakha Akademii nauk SSSR  
(Institute of Biochemistry imeni A. N. Bakh of the Academy of Sciences, USSR)

SUBMITTED: January 21, 1959

Card 4/4

17(3)

SOV/20-126-5-59/69

AUTHORS:

Gavrilova, L. P., Spirin, A. S., Belozerskiy, A. N., Corresponding Member, AS USSR

TITLE:

The Effect of Temperature on the State of Macromolecules of Viral Ribonucleic Acid in Solution (Deystviye temperatury na sostoyaniye makromolekul virusnoy ribonukleinovoy kisloty v rastvore)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 5, pp 1121-1124 (USSR)

ABSTRACT:

The authors have not succeeded in a former paper (Ref 1) to prove any clear correlation of the process of the spontaneous loss of the infectious power with the alteration of the physicochemical indices: the ultraviolet absorption, the viscosity and the sedimentation. But further studies could show new characteristics in the behavior of the macromolecules of the infectious ribonucleic acid (RNA). In this article data about the viscosity and sedimentation are given. The production of the infectious (RNA) and the control of its infectious power was carried out as in reference 1. In figure 1 the character of the temperature dependence of this RNA in phos-

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phate buffer can be seen. As curve 1 shows, no essential alteration of the viscosity takes place at a temperature increasing between 20 and 50°. At further heating a rapid increase of viscosity results, the maximum being at 60-70°. Therefore in this fixed and rather narrow temperature range a transformation of the RNA-molecules ensues from one state into another. Thereat the molecules are not inactivated at once (that is they don't lose their infectious power). This transformation is reversible. Out of curve 2 it can be seen that RNA preparations which have lost their infectious power show none of the above mentioned temperature effects. It has proved that the amount of the viscosity increasing on heating is proportional to the infectious activity of the RNA-preparations. Out of figure 2 it can be seen that the temperature effect is even greater in 6 m urea buffered with phosphate and that it takes place at a deeper temperature (40-50°). At 50° the viscosity is quadrupled and remains now as before reversible. It remains also a function of the infectious activity (Fig 2: 2-4). At a complete loss of the infectiousity also the tem-

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perature effect is missing (Fig 2: 5). To find out the reasons of this phenomenon sedimentation experiments at different temperatures were made. Out of table 1 follows that the tripling of the specific viscosity is accompanied by a decrease of the sedimentation constant to  $1/3$ . This makes it credible that the temperature effect is combined with a rapid increasing of the particle asymmetry of the RNA. Apparently the RNA-polynucleotide-chain is levelled existing at deep temperatures as skein of this or that shape (Refs 3-5). The decrease in the temperature of the said effect by urea lets suppose a considerable importance of the separation process of the hydrogen bonds on reaching the above effect. On comparing the infectious and noninfectious RNA-part a much smaller viscosity can be noticed at the latter than at the first but the sedimentation constants are near together in both cases. It is also imaginable that the infectious RNA-molecules exist at  $50^{\circ}$  in urea as more or less levelled unbroken 1-chains whilst the no more infectious RNA are represented by much shorter chains. But since (Ref 1) no clear difference can be noticed between the particle size

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The Effect of Temperature on the State of Macromolecules of Viral Ribonucleic Acid in Solution

of both RNA-forms the authors suppose that the unbroken 1-chain structure of the native RNA is changed into a broken one in the course of the loss of the infectious power (incubation at room temperature or at 37°). Out of all this it may be seen, that the amount of the temperature effect is a clear physicochemical criterion of the infectious power of the viral-RNA-preparations. There are 3 figures, 1 table, and 8 references, 7 of which are Soviet.

ASSOCIATION: Institut biokhimii im. A. N. Bakha Akademii nauk SSSR (Institute of Biochemistry imeni A. N. Bakh of the Academy of Sciences, USSR) Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: April 3, 1959

Card 4/4

17(3)

AUTHORS:

Vanyushin, B. F., Belozerskiy, A. N., Corresponding Member  
AS USSR

SOV/20-127-2-63/70

TITLE:

A Comparative Investigation of the Composition of Ribonucleic  
Acids in Higher Plants

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 2,  
pp 455 - 458 (USSR)

ABSTRACT:

The composition mentioned in the title has hitherto been investigated only in several species (Refs 1-8). Conclusions cannot be drawn from these data to the composition of this acid (RNA) or to its variability limits in plants of different systematic groups. In the present paper the nucleotide composition of 28 plant species (representatives of 5 types, 6 classes, 23 orders, and 25 families; Ref 9) was investigated. Seeds, pollens, and thallom material served for this purpose (supplied by M. A. Mazurenko, F. D. Kostik, and M. S. Chichagova). The ribomononucleotides were separated by a) electrophoresis, and b) chromatographically a) The deliquescence of greater quantities of liquid (100 -400  $\mu$ l) was prevented by two graphite-pencil-

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stripes. The position (sequence) of the nucleotides from the cathode to the anode was the following: cytidylic-, adenylic-, guanylic-, and uridylic acid. The mobility of these nucleotides was similar to that of the publications (Ref 11). Considerable quantities of pigmented substances disturb in the hydrolysates of the RNA of many substances so that the determination of the nucleotides was only possible by electrophoresis on paper. Table 1 shows the results. They show that certain differences in the RNA composition may be reliably detected only between the representatives of plants classes which are most remote from one another. This points to a relatively low specificity of this composition in the higher plants. The investigated plants differ not only with respect to their systematic position and origin, but also to their ecology; there are arboreal-, shrublike-, herbaceous-, annual-, and perennial plants, culture plants with a specialized metabolism (fruit- and oil plants, cereals, gutta producers) as well as uncultivated plants, relic species as well as the representatives of the recent families. In spite of these differences their total RNA composition is strikingly similar. This shows that the RNA composition depends

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only little on the essential conditions for life of the plant organisms and changes only inconsiderably also in the course of their evolution. What is even more striking - the RNA composition is unusually similar to that of microorganisms and animals. Thus it is similar for all organisms. Therefore the nucleotide sequence in the RNA molecule chain must be investigated since the RNA specificity is apparently bound to be due mainly to this structural factor. There are 1 table and 13 references, 5 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: April 30, 1959

Card 3/3

ZAITSEVA, G.N.; BELOZERSKIY, A.N.; NOVOZHILOVA, L.P.

Studying phosphorus compounds in developing *Azotobacter vinelandii*  
by the use of D32. *Biokhimiia* 25 no.2:198-210 Mr-Apr '60.

(MIRA 14:5)

1. Biologo-pochvennyy fakul'tet Gosudarstvennogo universiteta im.  
M.V. Lomonosova, Moskva.

(AZOTOBACTER)

(PHOSPHORUS METABOLISM)

KULAYEV, I.S.; KRITSKIY, M.S.; BELOZERSKIY, A.N.

Metabolism of polyphosphates and some other phosphorus compounds during the development of fruit bodies in the mushroom *Agaricus bisporus* L. *Biokhimiia* 25 no.4:735-748 JI-Ag '60. (MIRA 13:11)

I. Institute of Biochemistry, Academy of Sciences of the U.S.S.R., and Faculty of Biology and Soil Sciences, the State University, Moscow.

(MUSHROOMS)

(PHOSPHORUS METABOLISM)



ZAYTSEVA, G.N.; BELOZERSKIY, A.N.; NOVOZHILOVA, L.P.

Effect of calcium ions on nitrogen and phosphorus metabolism in  
Azotobacter vinelandii. Mikrobiologiya 29 no.3:343-350 My-Je '60.  
(MIRA 13:7)

1. Biologo-pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta  
im. M.V. Lomonosova.

(AZOBACTER)

(NITROGEN METABOLISM)

(CALCIUM—PHYSIOLOGICAL EFFECT)

(PHOSPHORUS METABOLISM)

ZAITSEVA, G.N.; BELOZERSKIY, A.H.

Formation and consumption of polyphosphates due to the action of  
an enzyme isolated, from *Azotobacter vinelandii*. Dokl. AN SSSR 132  
no.4:950-953 Je 60. (MIRA 13:5)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
2. Chlen-korrespondent AN SSSR (for Belozerskiy)  
(AZOTOBACTER)  
(PHOSPHATES)  
(CHEMISTRY, ORGANIC--SYNTHESIS)

VANYUSHIN, B.F.; BELOZERSKIY, A.N.; BOGDANOVA, S.L.

Comparative study of the nucleotide composition of ribonucleic  
and desoxyribonucleic acids in some fungi and myxomycetes. Dokl.  
AN SSSR 134 no.5:1222-1225 0 '60. (MIRA 13:9)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
2. Chlen-korrespondent AN SSSR (for Belozerskiy).  
(FUNGI) (NUCLEOTIDES) (MYXOMYCETES)

VANYUSHIN, B.F., ~~BELOZERSKIY, A.N.~~  
BELOZERSKIY, A.N.

Nucleotide composition of ribonucleic and deoxyribonucleic acids in  
some autotrophic bacteria. Dokl. AN SSSR 135 no.1:197-199 N '60.  
(MIRA 13:11)

1. Moskovskiy gosudarstvennyy universitet im.M.V.Lomonosova.
2. Chlen-korrespondent AN SSSR (for Belozerskiy).  
(BACTERIA, AUTOTROPHIC) (NUCLEOTIDES)