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USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS  
BIOMEDICAL AND BEHAVIORAL SCIENCES  
No. 79

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13 October 1977

# USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

## BIOMEDICAL AND BEHAVIORAL SCIENCES

No. 79

This serial publication contains abstracts of articles and news items from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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I. BIOMEDICAL SCIENCES  
Agrotechnology

USSR

THE GOAL--A HIGH YIELD

Moscow ZEMLEDELIYE in Russian No 6, Jun 77 pp 8-9

LEVITSA, YA.

[Abstract] The All-Union Genetic-Breeding Institute, located on the Odessa frontier, is working on development of new varieties of grain crops (mainly winter corn crops and corn for the European USSR) and improvement of grain quality and technological properties. The institute now has the largest phytotron in Europe--a modern 2000 m<sup>2</sup> automated station with a 6-story laboratory complex, greenhouses, and a climatic and freezing chamber which permits year-round work with plants under any desired conditions. In the Ninth Five-Year Plan, research at the institute provided an economic effect of 588.8 million rubles. It has been the scene of development of 35 varieties of farm crops on 9 million hectares. Figures 5.

USSR

INCREASING THE EFFICIENCY OF USE OF TECHNOLOGY

Moscow ZEMLEDELIYE in Russian No 6, Jun 77 pp 10-11

MAKSIMOVA, L. A., candidate of economic sciences VNIISKhT All-Union Scientific Research Institute of Agricultural Technology

[Abstract] Factors to be considered in increasing the use of technology were calculated with a tractor brigade working in the Southern Forest Steppe Zone of Novosibirsk Oblast as an example. It was recommended that the efficiency of the use of technology and of the tractor pool be increased by improvement of the composition of them on each individual farm and by improvement of organization of shifts for using the equipment, especially in periods when intensive field work is in progress. Factors involved in increasing productivity were calculated and presented in 4 tables: duration of use of equipment in 1 day (hours); number of tractors required to perform the work of the brigade; balance values of machines (in rubles) and seasonal variations in the use of tractors and combines in field work (hours). Tables 4.

USSR

THE NEED FOR GOOD HANDBOOKS

Moscow ZEMLEDELIYE in Russian No 6, Jun 77 p 39

MIKHAYLOV, N. N., candidate of agricultural sciences, TsINAO

[Abstract] The "Handbook on Mineral Fertilizers" compiled by B. I. Dukarevich, published by "Moscow Worker" in 1976, was reviewed and criticized. Deficiencies include omissions and errors in the section on the characteristics of mineral fertilizers and the absence of up-to-date data on the basic chemical, physical, and agrochemical properties of mineral fertilizers. The section on proper doses of mineral fertilizers for different types of crops contains useful data but also some obsolete material. Soil charts and agrochemical cartograms are inadequate for some regions and the material is not grouped for all regions of the non-chernozem zone. The handbook contains descriptions of some machines no longer in production but omits materials on some new equipment and some new forms of organization of the work of the agrochemical service are not included.

USSR

UDC 631.51:633.18 (470.62)

RICE CULTIVATION ON COMPACTED SOIL

Moscow ZEMLEDELIYE in Russian No 6, Jun 77 pp 74-78

KANDAUROV, N. S., Candidate of Agricultural Sciences, PATRIN, P. N., and SHABEL'NIKOV, YU. G., Kuban Agricultural Institute

[Abstract] New cultivation technology is based on production of rice sprouts with natural soil moisture without flooding but with pouring on of water after appearance of 2 or 3 leaves. It employs a change in the combination of machines and tools used (including a plow which embeds plant residues in the upper soil layers). The new technique has several advantages. It provides increase of rice without watering. It improves the heat regime of the soil and it permits narrow-row (inter-rows 7.5 cm) sowing, reduces preplanting working of the soil. There is less lodging, and row harvesting can be employed. Figures 3; tables 4.

USSR

UDC 636.4.085.13

PROVIDING SWINE WITH THEIR REQUIREMENTS OF AMINO ACIDS CONTAINING SULFUR DURING  
USE OF YEASTS IN RATIONS

Moscow ZHIVOTNOVODSTVO in Russian No 4, Apr 77 pp 55-56

YAROV, I. I., professor, and LEZHNIINA, L. R., graduate student, Moscow Technological Institute of the Meat and Dairy Industry (MTIMP)

[Abstract] A scientific experiment was conducted on swine of three generations to study the feasibility of using yeasts as a natural protein-rich feed and with the addition of methionine in the rations of pregnant and suckling swine and the young obtained from them. It was established that rations of barley, corn and yeasts contain adequate amounts of cysteine and methionine, and therefore the addition of dl-methionine to such rations is unnecessary.

USSR

UDC 636.4.086.1

USE OF GRAIN FODDER MIXTURES TO FATTEN YOUNG BULLS

Moscow ZHIVOTNOVODSTVO in Russian No 4, Apr 77 pp 53-54

BOYKO, I. I., candidate of biological sciences, YEPIFANOV, G. F., candidate of agricultural sciences, All-Union Scientific Research Institute of Livestock Breeding, STEPANOV, N. I., candidate of agricultural sciences, director of "Mikheykovskiy" Sovkhoz, Yartsevskiy Rayon, Smolenskaya Oblast, KUT'IN, V. P., chief agronom, and AFANAS'YEVA, YE. S., technological engineer

[Abstract] Investigations were conducted to determine the optimal harvest times of fodder grain crops and verify the effectiveness of use of the entire mass of grains in fattening young bulls. The harvest of fodder units per hectare sown was 10.3% higher and of digestible protein 24.39% higher than in the period of complete ripeness. When granules of grain crops were used as the ration a high daily increase (1019 g) of fattened young bulls was obtained at low fodder expenditures per kg of growth (7.3 fodder units).

USSR

UDC 636.22/.28.084.412+632.2/.4

OPTIMIZATION OF RATIONS AND FODDER PRODUCTION IN MILK CATTLE HUSBANDRY

Moscow ZHIVOTNOVODSTVO in Russian No 4, Apr 77 pp 52-53

BOBROV, V. I., KONDRATENYA, M. A., and MIKHEDOV, N. T., candidates of agricultural sciences, and KHOMYAKOVA, YE. I., programmer mathematician, Belorussian Scientific Research Institute of Animal Husbandry

[Abstract] Optimization of the ration can bring great savings in milk cattle husbandry, reducing milk cost by 10% or more and enabling the maintenance of more cows and resulting greater production. By applying a computer program developed to calculate the optimal ration to the available fodder resources it was found that a given sovkhos could, through its own fodder production, maintain 543 cows producing 3700 kg of milk each as against the actual 520 producing 3213 kg. Table 1.

USSR

USE OF ENZYME PREPARATIONS IN FEEDING CARP

Moscow RYBOVODSTVO I RYBOLOVSTVO in Russian No 3, May/Jun 77 pp 14-15

AUKUSTINAVICHYUS, V., MARMA, B., and SHIRVIS, R., Central Scientific Research Laboratory, Vil'nyus Experimental Industrial Enzyme Preparations Plant

[Abstract] Tests were conducted with protosubtilin GZ with an activity of 80 units/g on yearling carp. In 1973-1974, beginning in May, mixed fodder containing 2 kg of the enzyme per ton was fed to the carp and test catches of 100 fishes were made every 15 days from June to September. Data for the two years of experiments showed that carp which had received the enzyme additive were 18% larger in weight and 12% longer. They had 27.8% more amino groups and a higher concentration of free acids both in the intestinal chyme and the blood serum.

USSR

UDC 619 614.641.3

# FIRE PREVENTION IN ANIMAL HUSBANDRY BARN

Moscow ZHIVOTNOVODSTVO in Russian No 2, 1977 pp 92-94

ROGOZIN, K. A., candidate of technical sciences, Sverdlovsk Agricultural Institute

[Abstract] Various arrangements and equipment required to assure the fire safety of farm buildings used for animals are discussed. The degree of fire-resistance of separate structures can be increased by a protective layer of concrete, brick, plaster, etc. Special care must be taken that dryers and furnaces are properly lined. Emergency exits, ladders and handrails must be adequate and unobstructed. It is recommended that electric motors, transformers and instruments not be installed without insulation and protection. Combustible materials must be stored separately.

USSR

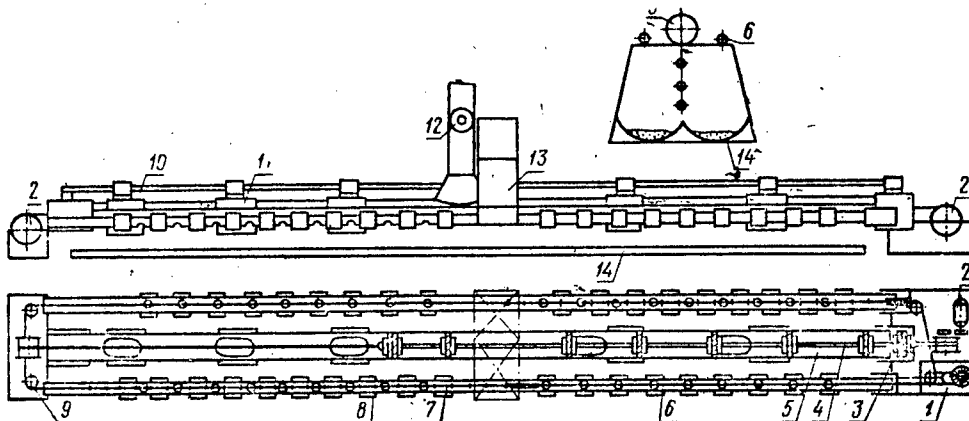
UDC 636.4.004.74

# COMBINED FODDER DISTRIBUTOR AT A SWINE-FATTENING FARM

Moscow ZHIVOTNOVODSTVO in Russian No 2, Feb 77 pp 76-77

YANKOVSKIY, A. V., chief engineer, Sovkhoz imeni 50th Anniversary of the USSR, Kalininskaya Oblast, and RYZHENKOV, V. N., candidate of technical sciences, All-Union Scientific Research Institute for Electrification of Agriculture (VIESKh)

[Abstract] A new feed distributor delivering both liquid and dry feed of any consistency has been designed for the fattening of swine (see figure). With the distributor, utilization of the fodder increased added weight of swine by 10-21% and reduced the cost per quintal of added weight by 5%.



Schematic diagram of a combined liquid and dry feed distributor:  
 1 - dry feed distributor motor unit; 2 - liquid feed distributor motor unit; 3 - liquid feed detachable cup; 4 - disk transporter; 5 - liquid feed distributor drive; 6 - dry feed distributor drive; 7 - disk transporter of dry feed distributor; 8 - shield; 9 - dry feed distributor turning unit; 10 - liquid feed distributor drive connecting rod; 11 - liquid feed distributor shield carriage; 12 - valve; 13 - dry feed bunker; 14 - hopper.

USSR

# STANDARDS FOR A NEW FODDER FORMULA FOR CARP FARMS

Moscow RYBOVODSTVO I RYBOLOVSTVO in Russian No 3, May/Jun 77 pp 11-12

OSTROUMOVA, I., State Research Institute of Lake and River Fisheries (GosNIORKh)

[Abstract] A high-protein granulated fodder for raising carp in warm waters (Formula No 1-75) has been developed in the Laboratory of Physiology of Fishes of GosNIORKh, tested and recommended to industry. It has the following contents (%): Fish meal 18, meat-bone meal 8, sunflower-seed meal 12, soya meal 7, nutrient yeast 20, oats 8, barley 10, wheat 10, sunflower phosphatides 3, inorganic phosphate 1, chalk 1 and molasses 2. Standard rations of Formula 1-75 are tabulated for fish weighing 50-800 g in waters with temperatures of 22-25° and 26-30°.

## Consumption of Feed Material for Growth of Carp Which Receive Various Amounts of No 1-75 Granulated Fodder

| Index                                                    | Daily portion of fodder, in % of fish weight |   |   |    |         |
|----------------------------------------------------------|----------------------------------------------|---|---|----|---------|
|                                                          | 2                                            | 5 | 7 | 10 | 12 - 15 |
| Final weight of fish, g                                  |                                              |   |   |    |         |
| Fodder coefficient                                       |                                              |   |   |    |         |
| Production per sq. M, kg                                 |                                              |   |   |    |         |
| Cost of fodder for 1 kg growth of fish, in rubels        |                                              |   |   |    |         |
| Consumption of energy for 1 kg growth, kcal*             |                                              |   |   |    |         |
| Outlay of protein per 1 kg of growth, g                  |                                              |   |   |    |         |
| Utilization of fodder protein for growth, %              |                                              |   |   |    |         |
| * 1 kg of granules of No 1-75 formula contains 2980 kcal |                                              |   |   |    |         |

USSR

PROBLEMS OF FODDER AND FEEDING AND WAYS TO SOLVE THEM

Moscow RYBOVODSTVO I RYBOLOVSTVO in Russian No 3, May/Jun 77 pp 1-2

[Abstract] The plan for the Tenth Five-Year period envisages an increase of 70% in farm fish production while the ponds available will increase only 20%. The difference must be made up by intensification of fish farming, in which the supplying of mixed fodders is of great importance. During the Ninth Five-Year period the needs of fish farming for mixed fodders were satisfied in a volume of 82% on the average (table). In many cases the fodders received did not have the approved formula contents and granules were degraded very rapidly during transportation and storage. Fodder also was not used effectively at many farms.

Delivery and use of mixed fodders in Soviet fish farming in 1971-1975

| Years | Calculated requirement, 1000 tons | Stocks obtained, 1000 tons |              |                 | Actual fodder coefficients |      |
|-------|-----------------------------------|----------------------------|--------------|-----------------|----------------------------|------|
|       |                                   | total                      | fish formula | granulated form | total                      | carp |
| 1971  | 404                               | 263                        | 212          | 144             | 3.1                        | 4.9  |
| 1972  | 405                               | 347                        | 270          | 197             | 2.8                        | 4.5  |
| 1973  | 445                               | 407                        | 313          | 220             | 2.9                        | 4.7  |
| 1974  | 565                               | 422                        | 360          | 240             | 3.6                        | 5.4  |
| 1975  | 675                               | 596                        | 446          | 350             | 3.4                        | 5.2  |

USSR

UDC 577.15.023

ENZYMATIC SYNTHESIS OF ANTIBIOTICS. INVESTIGATION OF THE REACTION OF CEPHALOTINE HYDROLYSIS-SYNTHESIS CATALYZED BY PENICILLINAMIDASE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 235 No 4, Aug 77 signed to press 26 Apr 77 pp 961-964

BEREZIN, I. V., corresponding member, Academy of Sciences USSR, MARGOLIN, A. L., and SHVYADAS, V. -YU., K., Moscow State University imeni M. V. Lomonosov

[Abstract] The complexity of purely organic chemical synthesis of new analogs of the penicillin and cephalosporin series of antibiotics has led to use of enzymatic synthesis by microorganisms for selective modification of those antibiotics. Immobilization of enzymes and their conversion into highly-specific and effective heterogenous catalysts has promoted this approach. In the present article the authors report their study of the reaction of hydrolysis-synthesis of cephalotone under penicillinamidase catalysis. Kinetics of hydrolysis of cephalotone were followed titrimetrically with a pH-stat (radiometer TTT-1c, Denmark), titrating with alkali the 2-thienylacetic acid formed. Synthesis of cephalotone from 2-thienylacetic acid and 7-aminocephalosporanic acids, catalyzed by immobilized penicillin-amidase, was carried out in a thermostatic cell, volume 10-20 ml in 0.2 M acetate buffer at pH 5.0. A complete series of equations is given which depicts the hydrolysis-synthesis reaction catalyzed by the enzyme. The relation of pH to standard free energy of the enzymatic hydrolysis of cephalotone (and of benzylpenicillin) indicates the optimum pH to be 4.5. Under conditions of the thermodynamic pH-optimum, the synthesis of cephalotone, the catalytic activity, and the stability of the penicillinamidase are quite low: the pH optimums of activity and stability of the enzyme are 8.15 and 6.9 respectively. Trials showed that change of the enzymatic reaction from pH 4.5 to 5 led to increase in yield and reaction rate. Results indicate that cephalotone can be produced by direct enzymatic synthesis with high yield. The specificity of action of the penicillinamidase gives promise of effective enzymatic synthesis of other antibiotics of the penicillin and cephalosporin series. Figures 3; table 1; references 12: 7 Russian, 5 Western.

USSR

UDC 577.150.8

#### DETERMINATION OF GLUCOAMYLASE ACTIVITY IN AMYLOLYTIC PREPARATIONS

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 13 No 4, Jul/Aug 77 signed to press 8 Oct 76 pp 615-120

BENDETSKIY, K. M., and PAVLOVA, YE. S., All-Union Scientific Research Institute for Fermentation Products, Moscow

[Abstract] A discussion is presented of the reasons for the errors which arise in the determination of glucose based on its specific oxidation in the presence of glucosooxidase. The substrate used in the experimental portion was soluble potato starch with a moisture content of 12.7%. Three enzymatic preparations were used. Comparison of the results of determination of glucoamylase activity showed that they were equivalent with the exception of the fact that one of the methods prescribed allows the use of solutions containing up to 50 micrograms of glucose per ml, while the other allows up to 150 micrograms. In both methods the glucoamylase capacity of amylolytic preparations is determined from the initial rate of formation of glucose from starch. The concentration of free glucose is estimated by means of the glucosooxidase reagent after 5, 10 and 20 minutes of hydrolysis. It is suggested that the form of the variation of concentration of free glucose as a function of time be considered, since it may be nonlinear due to the effect of a number of factors, such as the presence of alpha-amylase, inactivation of the enzyme, etc. If the variation is nonlinear, the value of the rate of formation of glucose is determined by extrapolation, rather than from the slope of the line representing the variation. Examples are presented of determination and calculation of the glucoamylase capacity for both cases. References 5: 4 Russian, 1 Western.

USSR

UDC 577.154.3

#### DENATURATION OF ALPHA-AMYLASE OF BACILLUS SUBTILIS IN AN ACID MEDIUM

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 13 No 4, Jul/Aug 77 signed to press 19 Oct 76 pp 577-580

KISELEVA, YE. M., MIRGORODSKAYA, O. A., MOMOT, N. N., AVIZHENIS, V. YU., MOSKVICHEV, B. V., and SAMSONOV, G. V., All-Union Scientific Research Institute for Antibiotics and Enzymes for Medical Applications, Leningrad

[Abstract] An earlier report showed that an increase in the thermal stability of some enzymes can be achieved by their inclusion in an ionite gel. In this report, results are presented from the study of the kinetics of denaturation of Bacillus subtilis alpha-amylase in the free state and when bonded with type KMDM gel. The alpha-amylase preparation used was amylosubtilin G10 kh, produced in the USSR. The activity of this preparation is 42,000 units per

gram, the protein content is 140 mg/g. KMDM gel is a carboxyl cationite based on methacrylic acid. The denaturation rate constants of native and modified enzymes at pH 2.1 and  $t=20\pm 2^\circ\text{C}$  are  $4.8\cdot 10^{-2}$  and  $6.7\cdot 10^{-4}$ , respectively. It is shown that the process of acid denaturation of alpha-amylase, both free and modified with KMDM, is described by a first order reaction equation. The change in activation parameters upon denaturation of alpha-amylase in the acid medium is calculated. Figures 4; tables 2; references 7: 5 Russian, 2 Western.

USSR

UDC 577.157+541.6

# STUDY OF THE PROPERTIES OF UREASE IMMOBILIZED BY CHEMICAL ATTACHMENT TO CELLULOSE DERIVATIVES

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 13 No 4, Jul/Aug 77 signed to press 7 Dec 76 pp 572-575

FESENKO, R. I., ARTEMOVA, YU. V., MALAKHOV, A. A., VIRNIK, A. D., YAKOVLEV, V. A., and ROGOVIN, Z. A., Moscow Textile Institute

[Abstract] The authors earlier demonstrated the possibility of immobilization of urease by attachment with its covalent bonds to cellulose derivatives containing various types of reactive functional groups and determined the optimal conditions for production of preparations of immobilized urease. In the present work, such properties of the synthesized compounds as the Michaelis constant, maximum specific activity, optimum action pH and variation of enzymatic activity of various urease preparations were determined. Soluble urease with an activity of 940 units per gram was used, as well as immobilized urease produced from it. The rate of hydrolysis of urea by soluble and immobilized urease was studied as a function of temperature using a 1M solution of urea in 0.01M phosphate buffer containing 0.01M KCl (pH 6.2). Activity varied directly with temperature from 20 to 50 C, then decreased with further increases in temperature. Figures 4; table 1; references 18: 12 Russian, 6 Western.

USSR

UDC 612.014.43:612.135

CHANGES IN THE DIAMETER OF THE MICROVESSELS OF THE MESENTERY UNDER THE INFLUENCE OF HEAT APPLIED TO THE ANIMAL BODY

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR SERIYA BIOLOGICHESKIKH NAUK in Russian No 3, 1977 signed to press 5 Nov 76 pp 64-70

KHODZHAYEVA, G. YE., SULTANOV, F. F., and TKACHENKO, B. I., Institute of Physiology and Experimental Pathology of the Arid Zone, Academy of Sciences TSSR; Institute of Experimental Medicine, Academy of Medical Sciences USSR

[Abstract] The purpose of this work was to study the changes in the diameter of the arterial and venous microvessels of the mesentery of the small intestine in animals exposed to heat. The study was performed on 25 cats under chloral-urethane narcosis (i/p, 60 and 600 mg/kg respectively) using heparine (1,000 units per kg). Heat was applied by contact with electric heaters for 2 hours; the rectal temperature was measured every 10 minutes. The reaction of the vessels of the mesentery was studied by television microscopy. It was found that the most frequent reaction of the arterioles of the mesentery to high temperature is expansion, of the veinules-contraction. When animals were heated until the rectal temperature rose from 36.0-40.0 C, the frequency of appearance of constriction and dilation of the veinules was almost the same, whereas the frequency of dilation of arterioles decreased, the frequency of constriction increased. The nature and degree of the reaction of the arterioles and veinules to developing hyperthermy of the organism depend on the initial diameter of the vessels. Microvessels with initial diameter 60-70 microns are more reactive to heating of the organism than vessels of smaller diameter. Figures 4; table 1; references 15: 9 Russian, 6 Western.

USSR

UDC 577.154

IMMOBILIZATION OF THE  $\alpha$ -AMYLASE ON THE SURFACE OF HIGHLY DISPERSED SILICON

Kiev DOPOVIDI AKADEMIYI NAUK UKRAYINSKOYI RSR in Ukrainian No 7, Jul 77 signed to press 7 Dec 76 pp 651-653

TERTIKH, V. A., YANISHPOL'SKIY, V. V., CHUYKO, A. A., GALICH, I. P., TSYPEROVICH, A. S., deceased, and KOVAL'CHUK, T. A., Institute of Physical Chemistry, Academy of Sciences Ukrainian SSR; Institute of Biochemistry, Academy of Sciences Ukrainian SSR

[Abstract] The aim of this work is to activate the aerosil surface for better binding of the  $\alpha$ -amylase. This was achieved by boiling the mixture containing 25 g of dry aerosil, 250 ml of toluene and 5.6 g of  $\gamma$ -aminopropyltriethoxysilane for 2 hr, removing the excess of modifying agent with toluene and drying the residue in vacuum at 100°C. The obtained aminoaerosil (2.5 g) is suspended then in 25 ml of CCl<sub>4</sub> and 0.39 g of 2,4-toluylenediisocyanate (preliminarily

dissolved in  $\text{CCl}_4$ ). The 2,4-toluylenediisocyanate is taken in the amount of 0.8-0.9 with respect to the concentration of amino groups, in order to increase the wetting property of the aerosil surface layer. After keeping the mixture at room temperature for 2-3 min., it was washed with  $\text{CCl}_4$  and dried in vacuum at  $20^\circ\text{C}$ . The concentration of isocyanate groups in the aerosil was controlled with IR spectroscopy by the intensity of the  $2290\text{ cm}^{-1}$  line. The activated carrier was used directly in experiments with the  $\alpha$ -amylase from *Aspergillus oryzae* fungus, which contained 96-98% of protein, with the amylolytic activity of  $7476 \cdot 10^4$  units/g. The binding property of the carrier was tested by dissolving 0.25 g of the  $\alpha$ -amylase in 10 ml. of 1 M phosphate buffer (pH 7) and adding to it 1 g of the aminoaerosil while constantly agitating the mixture at room temperature for 10-15 min. The nonfixed amylase was removed by a glass filter. The resulting residue was washed in 1 M phosphate buffer (pH 7) and 0.005 M calcium acetate (pH 5.5) until no amylolytic activity was detected in the washing medium. The total amylolytic activity of the immobilized  $\alpha$ -amylase was 614,000 units/g when the aerosil was treated with  $\gamma$ -aminopropyltriethoxysilane and 2,4-toluylenediisocyanate, and only 8,000 units/g when the aerosil was treated with  $\gamma$ -aminopropyltriethoxysilane and glutaric aldehyde. Tables 1; references 15: 8 Russian, 7 Western.

USSR

UDC 616.127.005.8--008.9:  
616.092.9:615.361.36

THE EFFECTS OF HEPARIN ON MYOCARDIAL NITROGEN METABOLISM IN DOGS, BOTH IN THE NORMAL STATE AND WITH INDUCED MYOCARDIAL INFARCTION

Kiev UKRAYINS'KYI BIOKHMICHNYI ZHURNAL in Ukrainian Vol 49 No 1, 1977 signed to press 29 Sep 75 pp 107-112

FETISOVA, T. V., and SMYRNOVA, I. P., Institute of Clinical Medicine imeni M. D. Strazhesko, Kiev

[Abstract] The widespread clinical use of heparin has made it necessary to determine the exact character of its varied effect on metabolism. Up to now, it has been generally believed that heparin produces changes in the polarization of membranes, so that it is readily able to penetrate into the cell and participate in the metabolic process, creating inert complexes from proteins and especially from enzymes. However, the facts supporting this hypothesis are limited in number, and have been derived from unstandardized research procedures. The position of heparin in nitrogen metabolism remains unclear, especially in connection with myocardial infarction. The authors studied protein metabolism and polynucleotides, taking into account the important role of these biopolymers in the vital activities of the cell. It was shown that heparin administered in the early stage of induced myocardial infarction prevents a number of shifts in protein and polynucleotide metabolism, has no effect on certain others, and promotes the development of only a very few. In the case of the undamaged myocardium, the inhibitory effects of heparin are

only slight, and the preparation activates many metabolic reactions of nitrogen-containing polymers. It is concluded that inactivation of enzyme systems within the cell is not a primary process, but only a secondary mechanism taking place in both normal and damaged tissues. Figures 2; table 1; references 25: 21 Russian, 4 English.

USSR

UDC 577.156

#### A SYSTEM OF AMINOPEPTIDASES DERIVED FROM ASPERGILLUS FLAVUS

Kiev UKRAYINS'KYI BIOKHMICHNYY ZHURNAL in Ukrainian Vol 49 No 1, 1977 signed to press 27 Sep 75 pp 101-106

TSYPEROVYCH, A. S., deceased, KOLODZEYSKAYA, M. V., and KONOPLICH, L. A., Institute of Biochemistry imeni O. V. Palladin, Academy of Sciences, Ukrainian SSR, Kiev

[Abstract] It is known from previous research (1970, 1972, 1973) that extracellular peptidohydrolase complexes produced by certain microorganisms contain a complex system of aminopeptidases. The purpose of the present study was to examine this system, and to determine the possibility of its being separated into components--that is, aminopeptidases such as leucine aminopeptidase, aminotripeptidase, the unique leucyl-glycyl-glycine-aminopeptidase described by L. A. KONOPLICH, et al, in 1973, and triglycine. These enzymes are marked by their variable degree of purity, and also by a multiplicity of forms (anion and cation), specific activity, chromatographic properties, thermal stability, and solubility. The presence of a separate triglycine-aminotripeptidase within the system was demonstrated. Data obtained suggest the presence of two different leucine-aminopeptidases. Study of the correlation between leucine amide and leucyl-glycyl-glucine during hydrolysis, and also comparison of the properties of fractions showing activity, do not support the assumption that both these reactions are due to a single enzyme. Figure 1; tables 3; references 10: 9 Russian, 1 English.

CONTENT OF DICARBOXYLIC AMINO ACIDS AND  $\gamma$ -AMINOBUTYRIC ACID IN THE STRUCTURES OF THE VISUAL ANALYZERS AND IN THE RETINA OF DOGS DURING POSTNATAL ONTOGENESIS

Kiev UKRAYINS'KYI BIOKHMICHNYI ZHURNAL in Russian Vol 49 No 1, 1977 signed to press 23 Jun 75 pp 60-65

AGAYEV, T. M., and BELIK, YA. V., Institute of Physiology imeni A. I. Karayev, Academy of Sciences Azerbaydzhan SSR, and Institute of Biochemistry imeni A. V. Palladin, Academy of Sciences Ukrainian SSR, Kiev

[Abstract] Although the glutamic and  $\gamma$ -aminobutyric acids (GA, GABA) of the cerebrum are important neurological agents (in negligibly small quantities of  $10^{-15}M$  they are able to excite or inhibit the cortical and subcortical neurons), the published literature offers only limited information on the content of a few free amino acids in some of the more important areas of the brain, and in certain species of animals. The authors accordingly have studied, during the past few years, the dynamics of the content of a number of free amino acids observing the visual analyzer of the dog brain in the postnatal period of ontogenesis (from birth to 1 year of age). The present study concerned variations in content of both the dicarboxylic amino acids and GABA in the cerebral visual analyzer (for visual zone 17), the subcortical formations, and also the retina, during the later stages of postnatal development. Information in this area is of great interest in interpreting the aging mechanisms of those structures, and in understanding the special features of their functioning during various postnatal stages of life. Data obtained are summarized in tabular form for three age groups of test animals (1 year, 3 years, and 15 years and older). Four physical structures are represented: the cortical visual zone 17, the anterior corpus bigenium, the corpus geniculatum laterale, and the retina. The data list content of free dicarboxylic acid (GA and Aspartic Acid, AA) and GABA in these structures. Age variation in the content of these acids differs somewhat in respect to the physiological region studied, but follows the general formulas of GA AA GABA for 1-year-old animals and GA GABA AA for 3- and 15-year-olds. Tables 2; references 16: 7 Russian, 9 Western.

USSR

UDC 577.153.4:577.153.9

EFFECT OF CHOLINESTERASE INHIBITORS ON ARYL- AND CARBOCHOLINESTERASE ACTIVITY

Kiev UKRAYINS'KYI BIOKHIMICHNYI ZHURNAL in Russian Vol 49 No 1, 1977 pp 57-59

TONKOPIY, V. D., Military Medical Academy imeni S. M. Kirov, Leningrad signed to press 26 May 75 pp 57-59

[Abstract] Carboxylesterase, which catalyzes the hydrolysis of the carboxylic acid esters, functions as a unique buffer in cases of poisoning with organophosphorus compounds, binding a significant number of them. Preliminary inhibition of this enzyme by specific inhibitors significantly increases the toxic effect of those compounds, and activation of the enzyme leads to strong defensive action of the organism. The author studied the effect of reversible inhibitors of cholinesterase--galanthamine, tacrine, oxazile and proserine--on the activity of aryl- and carboxylesterases. These preparations were shown to have no effect on the activity of the enzymes. Tables 3; references 16 (Western).

USSR

UDC 577.17.04

EFFECT OF THIOPHOSPHAMIDE ON THE COPPER CONTENT OF RABBIT TISSUES

Kiev UKRAYINS'KYI BIOKHIMICHNYI ZHURNAL in Ukrainian Vol 49 No 1, 1977 signed to press 20 Apr 75 pp 41-44

SAVYTS'KYI, I. V., and HOTSULYAK, L. O., Department of Biochemistry, Odessa Medical Institute imeni N. I. Pirogov

[Abstract] Copper plays an important role in homopoiesis, cell division and growth, tissue respiration, immunogenesis, and some other important physiological processes. It is known that removal of the thyroid gland from rabbits reduces the copper content of the blood, while administration of thiophosphamide actually increases the content. Some data indicate that thiophosphamide induces biochemical changes very similar to those produced by ionizing radiation. These facts suggested the present research. Tests were run on rabbits 30 min, 6 hrs, and 1, 3, 7, 15, and 30 days following intravenous administration of thiophosphamide in doses of 6 mg per kg of body weight, the copper content of various tissues, and also the blood, urine and feces, were determined. The tissue samples were dried and calcined in a muffle furnace. Quantative determination of the copper content was made by the diethyldithiocarbamate method, with use of the SF-4A spectrophotometer. Copper content of the tissues varied in a similar pattern for all the tissues, rising up to the 24-hour stage, then falling, then rising again, finally reaching a maximum on the 30th day. The spinal cord tissue was exceptional, showing a steady increase throughout the experiment. Excretory matter showed a general increase for 2 weeks, then a final drop. Table 1; references 14 (Russian).

USSR

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EFFECT OF CRYOPROTECTORS ON THE SYNTHESIS OF PROTEIN BY A CELL-FREE SYSTEM  
FROM RAT LIVER

Kiev UKRAYINS'KIY BIOKHMICHNYY ZHURNAL in Ukrainian Vol 49 No 4, 1977 signed  
to press 27 Nov 75 pp 39-42

GULEVSKIY, O. K., Institute for Problems of Cryobiology and Cryomedicine,  
Academy of Sciences Ukrainian SSR

[Abstract] The synthesis of protein by a postmitochondrial supernatant fraction from rat liver containing the physiological concentration of Mg ( $5\text{mM Mg}^{2+}$ ) was inhibited by ethylene glycol, polyethylene glycol-400, polyethylene glycol-4000, dimethylsulfoxide, ethanol, methanol, and glycerol. Inhibition depended on the concentration and hydrophobicity of these cryoprotectors. This inhibition can be attributed to the stabilization of ribosomes, or to suppressing the activity of some Mg-dependent enzymes by cryoprotectors. However, when the concentration of Mg in the cell-free system was only 1-2 mM, all cryoprotectors, with the exception of glycerol, kept the synthesis of protein at the same level as in controls containing 5 mM  $\text{Mg}^{2+}$ . The incorporation of  $^{14}\text{C}$ -leucine in this case was a function of the  $\text{Mg}^{2+}$  concentration in the system. Figures 4; references 21: 11 Russian, 10 Western.

USSR

UDC 581.132.03

## AFTEREFFECT OF CONSTANT MAGNETIC FIELD ON PHOTOCHEMICAL ACTIVITY OF CHLOROPLASTS

Moscow FIZIOLOGIYA RASTENII in Russian Vol 24 No 3, May/Jun 77 signed to press  
20 Jul 76 pp 491-495

LEBEDEV, I. S., LITVINENKO, L. G., SHIYAN, L. T., Ukrainian Agricultural Academy, Kiev

[Abstract] Winter wheat, beans (*Phaseolus*) and peas displayed increased photochemical activity in their chloroplasts when they had been grown 4-5 days in a constant magnetic field (CMF) of 5,020 Oe. Photophosphorylation rates and light and dark ATPases increased. The Hill reaction increased in the exposed plants. By the time the plants were 3 weeks old the amount of  $K_3Fe(CN)_6$  per milligram of chlorophyll was almost double that of the controls. By the end of growth, there had been an increase in the quantity of grain pigments in the exposed plants. This confirms other research. Plants grown from seeds exposed to a CMF have a higher activity of phosphorylation of chloroplasts with phenazine-metaspulphate. There was an increase in light and dark Mg-dependent ATPase, regenerating ADP. There are several ways for the magnetic fields to affect plants: 1, through biochemical transformations in the plant embryo, dependent upon the structure and composition of nucleic acids; 2, the field might increase the number of spirals in the DNA; 3, energetically-advantageous changes in the characteristics of electron and ion transport; 4, changes in the properties of cytoplasm and the activity level of enzymes. Further research is recommended and thanks is given to Professor P. I. Baranskiy. Tables 3; references 17: 13 Russian, 4 Western.

USSR

UDC 581.143.037

## GROWTH RESPONSE OF RYE COLEOPTILE TESTS TO CONSTANT MAGNETIC FIELD

Moscow FIZIOLOGIYA RASTENII in Russian Vol 24 Iss 3, May/Jun 77 signed to press  
3 Jun 76 pp 500-505

NOVITSKIY, YU. I., and KHEYN, Z. P., Institute of Plant Physiology imeni K. A. Timiryazev, Academy of Sciences USSR, Moscow

[Abstract] Most research on the effects of a constant magnetic field (CMF) relates to the parameters of the field itself and devotes less attention to the physiological state of the plants. An attempt is made to determine the dependence, of reactions to CMF, on the concentrations of exogenous auxin (indolyl-acetic acid). Fourteen variants, with concentrations ranging from 350 to 8,400  $10^{-2}$  mg per liter were studied during 1974-75. The Onokhoyskaya variety of rye was used. A dispersion diagram shows the results, both for auxin and K-auxin. Average growth was greater in plants receiving the latter and the response to CMF was more distinct in the plants with K-auxin. No

attempt was made to analyze the reasons for increasing the variability of average growth in plants exposed to a CMF which received potassium in ionized form. However, it is felt that this variability involves ion balances. The response correlated with rate of growth in the control. The inhibiting effect corresponded to high growth rates, while stimulating effects corresponded to low growth rates. Figure 1; tables 3; references 14: 9 Russian, 5 Western.

USSR

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ROLE OF VARIABLE TEMPERATURES IN THE REPRODUCTION OF PARAMECIUM CAUDATUM

Moscow ZHURNAL OBSHCHEY BIOLOGII in Russian Vol 38 No 4, Jul/Aug 77 signed to press 3 Apr 76 pp 609-619

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[Abstract] The eurithermal protozoa infusoria *Paramecium caudatum*, clone HE, was the subject of the authors' study. These protozoa are felt to be better adapted to temperature variations over a 24-hr day than to an existence in the rigidly controlled temperature conditions of a thermostat. The authors found that the specimen infusoria can adapt to changes from 0 to 28° wherein the rate of division of *P. caudatum* varies as a function of the temperature. In 24-hr changes of temperature in the range of 6, 12, and 20° (28-16°, 24-12°, 22-10°, 18-6°, 16-10°, 12-0°, and 16-4°, and 10°) the rate of infusoria division was 1.3-2.0 times higher than at corresponding mean constant temperatures. Stimulation of division is absent if the range of changes embraces subnormal, injurious temperatures--for example with fluctuations from 28 to 0.5°C. Under the effect of a 24-hr change of temperature, the optimum vital activity of *P. caudatum*, based on division rate, shifts toward the low, positive temperatures. Under conditions of a daily temperature change in the range of 12° (0-12°, 4-16°, 6-18°, 10-22°, 12-24°, 16-28°) the total amount--degrees . hr--needed for one division amounts to 240 to 320, significantly less than the quantity--degrees.hr--for one division under conditions of constant temperature (6,10,12,14,16,18, and 22°). One of the features of the reaction of infusoria to change in temperature over 24-hr is that division of the infusoria is synchronized and, depending on the range of the 24-hr change of temperature, different periods of synchronous division of *P. caudatum* are possible. Under changeable temperature conditions, the *P. caudatum* displays individual reactions of two types, viz., change in rate of physiological processes, and shift in temperature limits of activity to the side of the temperature change. Figures 2; tables 3; references 48: 34 Russian, 14 Western.

## HYDROCHEMISTRY OF 27 SOUTH-ESTONIAN WATER BODIES

Tallinn IZVESTIYA AKADEMII NAUK ESTONSKOY SSR, BIOLOGIYA in Estonian Vol 26  
No 2, 1977 signed to press 9 Jul 75 pp 149-195

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of Sciences EstSSR

[Abstract] The authors have carried out hydrochemical analysis of 27 water bodies--26 lakes and 1 reservoir--in Southern EstSSR. Results are tabulated according to water source, multiple number of samplings, and tests. Water color was found to vary from pale yellow-green to brown-red, transparency from 0.4 to 5.5 m; in the majority of cases it ranged from 1 to 3 m. The water pH spread was from less than 6.0 to more than 9.2. Content of minerals in the surface layer of the water bodies ranged from 0 to 3.64 mg equiv/liter. Content of organic matter ranged from 10.4 to 47.9 mg O/liter, based on dichromate oxidizability. In the bottom water layer the mineral content reached up to 4.67 mg equiv/liter; organic matter here reached up to 52.9 mg O/liter. Mineral content and source of organic matter served as criteria to group the lakes; buffer capacity, content of organic matter, character of the water bottom, and patterns of formation of the chemical components, also served to classify the lakes. Intensive commercial and daily living use of the southern region has disrupted those lakes primarily with poor buffer capacity on sandy bottoms. The quality of the lake waters has deteriorated with the intervention of man. Table 1; references 16: 7 Russian, 5 Estonian, 2 German, 2 English (these are from Tallinn).

USSR

UDC 616-003.821(213.52)

EPIDEMIOLOGY OF SECONDARY AMYLOIDOSIS IN THE ARID ZONE OF CENTRAL ASIA (BASED ON AUTOPSY DATA)

Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR SERIYA BIOLICHESKIKH NAUK in Russian No 3, 1977 signed to press 20 Nov 77 pp 76-82

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[Abstract] This work presents a study of the epidemiology of amyloidosis in the arid zone of the Central Asiatic Republic. According to autopsy data, the morbidity is 2.64%. Predominant among diseases complicated by amyloidosis are tuberculosis, chronic non-specific pulmonary disease, chronic suppuration, chronic glomerulonephritis, and urologic diseases. The results of the studies do not confirm the widespread opinion that men suffer from amyloidosis more frequently than women; there is no reliable difference in the morbidity of amyloidosis as a function of sex. Deposition of amyloid in most cases is found in the kidneys followed by the spleen, liver and adrenal glands. In cases of tuberculosis, hepatic amyloidosis is observed significantly more frequently than with other diseases. The reason for this phenomenon is not clear, but it is presumed that it is related to the greater dystrophic changes in the liver in tuberculosis. Amyloidosis is the cause of death in 0.7% of cases of the total number of autopsies, in 25.3% of the total number of cases of amyloidosis. Amyloidosis was not clinically diagnosed in 43.8% of cases. Tables 3; references 31: 21 Russian, 10 Western.

USSR

SECOND ALL-UNION SYMPOSIUM ON MARINE PARASITOLOGY

Vladivostok BIOLOGIYA MORYA in Russian No 1, 1977 p 19

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[Abstract] The title symposium was convened in Kaliningrad, 18-20 May 1976. Organizers were the Scientific Council on Diseases of Fish, Ministry of the Fishing Industry USSR, the Ichthyological Commission, Atlantic Ocean Scientific Research Institute of Sea Fisheries and Oceanography, and the Kaliningrad Technical Institute of the Fishing Industry. Reports described research on parasites and marine fish diseases--myxosporidia in ocean fish (SS. Shulman, of the ZIN, AS, USSR), the nematode *Anisakis* sp. in White Sea herring (V. G. Kulachkova, of the ZIN, AS, USSR), effect of parasites on intrapopulation fish grouping (Kurochkin), and marine parasitic diseases (Yu. L. Mamayev, Far East Science Center, AS, USSR), G. A. Steyn, Inst. Cytology, AS, USSR, V. M. Nikolayev and V. R. Dubin, Institute of Biology of the Southern Seas, AS, UkrSSR, and the Azov Sea SRISFO, Ye. V. Zhukov, ZIN, Ye. B. Yevdokimova and I. G. Kuznetsova, Atlantic Ocean SRISFO. Helminths in pinnipeds were discussed by S. L. Delyamure, Sevastopol University; three other reports dealt with marine mammal helminths. A. V. Gayevskaya and Nigmatullin, Atlantic Ocean SRISFO, described parasites of marine invertebrates. The participants generally decried lack of coordination in Soviet parasite research, and shortcomings in training of new research personnel.

USSR

UDC 576.809.5

COOXIDATION OF LOW MOLECULAR WEIGHT AROMATIC HYDROCARBONS BY YEASTLIKE FUNGI OF THE CANDIDA FAMILY

Baku IZVESTIYA AKADEMII NAUK AZERBAYDZHANSKOY SSR, SERIYA BIOLOGICHESKIKH NAUK in Russian No 4, 1976 pp 73-78

ISMAILOV, N. M., GANBAROV, KH. G., ABDULLAYEVA, E. M., and MEKHTIYEVA, N. A.

[Abstract] The present work is a study of oxidation of several alkylbenzenes by *Candida* yeastlike fungi under cooxidation conditions. Strains used were *C. guilliermondii*, *C. glaussenii*, and *C. tropicalis*, grown under periodic cultivation in a liquid mineral medium. The growth hydrocarbon substrate was *n*-hexadecane, 0.8 vol%. Test substrates were toluene, xylenes, mesitylene, and pseudocumene; the alkylbenzenes were added to the yeast cultures in the exponential phase of growth. Under cooxidation conditions the test strains oxidized the test hydrocarbons to monobasic aromatic acids; the toluene was oxidized to benzoic acid, *m*-xylene to *m*-toluic acid, *p*-xylene to *p*-toluic acid, pseudocumene to 3,4-xylic acid, and mesitylene to 3,5-xylic acid. In addition to the identified products of transformation, a number of unidentified catechol derivatives were produced. The authors conclude that oxidation of aromatic hydrocarbons, under cooxidation conditions, during growth on *n*-paraffins, is accomplished not only by certain bacteria, but also by the yeastlike fungi. The number of microorganisms which can cooxidize aromatic hydrocarbons is, thus, larger than has been assumed up to now. The data are of interest in resolution of the problem of microbiological deparaffinization of fuels, by the use of yeastlike fungi. The latter can be considered as potential detoxicants of ring structures under natural conditions. Figures 7; references 14: 5 Russian, 9 Western.

USSR

MUTANTS OF NPL-1 WHICH CONTROL NAPHTHALENE OXIDATION

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 235 No 2, Jul 77 signed to press 6 Apr 77 pp 494-496

BORONIN, A. M., BORISOGLEBSKAYA, A. N., and STAROVOYTOV, I. I., Institute of Biochemistry and Physiology of Microorganisms, Academy of Sciences USSR, Pushchino, Moskovskaya Oblast

[Abstract] The presence of the NPL-1 plasmid in *Pseudomonas putida* 12A strain has already (1976) been demonstrated by the authors' laboratory. The current report describes separation of mutants of this plasmid, and preparation of strains of *Pseudomonas* with a high rate of transforming naphthalene into salicylic acid. Plasmid NPL-1 has the capacity of conjugated transmission to strains of *Ps. putida* 12A which do not contain the plasmid, and to strain *Ps.*

fluorescens 16II which grows on salicylate as the single carbon source. The authors used a strain of *Ps. putida* 12A with plasmid NPL-1 which can grow on naphthalene or salicylate as the single source of carbon, and derivatives of this strain: 128-1-10 ( $\text{Nah}^-\text{Sal}^+\text{Ade}^-$ ) with eliminated NPL-1; and 12A-50 ( $\text{Nah}^-\text{Sal}^+\text{Ade}^-$ ) which has lost plasmid NPL-1, not able to grow on salicylate. In study of conjugated transfer of the mutant plasmid NPL-41, the recipients used were *Ps. fluorescens* 16II (from the authors' laboratory), *Ps. putida* PpG1 and PpG7 (from the collection of Prof. L. S. Gunsalus), *Ps. aeruginosa* 1822 (from Prof. E. I. L. Lowbury), and *Ps. aeruginosa* ML-4262 (from Prof. S. Mitsuhashi). The mutagen was nitrosoguanidine. The conjugated transfer of plasmid was done by the Dunn and Gunsalus method (1973). The 12A strain produced mutants incapable of growth on naphthalene or salicylic acid; in two of these, 12A R-1 and 12A S-2, further processing produced mutants which do oxidize naphthalene--which indicates presence in them of plasmid NPL-1, essential for oxidation of naphthalene. The mutant strains can transmit the  $\text{Nah}^+$  character to strain 12A-50; the character can be transmitted also to *Ps. aeruginosa* ML 4262, *Ps. putida* PpG7, and *Ps. putida* PpG1. The recipients can in turn transmit the  $\text{Nah}^+$  character to other recipients. The authors discuss the nature of mutation with respect to NPL-1. Tables 2; references 5: 3 Russian, 2 Western.

USSR

UDC 581.526.325.03

# CONTINUOUS CULTURE OF MARINE ALGA PLATYMONAS VIRIDIS

Vladivostok BIOLOGIYA MORYA in Russian No 1, 1977 signed to press 8 Jul 76  
pp 73-77

SILKIN, V. A., BELYANIN, V. N., and PAUTOVA, L. A., Invertebrate Reproduction Group, Institute of Marine Biology, Far East Science Center, Academy of Sciences USSR, Vladivostok 690022; Laboratory of Biophysics, Institute of Physics, Siberian Division, Academy of Sciences USSR, Krasnoyarsk 660036

[Abstract] Continuous culture is becoming an economically effective way to produce algae biomasses for fodder. Provision of conditions for the continuous culture which correspond to basic physiological requirement of the cells is still difficult due to insufficient study of the marine algae and to the intricate complex of factors of the environment. The authors have undertaken experimental continuous cultivation of the single-cell green alga *Platymonas viridis* and compared its growth characteristics in a continuous regimen with that in a periodic culture, and have examined the possibility of control of a two-stage process in a chemostat. The alga used was that described by Roukhiyainen (1966); light source was an LB-40 luminescent lamp; the culture was illuminated with  $10.5 \text{ w/m}^2$  FAR (4 klk). The two-stage chemostat was described by Herbert (1964). A culture regimen was achieved at a density of suspension of algae of  $18.8 \times 10^6 \text{ kl/cm}^2$ , with a constant rate of flow, dilution coefficient  $0.02 \text{ hr}^{-1}$ . Chemostat cultivation of the cells increased productivity of the alga by a factor of more than 5, as compared with its

productivity in the most productive phase of intensive growth of an accumulating culture. Control of the marine alga culture in the chemostat can be achieved by varying the rate of flow of the medium. The authors have analyzed the alga growth in a monostream two-stage chemostat at dilution coefficients of 0.02 and 0.04 hr<sup>-1</sup> for the first step, and 0.062 and 0.124 hr<sup>-1</sup> for the second step. The change from 0.02 to 0.04 hr<sup>-1</sup> in the first stage resulted in a small reduction in population density of 11.6 x 10<sup>6</sup> cell/cm<sup>2</sup> to 11.0 x 10<sup>6</sup> cell/cm<sup>2</sup>. The second stage showed a greater reduction, 5.3 x 10<sup>6</sup> cell/cm<sup>2</sup> to 4.0 x 10<sup>6</sup> cell/cm<sup>2</sup>. Figures 3; references 10: 4 Russian, 6 Western.

USSR

UDC 582.288-11

TRANSFORMATIONS IN NITROGENOUS SUBSTANCES OF MOLASSES RESIDUES IN THE PROCESS OF DEVELOPMENT OF CANDIDA UTILIS LAMBDA-35

Kiev MIKROBIOLOGICHNIY ZHURNAL in Ukrainian Vol 39 No 4, Jul/Aug 77 signed to press 5 Apr 76 pp 422-426

IL'YINA, L. D., and VRATCHENKO, L. I., Ukrainian Scientific Research Institute of the Alcohol Industry

[Abstract] The authors have studied cultivation of *C. utilis* lambda-35 on molasses residues supplemented with an additional source of nitrogen, ammonium sulfate or urea. In a periodic cultivation regimen, the organism utilizes ammonia nitrogen in the lag phase and at the start of the exponential phase of growth. The middle and end of the exponential phase are characterized by accumulation of ammonia nitrogen and by the predominant use of the liquor aminoacids. The organism can assimilate pyrrolidone carboxylic acid, up to 42-58%. The aminoacids of the protein substances, and of the products of incomplete cleavage of the protein, are utilized by the *C. utilis* up to 61-68% of the total aminoacids. Utilization of pyrrolidone carboxylic acid, aspartic acid, and alanine, in the initial period of cultivation of the *C. utilis*, is significantly inhibited by ammonium sulfate. Figures 3; table 1; references 10: 7 Russian, 3 Western.

USSR

UDC 576.8.095:577.16

VITAMIN REQUIREMENTS AND BIOSYNTHESIS OF B GROUP VITAMINS BY ETHANOL-ASSIMILATING BACTERIA

Kiev MIKROBIOLOGICHNIY ZHURNAL in Ukrainian Vol 39 No 4, Jul/Aug 77 signed to press 30 Jul 76 pp 427-432

KVASNIKOV, YE. I., YELISEYEVA, G. S., PETRENKO, O. F., PAVLENKO, N. I., GAVRILENKO, M. N., SUMNEVICH, V. G., and SOLOMKO, E. F., Institute of Microbiology and Virology, Academy of Sciences UkrSSR

[Abstract] *Acinetobacter calcoaceticus* K-9, from a fruit orchard, *A. calcoaceticus* K-25 from a vineyard, *Pseudomonas fluorescens* 35/2, from a fruit orchard, and *Ps. putida* 110/1 from effluent waters of an alcohol plant, all in Kiev Oblast, assimilate ethanol in a medium wherein the ethanol is the sole carbon source; *A. calcoaceticus* K-25 and *P. fluorescens* 35/2 do not require vitamin supplementation of the medium, the other two require paraaminobenzoic acid supplementation for optimal growth. An increase in growth rate of the bacteria, from 0.2 to 0.45 hr<sup>-1</sup>, leads proportionally to a decrease, by a factor of 1.5-2.0, in the content of vitamins of the B. group in the cells and growth liquor. Under similar cultivation conditions--rate of dilution of the medium 0.25 hr<sup>-1</sup>, and temperature of 30°C--an increase 1.0 to 2.56% in ethanol concentration in the medium leads to an increase in content of all of the B vitamins in the cell-medium system. The 30°C temperature and 2.5% level of ethanol is optimal for producing a biomass with first class vitamin content. Tables 4; references 5 (Russian).

USSR

UDC 577.15:576.851.5

SOME FEATURES OF SPECIFIC PROTEINASES OF MESOPHILIC AND THERMOPHILIC BACTERIA

Kiev MIKROBIOLOGICHNIY ZHURNAL in Ukrainian Vol 39 No 4, Jul/Aug 77 signed to press 9 Oct 76 pp 444-451

KOLCHINSKAYA, I. D., and KRASNIKOV, YE. I., Institute of Microbiology and Virology, Academy of Sciences UkrSSR

[Abstract] The mesophilic bacteria examined was *Bacillus subtilis* 188; the thermophilic bacteria were *B. subtilis* 1 b-14, and 4 b-3, and *B. circulans* 4 b-8 and B-22, all from the authors' institute collection. Proteinases which hydrolyze, in addition to the globular, the insoluble fibrillar proteins elastin and collagen were isolated from these bacteria. The optimum temperature and thermostability of the caseinolytic and elastolytic proteinases of the thermophilic bacteria are considerably higher than of the proteinases of the mesophilic *B. subtilis* 188. The authors have devised a method for fractionation of *B. subtilis* 188 proteinases which preserves the high activity in the elastolytic and collagenolytic components of the complex. Chromatography

on cation exchange resin KB 51x2 has been used successfully to concentrate the B, subtilis proteinases with preservation of all of the complexes of the enzymes. At least four iso-elastases, three proteinases, which hydrolyze casein and collagen, and two hemoglobinolytic enzymes have been separated by ion-exchange chromatography on carboxymethylcellulose. Gel filtration on sephadex G-75 revealed the complex nature of the elastolytic component of the B. subtilis proteinases, and its low molecular portion is essential for its activity. Figures 5; tables 4; references 13: 9 Russian, 4 Western.

USSR

UDC 634.0.863 331.876

#### ORGANIZATION, EXPERIENCE, AND PROBLEMS OF SOCIALIST COMPETITION

Moscow GIDROLIZNAYA I LESOKHIMICHESKAYA PROMYSHLENNOST' in Russian No 4, 1977  
pp 17-19

IL'YINA, V. N., zavkom chairman, Lobvinskiy Hydrolysis Plant

[Abstract] Socialist competition at the plant is organized on the Leninist principles of comparability, publicity and the possibility of repetition, and much preparatory work is done before pledges are made. Shop socialist pledges are defended before a special commission which not only approves or disapproves but also makes recommendations. Results of the competition are summed up monthly and reported at meetings of the mass production commission and the zavkom, and if the winners are known, the work of the other shops and sections is analyzed. The chief of a lagging shop must report at the zavkom meeting the reasons for failure to fulfill the plan, for increases of cost and wages and for the absence of rationalizers' proposals. An important role is played by the system of incentives and rewards, which only becomes effective when awards are sufficiently publicized. Special attention is devoted by the zavkom to the avoidance of any waste of materials, power, working time, etc; which are still encountered.

USSR

UDC 576.8:577.16

FORMATION OF RIBOFLAVIN AND ITS NUCLEOTIDES IN A HEAT TOLERANT CULTURE OF MYCOCOCCUS LACTIS STRAIN 41 ON A MEDIUM WITH PARAFFIN

Ashkhabad IZVESTIYA AKADEMII NAUK TURMENSKOY SSR SERIYA BIOLOGICHESKIKH NAUK in Russian No 3, 1977 signed to press 22 Nov 76 pp 86-89

SAKHATOV, R. S., Turkmen Scientific Research Institute of Soil Science

[Abstract] Some microorganisms can synthesize riboflavin on hydrocarbon media more intensively than when carbohydrates are used. One such is Mycoccus lactis strain 41, with which the present work was performed. The purpose of the studies was to determine the forms of riboflavin produced by this mycoccus and their quantities. As it develops on a mineral medium containing paraffin, the heat tolerant microorganism Mycoccus lactis strain 41 forms riboflavin, flavinmononucleotide and flavinadenine dinucleotide, amounting to 40% of the total flavins. The flavin formation process of this culture on the paraffin-containing medium is a two-phase process. Figure 1; tables 3; references 11: 8 Russian, 3 Western.

USSR

UDC 577.156+576.809.52

INFLUENCE OF AERATION AND CERTAIN REDUCING AGENTS ON THE BIOSYNTHESIS OF PROTEASES AND NOVOBIOCIN UPON DEEP CULTIVATION OF ACTINOMYCES SPHEROIDES STRAIN 35

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 13 No 4, Jul/Aug 77 signed to press 9 Nov 76 pp 493-500

KRIVOVA, A. YU., YEGOROV, N. S., and AL'-NURJ, M. A., Moscow State University

[Abstract] The properties of the proteases formed by Actinomyces spheroides strain 35 in deep cultivation in an optimized nutrient medium were studied. An increase in the accumulation of novobiocin (487-585 micrograms per milliliter) and proteases with caseinolytic activity from 3.14-11.40 micrograms of thyrosine per microgram of protein occurred almost in proportion to the increase in the quantity of dissolved oxygen in the medium. Aeration conditions had somewhat less influence on the biosynthesis of proteases hydrolyzing fibrin. It was shown that some reducing agents (mercaptoethanol, cysteine, glutathione) when introduced into the medium, influenced the biosynthetic capability of the actinomyces; the accumulation of biomass when glutathione and cysteine are present is almost the same as the control experiment; the accumulation of mercaptoethanol inhibits the growth of the biomass. All of the reducing agents studied suppressed the synthesis of novobiocin. The reducing agents studied can thus significantly reduce the synthesis of antibiotics, as well as enzymes hydrolyzing casein, producing a culture food which is highly active as to fibrinolysis. The change in the producing capacity of

Act. spheroides 35 as to caseinolytic activity is specific for each reducing agent. As the concentration of glutathione, cysteine and mercaptoethanol increased over 0.02-0.03%, a drop in the biosynthetic activity was noted, particularly in the presence of mercaptoethanol. Figures 3; tables 4; references 14: 11 Russian, 3 Western.

USSR

UDC 577.156

#### BIOSYNTHESIS OF PROTEASE BY HALOBACTERIUM SALINARIUM

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 13 No 4, Jul/Aug 77 signed to press 11 Oct 76 pp 501-508

KOVALEVA, N. A., KONNOVA, A. A., TSAPLINA, I. A., and GORBUNOV, K. V., Institute of Microbiology, Academy of Sciences USSR, Moscow; Astrakhan Technical Institute of the Fish Industry and Economy

[Abstract] The purpose of the present work was to distinguish proteolytically-active strains of halobacterium salinarium and study the biosynthesis of protease under extreme conditions of salinity of the medium. Of 116 strains of bacteria tested, the two most active protease producing strains were selected. These two strains, both halobacterium salinarium, yield the maximum of the enzyme with an initial nutrient medium pH of 6.5 for strain 65-II and 7.0 for strain 44-III (temperature 40 C). The optimal concentration of NaCl is 4N for strain 65-II and 5N for strain 44-III. The capability for the strains to form proteolytic enzymes was judged on the basis of the degree of hydrolysis of casein in 10-14 days at 37 C on a solid medium consisting of (percent): nonfat milk-50, agar-2.5, NaCl-25, tap water-remainder, pH 7.0-7.2. NaCl concentration was varied at intervals of 1 M. Figures 4; tables 4; references 17: 7 Russian, 10 Western.

INFLUENCE OF ADDITION OF CERTAIN ENZYME INHIBITORS AND STIMULATORS TO THE  
NUTRIENT MEDIUM OF FIBRINOLYTIC AND ANTIBIOTIC ACTIVITY OF THE FUNGUS TRI-  
CHOTHECIUM ROSEUM

Moscow PRIKLADNAYA BIOKIMIYA I MIKROBIOLOGIYA in Russian Vol 13 No 4, Jul/  
Aug 77 signed to press 28 Jul 76 pp 515-519

SHARKOVA, T. S., MAKSIMOVA, R. A., ANDREYENKO, G. V., and SILAYEV, A. B.,  
Moscow State University

[Abstract] A study is made of the effect of a number of substances known as enzyme inhibitors or stimulators on the fibrinolytic and antibiotic activity of *T. Roseum*. Strain D was used in the study. Deep cultivation was performed in 600 ml flasks containing 200 ml of the medium on a rocking stand operating at 250 cycles per minute over a period of 6 days at 25-26 C. Metal-binding agents (such as EDTA) caused a sharp decrease in the overall fibrinolytic activity in the culture, but EDTA caused an increase in the activity of enzymes which activate plasminogen. SH-group reagents (such as iodine) had practically no influence on antibiotic formation or total fibrinolytic activity.  $(\text{NH}_4)_2\text{MoO}_4$  had the greatest stimulating effect on the antibiotic and fibrinolytic activity.  $\text{SnCl}_2$  and  $\text{ZnSO}_4$ , while practically not changing the antibiotic activity, depressed fibrinolytic activity.  $\text{MnSO}_4$ ,  $\text{Co}(\text{NO}_3)_2$ , and  $\text{CuCl}_2$  depressed total fibrinolytic activity.  $\text{CuCl}_2$  and  $\text{CaCl}_2$  inhibited biosynthesis of the antibiotic.  $\text{MnSO}_4$  inhibited the activity of the fibrinolytic complex and the antibiotic activity.  $\text{Co}(\text{NO}_3)_2$  inhibited the total fibrinolytic activity of the enzyme, but increased the plasminogen activation capability. Aspartic acid stimulated the growth of the fungus and the formation of the fibrinolytic complex; the antibiotic activity remained practically at the level of the control. Glucose stimulated the total fibrinolytic activity and the ability to activate plasminogen but decreased antibiotic activity. Plasminogen activation was increased and antibiotic formation decreased by  $\text{NaCl}$ . Figures 2; table 1; references 8: 6 Russian, 2 Western.

USSR

UDC 576.809.53+576.85+576.8.095.323.77

# FORMATION OF VOLATILE ACIDS BY IMMOBILIZED CELLS OF PRIONIC-ACID BACTERIA

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 13 No 4, Jul/Aug 77 signed to press 8 Nov 76 pp 531-537

VOROB'YEVA, L. I., ALEKSEYEVA, M. A., SURKOVA, I. G., and GAYTAN, V. I.,  
Moscow State University

[Abstract] The purpose of this work was to develop a method of producing preparations of immobilized propionic-acid bacteria and to use it for biosynthesis of propionic and acetic acid. The cells of prionic-acid bacteria immobilized in polyacrylamide gel can synthesize propionic and acetic acids while fermenting glucose and starch. The activity of these immobilized cells is 30% lower than that of free cells. After 7 months of activity, the formation of volatile acids had decreased by 80% in comparison to the initial productivity. Electron microscope studies showed that the decrease in acid formation resulted from lysis of a significant portion of the cells. The immobilized cells differ from free cells in their greater thermal stability and accumulate the maximum quantity of acids at 37 C, pH 6.2-7.0. In spite of the continued use of the immobilized cells for 7 months, cofactors did not have to be introduced to the incubation mixture. The work was performed with propionic acid bacteria identified as *Propionibacterium shermanii*, *P. technicum* and *P. arabinosum*. The cultures of bacteria were grown in a medium consisting of (percent): glucose-2,  $(\text{NH}_4)_2\text{SO}_4$  0.3, corn extract 2.0,  $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$  0.005, tap water, pH 6.9-7.0. Figures 3; tables 4; references 19: 11 Russian, 8 Western.

USSR

UDC 576.807.8

# USE OF AN INSTRUMENT RECORDING THE ELECTRIC CHARGE OF A CELL IN CULTIVATION OF ENDOMYCES MAGNUSII

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 13 No 4, Jul/Aug 77 signed to press 18 Nov 76 pp 621-623

GOGOLEV, M. N., YEGOROV, I. A., ZVYAGIL'SKAYA, R. A., PANTSKHAVA, YE. S., and SALTYKOV, YU. F., Institute of Biochemistry imeni A. N. Bakh, Academy of Sciences USSR, Moscow

[Abstract] Preliminary data indicate that development of a cell population of *Endomyces magnusii* is accompanied by changes not only at the cellular, but also at the subcellular and enzymatic levels. For example, it was established that the mitochondria of *Endomyces magnusii* at all of the growth stages studied, while retaining maximum effectiveness of the process of oxidative phosphorylation, manifested certain peculiarities in the regulation of energetic processes. This required strict testing and precise recording of the

physiological condition of the cell in the process of development of the population, as well as determination of the duration of the growth cycle optimal for the production of the most stable mitochondria. A correlation is demonstrated between the growth rate of the biomass of *endomyces magnusii* and the rate of change of electrical characteristics of the culture medium. The possibility is discussed of using a remote sensor recording the electrical parameters of the culture medium to check the growth of the cell population of the microorganisms. A remote sensor has been developed for this purpose at the Institute of Biochemistry imeni A. N. Bakh of the Academy of Sciences, USSR. Figures 2; references 3: 2 Russian, 1 Western.

USSR

UDC 616.36-057

DETOXIFYING AND EXCRETORY FUNCTION OF ANIMAL LIVER AFTER ACUTE POISONING WITH PESTICIDES AND PHARMACOTHERAPEUTIC AGENTS

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 6, Jun 77 signed to press 22 Oct 76 pp 26-29

KARIMOV, V. A., Uzbek Scientific Research Institute of Sanitation, Hygiene, and Occupational Diseases

[Abstract] Agricultural workers in Uzbekistan periodically come in contact with phospho- and chloroorganic pesticides, apparently by infraction of standard procedures. Treatment has been symptomatic, and the author stresses the need for study of the pathogenesis, and appropriate therapy, of acute and chronic poisonings. He undertook the title studies on rabbits. He found that a combination of lindane and rogor, in 1/2 the LD<sub>50</sub>, depressed the excretory and antitoxic functions of the liver, as revealed by liver tests with Bengal Rose, bromsulfthalein, and the Quick-Pytel test. The drugs tested (B<sub>1</sub>, B<sub>6</sub>, B<sub>12</sub>, methionine, galascorbin, dibasol, C, cocarboxylase, and mumiye) in a 15-day therapeutic trial indicated that B<sub>6</sub>, B<sub>12</sub>, galascorbin, and methionine were most effective in restoration of liver detoxifying and excretory functions. No references.

USSR

UDC 615.917'838.1

TOXICOLOGIC CHARACTERISTICS OF BENZANTHRONE AND DERIVATIVES IN RELATION TO STRUCTURE

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian No 4, 1977 pp 457-463

VOLODCHENKO, V. A., SADOKHA, YE. R., OSTROVSKAYA, I. S., and TIMOSHENKO, L. V., Industrial Toxicology Laboratory, Kharkov Institute of Labor Hygiene and Occupational Diseases, Ministry of Health Ukrainian SSR

[Abstract] Rats, mice, and rabbits were employed in an attempt to establish structure-toxicity relationships for benzanthrone (I), bromobenzanthrone (II), dibromobenzanthrone (III), dibenzanthronyl (IV), methoxybenzanthrone (V), and dibenzanthrone (VI; violanthrone). Determinations of LD<sub>50</sub> values on mice and rats revealed the following sequence in terms of molar units: IV<I<V<II<III<VI. Subacute toxicity studies revealed interspecies differences in susceptibility with resultant deviations from the norm in terms of histopathologic, hematologic, and clinical chemistry parameters. Generally, while adaptability was a feature with I, IV, and V, cumulative effects were in evidence with II and III. The pathologic changes indicative of hepatic, renal, hematopoietic, and lymphoid system damage were accompanied by a marked increase in the number of lymphoid, histiocytic, and plasmacytic cells in the connective tissues.

Congestion and edema were present in the brains of the experimental animals. In view of the fact that the pathologic findings were less pronounced with repeated administration of IV, V, and VI than seen with I, II, and III, it appears that incorporation of the methoxy group into the I molecule, as well as the conjugation of two I molecules, serves to mitigate the toxicity of this series of dyes. Tables 2; references 24: 15 Russian, 9 Western.

USSR

UDC 612.6.052.014.46:615.287.5

CYTOGENETIC STUDIES ON REPELLANT MUTAGENICITY: DIMETHYLPHTHALATE AND N,N-DIETHYLAMIDE DERIVATIVES OF PHENOXYACETIC ACID

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian No 4, 1977 pp 454-457

YURCHENKO, V. V., All-Union Scientific Research Institute of Disinfection and Sterilization, Moscow

[Abstract] Two repellants, dimethylphthalate (DMP) and N,N-diethylamide (P-203) derivatives of phenoxyacetic acid, were tested for mutagenicity on outbred albino rats and mice. Metaphasic bone marrow smears obtained from 12-15 gm male mice 20 hr after intraperitoneal injection of 1/5th LD<sub>50</sub> dose of DMP (1400 mg/kg) or P-203 (250 mg/kg) revealed a statistically significant increase in the number of chromosomal aberrations in the case of P-203 mice ( $t=4.5$ ;  $P<0.001$ ), while in the case of the DMP mice the findings were unremarkable ( $t=1.9$ ;  $P=0.08$ ). Subacute tests were conducted on 170-220 gm male rats and involved a single or multiple cutaneous applications (a total of 21-23 applications over a 1 month period) of 1250 mg/kg of DMP or P-203, with partial hepatectomy 2 days after the last application and sacrifice of the animals 28 hr thereafter. Evaluation of hepatic squash preparations in anaphase showed lack of mutagenicity after a single application of either agent. However, multiple applications lead to a marked increase in the number of chromosomal aberrations in the case of P-203 ( $t=6.8$ ;  $P 0.001$ ) and DMP ( $t=2.78$ ;  $P<0.02$ ). Tables 2; references 6: 4 Russian, 2 Western.

USSR/POLAND

UDC 615.285.7.099.07:616.33-018.73-091.8-07

MORPHOLOGIC AND HISTOCHEMICAL CHANGES IN THE GASTRIC MUCOSA OF THE RAT INDUCED BY SUBACUTE CHLOROPHOS POISONING

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian No 4, 1977 pp 451-454

KUCZINSKI, M., SAWICKI, B., and WORONECKA, H., Department of Histology and Embryology, Institute of Biostructure, Bialystok Medical Academy, Poland

[Abstract] Histologic and histochemical studies were performed on gastric mucosa obtained from 94 male Wistar rats (3-4 months old; 220-250 gm in weight) subjected to intragastric administration of chlorophos (CLP) in doses of 250 mg/kg/day (1/2 LD<sub>50</sub> dose), 10 mg/kg/day (1/5th LD<sub>50</sub> dose), or 5 mg/kg/day (1/10th LD<sub>50</sub> dose) for 21 days. Histopathologic examination of the glandular elements revealed dose-dependent structural changes which were particularly marked in the case of the chief cells (darker H&E staining, homogenization, separation from fundus membrane, etc.). Histochemical evaluation of acid phosphatase (AcP) and alkaline phosphatase activities showed the former to be depressed in CLP treated rats vis-a-vis physiologic saline treated animals, while the latter activity remained unaltered. Depression of AcP activity in the chief cells was interpreted to reflect CLP mediated suppression of pepsinogen secretion since this enzyme is felt to destroy excess pepsinogen in chief cell cytoplasm. Figures 4; references 10: 6 Russian, 1 Polish, 3 Western.

USSR

UDC 616.5-057.001"1976-1980"

MAIN DIRECTIONS OF STUDY OF OCCUPATIONAL DERMATOSES IN LEADING BRANCHES OF INDUSTRY IN 1976-1980

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 6, Jun 77 signed to press 20 Jul 76 pp 4-8

SOMOV, B. A., and BRUYEVICH, T. S., Institute of Labor Hygiene and Occupational Diseases, Academy of Medical Sciences USSR

[Abstract] The implementation of a whole series of technological measures on the modernization, automation and mechanization of production processes has reduced the occurrence of occupational dermatoses in the leading branches of industry. In some occupations none occur. However, the main occupational pathology of the skin registered by the health service is caused by chemicals, as a result of the greater production of new chemicals and their wide introduction into all branches of industry. The main direction is study of the various conditions under which occupational dermatoses develop, especially in key industries.

USSR

UDC 633.511 632.95.028

RESIDUAL QUANTITIES OF DALAPON IN THE SOIL AND COTTON PLANTS

Moscow DOKLADY VSESOYUZNOI ORDENA LENINA AKADEMII SEL'SKOKHOZYAYSTVENNYKH  
NAUK IMENI V. I. LENINA in Russian No 6, Jun 77 signed to press 26 Nov 76  
p 43

ALIMOV, A., Central Asian Scientific Research Institute of Plant Protection

[Abstract] Investigations were conducted to determine residual quantities of Dapalon in the soil and cotton plants in various phases of their development. It was found that the application of Dapalon on the same section for 2 years in a row leads to its accumulation in cotton seeds. In addition, the standard for the application of Dapalon on cotton sowings was determined.

USSR

UDC 599.537:591.432.2:591.473.32

PHARYNGEAL MUSCLES OF BLACK SEA DOLPHINS

Moscow ZOOLOGICHESKIY ZHURNAL in Russian Vol 56 No 7, Jul 77 pp 1092-1099

VRONSKIY, A. A., Institute of Zoology, Academy of Sciences UkrSSR, Kiev

[Abstract] Study of the title muscles was carried out in three species of dolphins, of the Black and Azov Seas: *Tursiops truncatus* (10), *Phocaena phocaena* (22), and *Delphinus delphis* (13). Sex and age of the animals were not determined. The authors used a muscle classification of G. A. Gimmel'-reykh who (1959) announced that four, basic, morphofunctional groups of muscles are to be distinguished in the nasopharynx, muscles of the tongue sector of the pharynx, the sublingual-pharyngeal group, and the laryngo-pharyngeal group. The study showed changes which have occurred in the pharynx structure of dolphins as a consequence of their adaptation to a water environment: i) formation--by the musculature of the tongue, the sublingual bone and cranial sector of the pharynx--of external and internal muscular walls of the stomatopharynx; ii) presence of a well-developed nasopharyngeal sphincter which provides isolation of the nasopharynx from lower-lying sectors of the pharynx; iii) fixation of the apex of the arytenoid-epiglottal tube in the cavity of the nasopharynx by the nasopharyngeal sphincter which provides complete and constant separation of the alimentary and air-carrying paths; iv) presence of vomero-pharyngeal and occipital-thyroid muscles, not described in terrestrial mammals. The swallowing action of the stomatopharyngeal musculature provides a sucking in of the food object into the pharyngeal cavity and advancing of it into the caudal sector of the pharynx. Figures 2; references 19: 12 Russian, 7 Western.

USSR

UDC 576.852.184.095 615.332(Nocamycinum

PRODUCTION OF NOCAMYCIN, A NEW ANTIBIOTIC BY NOCARDIOPSIS SYRINGAE SP. NOV.

Moscow ANTIBIOTIKI in Russian No 6, 1977 signed to press 4 Feb 77 pp 483-486

GAUZE, G. F., SVESHNIKOVA, M. A., UKHOLINA, R. S., KOMAROVA, G. N., and BAZHANOV, V. S., Institute for Investigation of New Antibiotics, Academy of Medical Sciences USSR, Moscow

[Abstract] The antibiotic produced by a new actinomycetous species, *Nocardiosis syringae*, was named nocamycin. It was produced when the organism was cultivated in a nutrient medium containing soybean meal, glycerin, sodium chloride and calcium carbonate. Nocamycin has a relatively low antitumor activity, inhibiting by 72-73% intraperitoneally implanted lymphadenosis of strain NK/LI in mice. Figure 1; tables 2; references 2 (Western).

USSR

UDC 615.332(Nocamycinum).011.4

PHYSICOCHEMICAL CHARACTERISTICS OF NOCAMYCIN, A NEW ANTITUMOR ANTIBIOTIC

Moscow ANTIBIOTIKI in Russian No 6, 1977 signed to press 4 Feb 77 pp 486-489

BRAZHNIKOVA, M. G., KONSTANTINOVA, N. V., POTAPOVA, N. P., and TOLSTYKH, I. V., Institute for Investigation of New Antibiotics, Academy of Medical Sciences USSR, Moscow

[Abstract] Nocamycin is produced by *Nocardiosis syringae* and recovered from the culture fluid by chloroform extraction. It has a molecular weight of 503, melting point 147-149°,  $[\alpha]_D^{20} = -50^\circ$ ,  $\lambda_{\max} = 235$  and 348 nm ( $E_{1\%}^{1\text{cm}} = 150$  and 420), a summary formula  $C_{26}H_{33}NO_5$  and a biological activity of 100,000 units/mg with respect to *Bacillus mycoides*. It forms salts with alkalies, soluble in water. Nocamycin is a natural substance not previously described. Figures 3; reference 1 (Russian).

## SPECIES COMPOSITION OF MICROORGANISMS WHICH OXIDIZE ANABASINE

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR in Russian No 3, 1977 pp 22-26

UMIRBAYEVA, K. ZH.

[Abstract] Storage of anabesine at the Chimkent Chemical-Pharmaceutical Plant was accompanied by a loss of anabesine which, in the final analysis, led to reduction of yield of valuable production. This provided the basis for the study of the breakdown of anabesine by microorganisms. A study of samples of anabesine from "Dormina" Sovkhoz of Chimkent oblast involving the isolation and identification of eiphyte microorganisms of it-segek (*Anabasis aphylla* L.) indicated that the increase of number of bacterial cells on the anabesine plant surface and in the rhizosphere soil is directly dependent upon the time of gathering samples and the storage conditions in the warehouse. Of the 62 strains isolated from the plant organs and the rhizosphere soil, morpho-physiological and biochemical characteristics of 43 strains were obtained. Isolated cultures were assigned to the following genera: *Micrococcus* Cohn, 1872; *Planococcus* Migula, 1900; *Pseudomonas* Migula, 1900; *Planosarcina* Migula, 1900; *Proactinomyces* Jensen, 1934; *Sarcina* Gruber, 1895; *Streptococcus* Billroth, 1975; *Micromonospora* Oerskov, 1923. All of the epiphytes of anabesine used anabesine as a single source of carbon and nitrogen, isolating the blue pigment in the substrate. Table 1; references 8: 3 Russian, 5 Western.

USSR

UDC 576.858.9

USE OF POWERFUL COHERENT LIGHT FOR DESTRUCTION OF  $C_D$  PHAGE CAPSID IN ORDER TO STUDY DNA PACKING

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 235 No 2, Jul 77 signed to press 5 Apr 77 pp 491-493

MANYKHIN, A. A., FANNIBO, A. K., MANYKHIN, E. A., and KLIMENKO, S. M., Institute of Virology imeni D. I. Ivanovskiy, Academy of Medical Sciences USSR, Moscow; Moscow Engineering Physics Institute

[Abstract] The nature of packing of DNA in bacteriophages is explained by two basic models advanced by two groups of investigators. Clarification of the packing, based on electron microscopy data, collected on partially or completely destroyed capsids, is not satisfactory, because breakdown of the protein membrane disorganizes the packed DNA and may lead to loss of the initial configuration of the intraphage DNA. The authors have used a 30 J ruby laser to break down the various macromolecular structures, since the technique leaves the remaining cellular organelles morphologically intact. Phage  $C_D$  in phosphate buffer, pH 7, in a solution of Janus green dye (Merck, Darmstadt) in a 10x10 mm cuvette was irradiated by the laser in free generation, with the optical pulse in a relatively smooth form, 1 msec duration. Data support the model of DNA packing as though in the form of a "spool" or "coil of rope." The stretching of the head with respect to the axis of the tail more logically supports the "coil of rope" form rather than the spool form. The data do not indicate the presence of a 75 Å diameter superspiral in the packed DNA. The mechanism of interaction of the laser and the dye, and of the destruction of the capsid, is discussed. The authors feel that laser irradiation of some viruses will assist preparation of specimens for electron microscopy of virion structures which are close to their initial organization. References 14: 5 Russian, 9 Western.

USSR

UDC 547.963.32

## FRACTIONATION AND PURIFICATION OF DNA METHYLASES AND OF SPECIFIC ENDONUCLEASES FROM ESCHERICHIA COLI SK CELLS

Moscow BIOKHIMIYA in Russian Vol 42 No 4, Apr 77 signed to press 2 Jul 76 pp 598-608

MIKOL'SKAYA, I. I., ALEKSANDROVA, S. S., LOPATINA, N. G., and DEBOV, S. S., Laboratory of Enzymology, Academy of Medical Sciences USSR, Moscow

[Abstract] The phenomenon of DNA specificity with respect to host prokaryotic cells, and the enzymological basis for this specificity, has received increasing attention in recent years in connection with the application of restrictive endonucleases in gene-engineering studies. Attention in the

present article has been given to DNA methylases, but the purpose of the work was to examine the entire system of host specificity of *E. coli* SK, including its restrictive components. Materials employed included S-adenosyl-L-methionine- $H^3$  (S-AM), from the Amersham, England, company; DNA-thymus, from Calbiochem; anionite DEAE-cellulose, from the English firm's Whatman DE-52; cationite, Whatman KM-cellulose; electrophoresis agarose, Bio-Rad, USA; non-ionic detergent, triton X-100, Ferak, West Berlin. Most efficient purification was by precipitation of proteins by 0.6 saturated ammonium sulfate with subsequent chromatography on KM-cellulose and concentration of fractions by dialysis against glycerol. Under these conditions, the methylase activity produced 4 discrete fractions. Due to purification, the specific activity of methylases increased 11-20-fold in various fractions. Methylase from the first (A) and fourth ( $B_{11}$ ) peaks catalyzed methylation of cytosine to produce 5-methylcytosine; methylase from the third peak ( $B_1$ ) methylated adenine to produce 6-methylaminopurine. Chemical specificity of the second peak (B) methylase could not be established due to very high lability of the enzyme in this fraction. Specific endonuclease was found in the gradient zones eluted by 0.1-0.2 M and 0.65-0.75 M NaCl. The authors believe that the enzymes providing DNA hydrolysis up to the formation of high molecular discrete fragments, are restricting endonucleases of the SK system. Several types of methylases and restricting endonucleases appear to be present in *E. coli* SK cells. Figures 7; tables 3; references 10: 3 Russian, 7 Western (3 are of Soviet origin).

USSR

UDC 576.8.8

# REPETITION OF NUCLEOTIDE SEQUENCES IN RNA FRAGMENTS OF BARLEY STRIPE MOSAIC VIRUSES

Moscow BIOLOGICHESKIYE NAUKI in Russian No 6, 1977 signed to press 29 Dec 76 pp 23-26

TAL'YANSKIY, M. E., MALYSHENKO, S. I., BOYKOV, S. V., and LOMONOSOV, M. V.

[Abstract] The authors suggest that the gene of the structural protein and other genes are doubled in all fragments of the genome of barley stripe mosaic virus (BSMV) and that BSMV is a multiploid virus. Direct proof of this suggestion would be provided by evidence of the presence of homologous nucleotide sequences in the makeup of the individual fragments of the genome of BSMV; the authors have undertaken molecular hybridization of individual RNA fragments of BSMV with a two-spiral replicative form of the RNA of the virus and have found support for doubling of the genetic information in the BSMV RNA fragments.

Strains Nx and Norwich were used in the experiments; the genome of Nx contains 2 RNA fragments, Norwich 3. Hybridization of the two-spiral replicative form of BSMV with the mono-spiral virion RNA shows presence of substantial homology of the nucleotide sequences between individual fragments (RNA 1 and RNA 2) of

the Nx strain and RNA 3 or the Norwich strain. Figure 1; table 1; references 9: 3 Russian, 6 Western (one of these is from the authors' laboratory).

USSR

UDC 576.8.8

COMPARATIVE ANALYSIS OF TRANSLATION PRODUCTS OF RNA STRAINS OF BARLEY STRIPE MOSAIC VIRUS WITH TWO- AND THREE-COMPONENT GENOMES

Moscow BIOLOGICHESKIYE NAUKI in Russian No 6, 1977 signed to press 29 Dec 76 pp 18-22

NEGRUK, V. I., DOLYA, V. V., and ATABEKOV, I. G., Moscow State University imeni L. V. Lomonosov

[Abstract] The genome of barley stripe mosaic virus (BSMV) is fragmented; it is composed of assemblies of physically independent fragments, none of which alone possess infectivity. Different strains of BSMV differ in the number of fragments in the genome; the Ture strain has two, the Norwich strain, three fragments. The authors have attempted to estimate the volume and character of the genetic information in each of the three fragments of the Norwich strain of BSMV and, also, to compare the products of in vitro translation of BSMV strains with the Ture two-component, and Norwich three-component genomes. (The Norwich strain was supplied by Dr. L. C. Lane, the Ture strain by Dr. T. V. Carroll). The authors' laboratory had previously (1976) shown the possibility of gene doubling in the composition of separate fragments of RNA barley stripe mosaic virus; similarity was revealed in assemblies of the polypeptide products of independent translation of RNA 1 and RNA 2 of the R (Russian) two-component strain. They found great similarity in the assemblies of the polypeptides formed in the translation of total preparations of the RNA strains of the BSMV with the Ture and Norwich strains in a cell-free protein-producing system from wheat embryo. The separate components of the Norwich strain, RNA 1, RNA 2, and RNA 3 were separated on polyacrylamide gel by electrophoresis. In the translation of RNA 2, a polypeptide is formed which is analogous to the protein of the viral membrane; in translation of RNA 1 and RNA 3, three heavier components are also formed. Figures 3; references 7: 2 Russian, 5 Western (two of these from the authors' laboratory).

COMPARATIVE ANALYSIS OF THE KINETICS OF RENATURATION OF FRESHLY SYNTHESIZED AND TOTAL DNA OF EUCARYOTES AS A METHOD OF EXPOSITION OF THE SELECTIVE SYNTHESIS OF THE GENOME

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 11 No 4, Jul/Aug 77 signed to press 20 Sep 76 pp 941-949

ROMANOV, G. A., and VANYUSHIN, B. F., Moscow State University imeni M. V. Lomonosov

[Abstract] The authors have made use of the method of the kinetics of renaturation of DNA to examine features of selective eucaryotic synthesis of a genome. That method helps to reveal the structure of organization of a genome, but also functional changes in the assemblies of DNA sequences. Their proposed adaptation of the method combines isotope marking, in vivo, of newly synthesized DNA with subsequent analysis of the kinetics of renaturation of DNA based on the total quantity of nucleotide material--total DNA--and on the radioactivity--the fresh DNA. The procedure utilizes a special computer program in the examination of the basic situations which can be met in a study of the selective synthesis of DNA in eucaryotes. The Seiko (Japanese) computer is used; the program is derived from the equation

$$C/C_0 = 1/(1 + K C_0 t)$$

where C is the concentration of denatured DNA;  $C_0$  the total concentration of DNA; t is the time; and K is the renaturation rate constant. The program involves an experimentally derived curve of renaturation of rat liver DNA: a theoretical study is made of the incidence of amplifications, incidences which vary with respect to multiplicity (from 50 to 2) taking into account the difference proportions of inclusions of the radioactive precursor into the amplified and other sequences of the DNA. The authors employ graphic analysis of the experiments involved in assaying the changes in specific radioactivity of the denatured and renatured DNA fractions as a function of the  $C_0 t$  value. This method is said to have great sensitivity, reliability, and simplicity. They show the basic patterns of changes in specific radioactivity of the DNA fractions with various instances of amplification; amplification of any multiplicity or "complexity" leads to regular and essential changes in the specific radioactivity of the denatured and renatured DNA at high values for  $C_0 t$ . The method can be used to determine the nature of the synthesis of rat liver DNA under normal conditions and when induced by hormone action. Selective synthesis of DNA apparently does not take place in the rat liver under normal conditions or under hormonal induction (hydrocortisone), hence hormonal induction of synthesis of RNA is not the consequence of additional synthesis of DNA matrices. Figures 5; references 30: 5 Russian, 25 Western (one of these is of Soviet origin).

## PHYSICAL CHEMICAL PROPERTIES OF SEVERAL PHAGES OF BACILLUS THURINGIENSIS

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 11 No 4, Jul/Aug 77 signed to press 1 Sep 76 pp 901-907

BOGUSH, V. G., SMIRNOV, V. B., REBENTISH, B. A., PERMOGOROV, V. I., AZIZ-BEKYAN, R. R., All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow

[Abstract] *B. thuringiensis* is important as the producer of the entomopathogenic protein delta-endotoxin. To clarify the mechanisms of the mutual effect of phages and cells of *B. thuringiensis*, the authors have undertaken a fundamental study of the biological and physical chemical properties of three representative phages of this bacteria; the strain used was 351 *B. thuringiensis* var. *galeria*, and phages Tg9, Tg10, and Tg13. Study was also made of the molecular weights of the double spiral DNA from these phages. The m. w. determination was done by electron microscopy of the molecule length, and by sedimentation constant. The m. w. of DNA of Tg10 phage was also measured by taking the sum of molecular weights of the fragments of restriction produced after hydrolysis with Eco RI endonuclease. The content of GC pairs, determined by m.p., was 37.9, 33.4, and 35.1% for Tg9, Tg10, and Tg13. The authors suggest, based on measurements of the intervals of melting of the DNA, that the DNA of phages Tg9 and Tg13 displays random distribution of pairs of the bases, whereas DNA of phage Tg10 may have a cluster-type distribution of GC pairs along the molecule length. Eco RI restrictase (produced from the biomass of the *C. coli* strain NML82) cleaves Tg10 DNA phage into six fragments of varying m. w. whereas Tg9 and Tg13 DNA phages are resistant to the enzyme action. The Tg10 DNA phage may occur in linear and ring forms. Biological and morphological properties of the phages are tabulated. Figures 4; tables 4; references 9: 1 Russian, 8 Western.

## INDUCTION OF COLICIN EI SYNTHESIS IN ESCHERICHIA COLI CELLS WHICH CONTAIN DIFFERENT AMOUNTS OF PLASMID DNA

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 11 No 4, Jul/Aug 77 signed to press 25 Jun 76 pp 757-765

KHMEL', I. A., VOROB'YEVA, I. P., BOGDANOVA, S. L., POLYANIN, V. P., and FETISOVA, I. V., Institute of Atomic Energy imeni I. V. Kurchatov, Moscow

[Abstract] The authors have examined spontaneous induction of colicin EI synthesis, and induction in response to the action of a DNA-tropic agent N-methyl-N'-nitro-N-nitrosoguanidine, in *E. coli* K12S (EI) cells with a different content of DNA Col EI (Col EI is the colicinogenic factor of EI).

The number of copies of plasmid DNA in a cell changed during cultivation of colicinogenic cells on media supplied with different sources of carbon, and in the cycle of synchronous cell division: the number of copies decreased with increase in time of cultivation; it immediately rose with protraction of the cycle of synchronous cell division. The authors did not find that the magnitude of the spontaneous induction or that of the nitrosoguanidine-provoked induction were a function of the number of copies of DNA Col EI in the coli cell. They conclude that the plasmid DNA content in the cell does not basically define the level of induction of colicin EI synthesis. Figures 4; table 1; references 15: 5 Russian, 10 Western.

USSR

UDC 612.822.1 612.822.3

RNA SYNTHESIS IN IDENTIFIED GIANT NEURON OF *Limnaea stagnalis* DURING GENERATION OF ACTION POTENTIAL IN RESPONSE TO DIRECT ELECTRICAL STIMULATION

Moscow FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 63 No 6, Jun 77 signed to press 6 Jul 76 pp 814-820

D'YAKONOVA, T. L., Laboratory of Bionics of Memory Systems, Institute of Oceanology imeni P. P. Shirshov, Academy of Sciences USSR, Moscow

[Abstract] It was shown by autoradiographic study of RNA synthesis that  $H^3$ -uridine incorporation in the giant neuron of the brain of the mollusk *Limnaea stagnalis* decreased during the generation of action potential in response to direct stimulation by an intracellular electrode. The relationship between variations of RNA synthesis in the neuron and the number of action potentials was nonlinear, although the effect was observed in each experiment. It is to be assumed that an electrically stimulated membrane participates in the regulation of RNA metabolism in the nerve cell. Figures 3; references 20: 9 Russian, 11 Western.

USSR

UDC 612.827 612.84

EFFECTS OF ELECTRICAL STIMULATION OF THE CEREBELLAR DENTATE NUCLEUS ON THE ACTIVITY OF NEURONS OF THE CENTER MEDIAN OF THE THALAMIC TUBERCLE

Moscow FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 63 No 6, Jun 77 signed to press 28 Sep 76 pp 797-805

AYRAPETYAN, A. A., and VAGANYAN, L. G., Laboratory of Evolution of Subcortical Structures of the Brain, Institute of Physiology imeni L. A. Orbeli, Academy of Sciences Armenian SSR, Yerevan

[Abstract] Electrical stimulation of the cerebellar dentate nucleus evokes, in neurons of the center median, responses with constant and variable latent periods. The latter constitute a majority and have a period of up to 20 milliseconds. Reactions with early and late components are registered in both cases. Inhibition periods of 50-100 msec were induced. Center median unit activity was synchronized during low-frequency stimulation, often preceded by inhibition periods. The effects ceased immediately after the stimulation was halted in 34% of the neurons and tonic influences were observed in 66%. Figures 5; table 1; references 20: 8 Russian, 12 Western.

USSR/BULGARIA

UDC 615.277.3.099

## THALIBLASTIN TOXICITY

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian No 4, 1977 pp 448-451

MIRCHEVA, Y., and STOICHKOV, Y., Oncology Research Institute, Medical Academy, People's Republic of Bulgaria, Sofia

[Abstract] Thaliblastin (TB), an antineoplastic agent derived from *Thalictrum minus* ssp. *elatum*, and containing 93-95% thalicarpine by composition, was tested for toxicity as a 2% percent solution administered intraperitoneally to male and female 80-120 gm Wistar rats and 20-22 gm DBA/2, C57BL/6, and BALB/c mice, as well as DBF<sub>1</sub> (C57BL/6 x DBA/2) hybrid and outbred mice. A single TB injection yielded the following LD<sub>10</sub>, LD<sub>50</sub>, and LD<sub>90</sub> data for the mice: 275-306 mg/kg, 325-350 mg/kg, and 370-420 mg/kg, respectively; the analogous rat data were 258, 310, and 380 mg/kg. Administration of TB for 5 days resulted in corresponding values of 102-165 mg/kg, 125-201 mg/kg, and 154-243 mg/kg for the mice, and 170, 203, and 272 mg/kg for the rats. A 20-day course of TB administration to outbred mice yielded toxicity data of 155, 185, and 220 mg/kg, respectively. While initially the Wistar rats appeared to be more susceptible to the toxic effects of TB than the mice, and the outbred mice seemed to be more resistant than the pure lines of mice, after 20 days there were no significant inter- or intraspecies differences. Administration of a single LD<sub>10</sub> dose, of one LD<sub>10</sub> dose/day for 5 days, or 4 injections of an LD<sub>10</sub> dose at 48 hr intervals to DBA/2 mice resulted in a drop in body weight of 13.1-16.4% 2 days after the last injection, with recovery to pre-injection weight by the 20th postinjection day. However, the treated mice continued to lag in body weight vis-a-vis untreated mice. Figures 1; tables 1; references 9: 1 Russian, 4 Bulgarian, 4 Western.

USSR

UDC 615.32/322

## PHARMACOLOGICAL PROPERTIES OF THE ALKALOID 1-SKULERIN

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 6, Jun 77 signed to press 5 Jul 76 pp 39-41

SADBRITDINOV, F. S., and KHAMDAMOV, I., Laboratory of Pharmacology and Chemotherapy, Institute of Chemistry of Plant Substances, Academy of Sciences UzbekSSR

[Abstract] The title alkaloid was first isolated, from *Corydalis Scouleri* (Brochmann-Hansen, 1966), and, later, from *Corydalis pseudoadunca* (M. U. Ibrogimova, et al, 1970). Its pharmacological properties have not yet been studied, hence its title study, in the form of the hydrochloride. Effect on behavior was tested in mice, rats, and dogs; effect on motor action in mice,

based on movement coordination; effect on sensitivity to pain in rats (A. K. Sangaylo, 1956, technique; effect on aggression (Tedeschi, 1959), on electro-defense conditioned reflexes, in rats and dogs. Other studies included its action in combination with caffeine and phenamine, its antiemetic action, its toxicity for white mice, and its effect on circulation, respiratory and the peripheral nervous system in narcotized cats. 1-Skulerin has a pronounced inhibitory action in the central nervous system: it depresses motor activity, lowers the toxicity of phenamine in mice, depresses provoked aggression and conditioned reflexes in rats and has an antiemetic action in dogs. It has a greater sedative and tranquillizing action than gindarin, or tetrahydroberberine, but is distinguished from the latter by a more pronounced cataleptic action; this is attributed to the presence of two hydroxyl groups, at positions 2 and 9, in the berberine skeleton. Figures 2; no references (authors and dates are cited in the text).

USSR

UDC 616.831/.832-057-092.4

#### EFFECT OF GLYCERETIC ACID DERIVATIVES ON THE CENTRAL NERVOUS SYSTEM

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 6, Jun 77 signed to press 25 Feb 77 pp 15-17

NURMUKHAMEDOVA, SH. D., AZIMOV, M. M., and KAMILOV, I. K., Department of Pharmacology, Tashkent Order of Labor's Red Banner Medical Institute

[Abstract] The authors have observed that certain doses of the title substances evoke a general depression in experimental animals, which is manifested by decreased motor activity and development of flaccidity. In the present article they report their study of the effect of 18-dehydroglyceretic acid, the 3-amino derivative, and the ammonium salt of glyceretic acid--which induce depression--on the central nervous system of 18-23 g white mice; specifically, they tested the influence of the derivatives on the soporific action of barbamil, sodium etaminal, chloralhydrate, and viadril. The derivatives prolong the action of all of the somnifacients and narcotics; they lower the body temperature slightly, and they intensify the analgesic action of morphine. Table 1; references none: several authors are cited in the text by name and date.

USSR

UDC 612.114.3

INFLUENCE OF EXPERIMENTAL POSTTRANSFUSIONAL POLYCYTHEMIA ON RESISTANCE OF ANIMALS TO ACUTE HYPOXIA

Moscow FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 63 No 6, Jun 77 signed to press 25 Oct 76 pp 911-913

SHCHERBA, M. M., TROSHIKHIN, G. V., VOLZHSKAYA, A. M., ROZOVA, YE. I., and ASHIRBEKOVA, A. A., Laboratory of Experimental and Clinical Hematology, Institute of Physiology imeni I. P. Pavlov, Academy of Sciences USSR, Leningrad

[Abstract] Investigations were conducted on rats to verify the importance of the factor of increase of the number of erythrocytes in the blood as an adaptational mechanism to oxygen insufficiency in acute hypoxia. Rats with experimental posttransfusional polycythemia were found to be less resistant to acute hypoxia than intact rats in spite of increased oxygen capacity of the blood on account of the greater mass of erythrocytes. Figure 1; table 1; references 9: 2 Russian, 7 Western.

USSR

EFFECT OF MINERAL FERTILIZERS ON THE DEVELOPMENT OF INBRED WHEAT RUST

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR in Russian No 3, 1977 pp 72-74

ABIYEV, S.

[Abstract] A 3-year study (1970-1972) of the effect of different mineral fertilizers on development of inbred wheat rust involved experiments under conditions existing in the steppe foothills zone on artificially infected dark-chestnut soil. Phosphorus fertilizers (60 kg/hectare), applied at the beginning of working the soil, increased the wheat plants' resistance to inbred rust. Unilateral application of nitrogen fertilizer increased the activity of wheat rust but helped to increase yields in years of weak development of rust (1971). In years of high development of wheat rust (1972), the improvement in yield by the use of nitrogen fertilizers was offset by increased rust development due to the nitrogen. Combined use of phosphorus and nitrogen increased the resistance of wheat plants to inbred rust and limited the loss of yield from this disease. Tables 2.

USSR

COMPARISON OF BIOLOGICAL VALUE OF PROTEINS FROM WHEAT, RYE, AND TRITIKALE

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 13 No 4, Jul/Aug 77 signed to press 11 Mar 77 pp 595-599

ZHMAKINA, O. A., RYADCHIKOV, V. G., and KRETOVICH, V. L., Moscow Technological Institute of the Food Industry; Krasnodar Scientific Research Institute for Agriculture

[Abstract] This work is dedicated to a study of the biological value of the grain of domestic forms of triticale, which was fed to animals in comparison studies with rye and wheat grain. The material used in the study was triticale type AD-196 and various varieties of wheat and rye from the 1975 harvest grown in State selection stations. The content of protein in the grain was determined by the Kjeldahl method, the lysine content using an automatic amino acid analyzer, and biological experiments were performed by the standard method using male white rats of the Wistar line at the Krasnodar Scientific Research Institute for Agriculture. Characteristics studied included growth rate, feed expended per gram of weight gain, effectiveness and digestibility of protein, and deposition of nitrogen in the bodies of the rats. The biological value of the proteins from the triticale was found to be inferior to that of the proteins in rye, but superior to that of the proteins in wheat. Figure 1; tables 4; references 6: 1 Russian, 5 Western.

## POLYMORPHISM OF GLYADIN AND ITS USE IN THE IDENTIFICATION OF VARIETIES AND RECORDING OF GENETIC RESOURCES OF WHEAT AND OTHER CEREALS

Moscow VESTNIK SEL'SKOKHOZYAYSTVENNOY NAUKI in Russian No 7, Jul 1977 pp 84-93

KONAREV, V. G., corresponding member of All-Union Agricultural Scientific Research Academy, and GAVRILYUK, I. P., and GUBAREVA, N. K., candidates of biological sciences, All-Union Scientific Research Institute for Plant Growing

[Abstract] Glyadin is an alcohol-soluble storage protein of wheat, a typical representative of the prolamines. It is poor in lysine and unusually rich in proline and glutamic acid, primarily present as glutamine. Recently, glyadin has attracted the attention of researchers as an object of biochemical genetic and phylogenetic studies, since it is quite polymorphous, the rich spectrum of its components reflecting the specificity of varieties and biotypes, so that it can be used as a system of protein markers in genome and genetic analysis and variety identification of wheat. The standard (or integral) spectrum of electrophoresis contains some 30 basic positions divided among the four basic fractions. Using this standard, the numbers of positions occupied by the electrophoretic components can describe the glyadin of any variety or biotype. Electrophoresis is the most convenient method of determining the variety specificity of wheat available at the present time and is the basis for the creation of an efficient system of recording the genetic resources of cereals, based on the spectrum of prolamine components. As methods of identification of components of this polymorphous protein are improved, the accuracy of analysis and value of the results produced will increase. Further interpretation of the genetic and phylogenetic information on varieties encoded in the spectra of prolamine and variety formulas will be facilitated by the combination of electrophoresis with other modern biochemical methods. Tables 3; references 50: 25 Russian, 25 Western.

USSR

FRACTIONAL COMPOSITION AND METHYLATION OF THE HISTONES OF LIVER CELL NUCLEI  
AT VARIOUS STAGES OF RADIATION DAMAGE

Kiev UKRAYINS'KYI BIOKHIMICHNYI ZHURNAL in Ukrainian Vol 49 No 1, 1977 signed  
to press pp 11-14

MEL'NYK, G. G., TSUDZEVICH, B. O., and KUCHERENKO, M. YE., Department of Bio-  
chemistry, Kiev State University imeni Shevchenko

[Abstract] Histones play an important role in the regulation of genetic activity, and also in certain other metabolic processes of cell nuclei. For this reason study of the fractional composition of histones, and of their interaction with DNA to form a nucleoprotein complex, is especially important; the same applies to the condition of processes before being transformed by methylation, acetylation and phosphorylation. Ionizing radiation produces distinct changes in the chromosomes, which are composed of DNA and histones. Study of radiation damage to the histones may therefore yield important information on the molecular nature of early radiation effects at the level of the cellular genetic apparatus. White rats were irradiated with the RUM-13 apparatus, with voltage of 190 kw and current strength of  $10^{-6}$ a. They were then dissected for investigation of chromosomal damage at periods of 2, 12, and 24 hours following the irradiation. The most notable changes in content of the different fractions of the histones was toward reduction (in percents) of F2a<sub>1</sub> and F2a<sub>2</sub> after 12 hrs, and F2a<sub>1</sub> after 24 hrs. The content of fractions F2b + F<sub>3</sub> had increased by 41.8% after 12 hrs. Intensity of methylation of all fractions after 2 hrs had increased significantly, while after 12 hrs this process was suppressed in fractions F2a<sub>1</sub> and F<sub>3</sub>, and after 24 hrs in F<sub>3</sub> and F<sub>1</sub> as well (in comparison with the norm). Relative amounts of the various fractions after the stated periods following irradiation are illustrated with block diagrams. Figure 1; references 18 (mainly English).

ASPARTATE-CARBAMOYLTRANSFERASE ACTIVITY IN RABBIT LIVER TISSUE, IN THE PRESENCE OF X-RAY IRRADIATION AND ADMINISTRATION OF VITAMINS AND ATP

Kiev UKRAYINS'KYI BIOKHIMICHNYI ZHURNAL in Ukrainian Vol 49 No 1, 1977 signed to press 14 Apr 75 pp 37-40

SAVITS'KIY, V. I., Odessa Medical Institute imeni N. I. Pirogov

[Abstract] Aspartate-carbamoyltransferase (ACT) is a very widespread allosteric enzyme. Its activity under the effects of a total radiation dose of 450 R was studied with the use of male rabbits which had previously been given doses of vitamin B<sub>6</sub> (one test animal had been given ATP in combination with a number of other vitamins). A study was then made of the animals' liver tissue at periods of 30 min, 2, 6, and 24 hrs, and 5, 10, 15 and 30 days following the irradiation. In 24 hrs the activity of ACT was greatly weakened; after this time, the activity gradually built up from day to day, except for the 10th day, when it diminished again, nearly to the normal level. Administration of pyridoxine, B<sub>6</sub> + ATP, or a combination of vitamins with macroenergy, was found to intensify ACT action, and to do so in proportion to the complexity of the "prescription." Table 1; references 22: 8 Russian, 14 Western.

USSR

UDC 617-001.17-001.36-085.384

RHEOPOLYGLUCINE AND CYTOCHROME C IN BURN SHOCK TREATMENT

Moscow PROBLEMY GEMATOLOGII I PERELIVANIYA KROVI in Russian Vol 22 No 6, Jun 77 signed to press 5 Oct 76 pp 22-26

KOCHETYGOV, N. I., professor, and BULAVIN, O. N., Laboratory of Experimental Pathology, Leningrad Institute of Hematology and Blood Transfusion

[Abstract] Burn shock is characterized by the development of severe oxygen insufficiency; infusion therapy, used in severe burn shock to restore blood circulation, does not completely eliminate oxygen insufficiency. One reason for this can be the development of tissue hypoxia, caused by inhibition of the activity of respiratory enzymes. In experiments on rabbits with burn shock there were early disturbances of circulation, oxygen transport and metabolism. The hemodynamic indices, oxygen supply, and acid-base balance were considerably improved or restored to normal by administering cytochrome C and rheopolyglucine. Rheopolyglucine alone was less effective. Figures 2; references 17: 14 Russian, 1 Hungarian, 2 Western.

USSR

UDC 614.37.+616.155.3

ANTITUMOR ACTION OF VACCINES FROM MICROORGANISMS ISOLATED FROM CATTLE AFFECTED WITH LEUCOSIS

Moscow VESTNIK SEL'SKOKHOZYAYSTVENNOY NAUKI in Russian No 6, Jun 77 pp 95-100

BARKHUDARYAN, V. A., candidate of veterinarian sciences, GEVONDYAN, V. S., candidate of biological sciences, and KARPOV, V. P., Institute of Experimental Veterinary Medicine (VIEV)

[Abstract] In the absence of etiotropic therapy, and especially, where certain pathologies, e.g., tumors and leucoses, are accompanied by a drop in natural immunity, investigators have been searching for means to stimulate the natural cellular and humoral factors of bodily resistance. The authors cite research in immunotherapy and note the absence of data on the antitumor properties of bacteria isolated from animals affected with malignant neoplasms and leucoses. They have, therefore, investigated the antitumor action of a vaccine isolated by the A. S. Troitskaya method, from a cow with leucosis (diagnosis established by clinical hematological examination). They found that the vaccine inhibited development of tumor growth up to 56-74% in white mice injected with C-180 sarcoma; simultaneous increase was seen in the SH-group in the spleen, brain, and liver, and decrease of peroxide oxidation products in the liver. Tables 3; references 27: 19 Russian, 8 Western.

USSR

UDC 577.49:636.082.4

THE LIGHT MODE STIMULATING MULTIPLE FETUSES IN SOWS AT LARGE FARMS

Moscow VESTNIK SEL'SKOKHOZYAYSTVENNOY NAUKI in Russian No 7, Jul 1977 pp 61-67

BELYAYEV, D. K., academician, AS USSR, KLOCHKOV, D. V., candidate of agricultural sciences, STEPKINA, G. N., Institute of Cytology and Genetics, Siberian Affiliate, Academy of Sciences USSR, SMIRNOV, A. I., and NAVAROV, B. I., candidate of technical sciences, All-RSASR Scientific Research and Planning-Technological Institute for the Mechanization of Animal Husbandry, MALYSHEV, A. M., Moscow Production Administration for Agriculture, and MOROZOV, V. N., candidate of agricultural sciences and chief of the swine husbandry shop, Taldom Sovkhoz

[Abstract] As animal husbandry is converted to an industrial basis, the light mode under which animals are kept becomes particularly important. Light information received by the nerve endings in the retina is converted in special neuroendocrine structures in the brain to hormonal information which stimulates many processes in the body; the power of light is particularly seen in the control of the reproductive function of seasonally breeding animals. It has been shown that photoperiodic conditions influence not only the breeding season of such animals, but also their fertility. Experiments have shown that additional illumination of sows during the fall and winter during pregnancy

increases the average size of a litter by 0.8-2.7 piglets. The total weight of the litter averaged 12-25 kg greater than the weight of control litters. Based on the experimental data, a method has been developed for photoperiodic stimulation of litter size in breeding sows. A test of the method of photoperiodic stimulation of the fertility of sows at "Taldom" sovkhos in Moscow Oblast confirmed the high effectiveness of the method. Litter size was increased by an average of 0.9-1.7 piglets, total litter weight at 2 months of age by 17-24 kg. The equipment developed for additional artificial illumination allows the system to operate automatically, fully satisfying the requirements of agricultural production, and can be recommended for extensive introduction. The economic effectiveness of the automatic system developed is 11,394 rubles per year for a breeding barn with a capacity of 324 breeding sows. Figures 2; tables 3.

II. BEHAVIORAL SCIENCES  
Physiological Psychology

USSR

UDC 615.214.03:614.449.9:574.34

ATTEMPT AT DIRECTED MODIFICATIONS OF INTRAPOPULATION INTERRELATIONS OF SOME  
PEST MAMMALS UNDER THE INFLUENCE OF NEUROTROPIC CHEMICALS

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[Abstract] From May to September, 1976, the authors attempted to disrupt the intrapopulation groupings of two mammalian species by altering their behavioral reactions. This work was done in the area of East Tannu-Ola, in the Tuvin-skaya ASSR. The animals studied were the Mongolian haystackers (*Ochotona pricei* Thom.) and Mongolian sandeel (*Meriones (Pallasiomys) unguiculatus* Milne-Eds.) whose populations display different spacial-etiologic structures. Behavior of the haystackers is distinguished by high aggression due to life in a small district under severe climatic conditions and poor food sources (mountain plateau, rocky wastes, crags). This aggression has promoted strong individualistic use of fodder and winter stores; each animal has its own burrow, and defends it against neighbors. The territory occupied by one family consists of a system of separate districts wherein the animals occupy a separate site. On the other hand, the sandeels live on grassy wastelands or on sites for wintering cattle, with adequate food sources. A sandeel family exploits this territory as a group. Aggression is directed against animals of other family groupings. Reserpine, or its analog sirosingopin (an English patented, rat-control agent), was used to affect the intrapopulation behavior of these two mammals; its use to eradicate rodents was found to be unsuccessful, and the authors used it only in the behavior tests, in minimum doses. Initially, doses of 0.1-0.3 mg/kg, administered to males or females inter-esophagally, were found to be ineffective, and the dose was raised to 0.5 mg/kg. In the haystackers, the agent apparently causes loss of aggression, inability to defend individual territory against control animals, and surrender of burrows. Ultimately, the existence of the haystacker population would probably be endangered due to disruption of their capacity to survive severe winter conditions. The behavior of the sandeels was not seriously affected by the agent. Despite clearly-expressed individual symptoms of poisoning, the intra-group and intra-family behavior was not changed from that of control animals. The authors feel that sedative drugs might be useful in altering the relationships of animal species which exhibit aggression against family members. Figure 1; references 9: 6 Russian, 3 Western.

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INFLUENCE OF THE MOLTING HORMONE ON TRAINING OF TENEBRIO MOLITOR L. LARVAE

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[Abstract] The authors have already reported the dependence of training of insect larvae on the phase of the cycle of the insects' postembryonal development (1973). In the present article they describe effect of the exogenous hormone of molting on larvae training. The specimen was the meal worm *Tenebrio molitor*, 20 mm long, selected from a culture immediately after molting. The insects were maintained in separate containers at 25°C. The insects were tested in a T-shaped labyrinth and the index of training was the total number of correct choices. Tests were made on the 3rd, 6th, and 9th day after molting. The molting hormone ecdisterone was found to support training of larvae; during endogenous gradual rise in titer of the hormone, training sharply improved when the hormone concentration was maximum. When exogenous ecdisterone was administered at any age period, training improved without affecting other behavior of the insects. The effect of the molting hormone on the larvae training depends on its concentration in the ganglia. Figures 3; tables 3; references 11: 2 Russian, 9 Western.

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