The theoretical principles...

The appearance of oxidation chain reactions in the lipoproteins will lead to damage of the membranes in the construction of which lipoproteins play a direct part. Thus, during swelling and at the start of the growth period of dried seeds irradiated in massive doses of 500 - 2000 r, multiple lesions of the internal dividing membranes occur, especially in the aleuronic layer and the cyme of the seed; considerably lesser lesions are noted in the bud. The author then summarizes data on the remote effects of seed irradiation. Numerous experiments have shown that one of the typical symptoms of remote irradiation sequelae is acceleration of aging. The irradiated organism passes through its developmental cycle and ages more rapidly than the non-irradiated organism. This phenomenon obviously underlies the fact that agricultural plants developed from irradiated seeds flower and ripen earlier than normal plants. It has also been found that presowing irradiation of seeds impairs the regulator functions of the nucleic metabolism, but does not effect the photosynthesis of carbohydrates. At late stages of the plant's development this often leads to a rise in the sugar content, a fact which may be of

great significance in agricultural practice. In plants which convert carbohydrates into fats or into fibers, there are reasons for assuming that presowing irradiation of the seeds will lead to an increase in the oil or fiber yield. Irradiation of plants which tend to generate carotin resulted in intensification of this trend, obviously by using the carbohydrate surplus for carbohydrate synthesis. The author concludes that presowing irradiation may have a beneficial effect in increasing both the quantity and the quality of the yield. There are 1 table and 23 references: 18 Soviet-bloc and 5 non-Soviet-bloc. The reference to the English-language publication reads as follows: P. Alexander, Immediate and Low Level Effects of Ions Rad., p. 47, London, 1960.

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR (Institute of Biophysics, AS USSR), Moscow

SUBMITTED: April 29, 1961

S/205/61/001/004/032/032
D298/D303

AUTHORS: Kuzin, A. M., and Berezina, N. M.

TITLE: Chronicle. Presowing gamma-irradiation of the seeds of agriculture crops

PERIODICAL: Radiobiologiya, v. 1, no. 4, 1961, 636-638

TEXT: The article presents the results of the Soveshchaniye po predposevnomu oblucheniyu semyan sel'skokhozyaystvennykh kul'tur (Conference on the Presowing Irradiation of the Seeds of Agricultural Crops), convened by the Institut biologicheskoy fiziki AN SSSR (Institute of Biophysics, AS USSR) in conjunction with the Sovet po ispol'zovaniyu atomnoy energii v sel'skom khozyaystve VASKhNIL (Council on the Use of Atomic Energy in Agriculture, VASKhNIL) on February 20-23, 1961, in Moscow. The conference was convened by the Laboratoriya radiobiologii (Laboratory of Radiation Biology) of the Institute of Biophysics, AS USSR, to summarize research on the effects of the presowing of seeds on the growth, development and biochemical composition of plants. The

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Chronicle. Presowing...

conference was attended by 96 specialists from 38 scientific research institutions and training institutes. The papers summarized research on the presowing irradiation of the seeds of various agricultural crops. In all cases a rise in yield, acceleration of maturation, and an increase in seed germination were noted. Generalization of the research data on maize obtained over a period of years in the Ukrainskiy institut fiziologii rasteniy (Ukrainian Institute of Plant Physiology), the Sibirskiy botanicheskiy sad Zapadnosibirskogo filiala AN SSSR (Siberian Botanical Gardens of the West Siberian Branch, AS USSR), the Institut biologii AN Latviyskoy SSR (Institute of Biology, AS Latviyskaya SSR), the L'vovskiy universitet (L'vov University), the Institut genetiki i selektsii AN Azerbaydzhanskoy SSR (Institute of Genetics and Selection, AS Azerbaydzhanskaya SSR) and the Institute of Biophysics, AS USSR, showed that gamma-irradiation of dry maize seeds in doses of 500 p to 4 kr stimulates its growth and development, gives an increase in grain yield of 10 - 18% and of green mass from 5 - 28%. An account of various individual studies of this problem is given. The Institute of Biology of the AS Latviyskaya SSR, the L'vov University, the Ural'skiy

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filial AN SSSR (Urals Branch, AS USSR), the Institute of Biophysics, AS USSR, in conjunction with the Vsesoyuznyy nauchno-issledovatel'skiy institut vitaminnoy promyshlennosti (All-Union Scientific Research Institute of the Vitamin Industry) studied the irradiation of various varieties of radish seeds. In all cases an increase of 11 - 26% in the root yield and a 5 - 6 day acceleration in root ripening were noted. The optimum radiation doses were 500 and 1,000 r. Presowing irradiation of tomatoes carried out by the Urals Branch, AS USSR, the L'vov University and the Institute of Biophysics, AS USSR, accelerated ripening of the fruits and increased the yield by 27 - 45%. Irradiation of sprouting seeds gave an increase in the fruit yield of up to 66%. This method should be subjected to all-round research since in almost all cases it gave higher indices than with irradiation of dry seeds. The presowing irradiation of carrots by the Institute of Biophysics, AS USSR, in conjunction with the All-Union Scientific Research Institute of the Vitamin Industry and L'vov University showed that this crop had a high resistance to radiation and that irradiation gave an increase in the root yield of

Chronicle. Presowing...

14 - 22%. Irradiation of sprouting seeds gave an increase of up to 50%. The Institute of Biophysics, AS USSR, the Institute of Genetics, AS Azerbaydzhanskaya SSR, and L'vov University found that irradiation of cucumber seeds in doses of 300 - 500 r gave an increase of 15 - 30% in the cucumber yield (with irradiation of dry seeds) or up to 39% (irradiation of sprouting seeds). The results of presowing irradiation of melon and watermelon seeds carried out by the Institute of Genetics, AS Azerbaydzhanskaya SSR, are also reported. Irradiation of sprouting seeds of sugar beet at L'vov University gave a rise of 26 - 56% in the fruit yield. This was accompanied, however, by a drop in the sugar content of the roots. The Nauchno-issledovatel'skiy institut kartofel'nogo khozyaystva (Scientific Research Institute of Potato Farming), the Institute of Biophysics, AS USSR, and the Institute of Biology, AS Latviyskaya SSR, studied the presowing irradiation of different varieties of potato. Irradiation in doses of 100 - 500 r gave a rise of 8 - 44% in the tuber yield. Grechushnikov found that presowing irradiation of potato tubers in a dose of 500 r gave a vitamin C content of 19.1 mg%, as opposed to 13.4% in the control. The authors of the article found

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that irradiation of tubers in a dose of 250 r gave an ascorbic acid content of 33.7 mg%, as opposed to 24.8% in the control. Presowing irradiation of perennial grass seeds carried out by the Urals Branch, AS USSR, and the Vsesoyuznyy nauchno-issledovatel'skiy institut udobreniy i agropochvovedeniya VASKhNIL (All-Union Scientific Research Institute of Fertilizers and Agropedology, VASKhNIL) gave an increase in the green mass yield at the first and subsequent mowings. The Institute of Biophysics, AS USSR, in conjunction with the Vsesoyuznyy nauchno-issledovatel'skiy institut l'na (All-Union Scientific Research Institute of Flax) and the Institut yadernoy fiziki (Institute of Nuclear Physics) studied the presowing irradiation of textile crop seeds (flax and Indian hemp) and found that this method led to an increase in the yield and the quality of the fiber. There is 1 table.

Card 5/5

S/205/61/001/005/003/005
D299/D304

AUTHORS: A.M. Kuzin, N.B. Gorkina, V.A. Kopylov, and L.M. Kryukova

TITLE: The nature of the metabolites which form in the irradiated leaves of plants

PERIODICAL: Radiobiologiya, v. 1, no. 5, 1961, 659 - 662

TEXT: Experiments were conducted to determine whether extracts from Vicia faba leaves inhibit cell devision only in homologous tissue or whether this inhibiting action extends to the cells of other species. An attempt was made to determine whether extracts from irradiated and non-irradiated leaves affect the cell division of Escherichia coli B. The leaves were irradiated with an РУП-1 (RUP-1) apparatus in a dose of 15 kr at an intensity of 212 r/min. Some 24 hr after irradiation, extracts were made from the leaves and were added to the meat-peptone broth in which the E. coli were cultured. The results confirmed the authors' previous observations (Ref. 6: Dokl. AN SSSR, 137, 4, 970, 1961) that substances form in the irradiated leaves of plants which strongly inhibit cell multiplication. It was found that the semiproducts of the fermentative oxidation

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The nature of the ...

of tyrosine had a similar effect on E. coli B as did the meristematic radicle cells of Vicia faba. Only the low-molecular products of tyrosine oxidation, and not the high-polymer melanines, inhibited cell division. The results conform to a hypothesis that the phenol compound metabolism is disturbed in irradiated leaves, in which there form oxidation semiproducts of a polyphenol and semiquinoid nature, responsible for disturbance of cell division. There are 5 tables and 7 references. 6 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR (Institute of Biophysics, AS USSR), Moscow

SUBMITTED: May 19, 1961

Card 2/2

KRYUKOVA, L.M.; LOMAKIN, M.S.; KUZIN, A.M.

Effect of extracts obtained from irradiated plants on the growth of different normal rat tissues and the tumor tissue of Guerin's carcinoma. Radiobiologiia 1 no.5:668-669 '61. (MIRA 14:11)

1. Institut biologicheskoy fiziki AN SSSR i Institut eksperimental'noy biologii AMN SSSR, Moskva.
(CANCER) (PLANTS, EFFECT OF RADIATION ON)

32746
S/205/61/001/006/006/022
D268/D305

27 1220 also 2209

AUTHORS: Kuzin, A.M., Agustini, Ch., Kopylov, V.A., and Budilova, Ye.V.

TITLE: On the effect of extracts from irradiated Vicia faba leaves on the P^{32} incorporation in isolated thymus cell nuclei

PERIODICAL: Radiobiologiya, v. 1, no. 6, 1961, 856 - 857

TEXT: In further studies on the effect of biologically active compounds accumulating in irradiated plants on nucleic acid synthesis in the cell nucleus, the action of extracts from irradiated and non-irradiated V. faba leaves on the phosphorylization processes in the isolated cell nucleus was studied, using the same irradiation and method for preparing the extracts as previously described by A.M. Kuzin et al. (Ref. 7: Tr. konf. po mekhanizmam pervichnogo deystviya ioniziruyushchey radiatsii, Kiyev (Transactions of the Conference on the Mechanisms of the Initial Action of Ionizing Radiation, Kiyev) 1961, in the press). Cell nuclei were isolated from the thymus of young rats by the Allfrey and Mirskiy method (Ref. 9:

Proc. Nat. Acad. Sci., 40, 881, 1954) and were then suspended in an 0.25 M saccharose solution with 0.0018 M $CaCl_2$. After incubation at 20°C for 3 hours, the suspension was centrifuged, and the nuclei finally extracted. The resulting alkali extract was used to determine radioactivity and the quantity of DNA according to the method of Burton (Ref. 10: Biochem. J., 62, 315, 1956). Preliminary experiments showed that when the boiled nuclear suspension was incubated with $Na_2HP^{32}O_4$ radioactive P was not included in the fraction studied, indicating that the alkali hydrolyzate was completely free from inorganic radioactive P. Results showed that nuclei incubated with extract from irradiated plants were less likely to incorporate P^{32} than was the case with non-irradiated, the average difference being 40 %. Extracts from irradiated plants as compared with non-irradiated, therefore, gave greater inhibition of the phosphorylization processes. There are 1 table and 10 references: 8 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: V.G. Allfrey, Proc. Nat. Acad. Sci., 40, 881, 1954; K. Burton, Biochem. J., 62, 315, 1956.

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32746
S/205/61/001/006/006/022
D268/D305

On the effect of extracts from ...

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR, Moskva (Institute of Biological Physics, AS USSR, Moscow)

SUBMITTED: July 18, 1961

X

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KUZIN, A.M.

Work of the radiobiological section of the First Biophysical Congress. Radiobiologiia 1 no.6:968-969 '61. (MIRA 15:2)
(RADIOBIOLOGY--CONGRESSES)

KUZIN, A.M.

Triumph of our system. Nauka i zhizn 28 no.4:6-7 Ap '61.
(MIRA 14:5)

1. Chlen-korrespondent AN SSSR.
(Aeronautics)

KUZIN, A.M.

Against the danger of the spread of atomic weapons. Vest. AN SSSR 31 no.8:78-80 Ag '61. (MIRA 14:8)

1. Chlen-korrespondent AN SSSR.
(Atomic weapons—International control)

21504

270000 4112 also

S/020/61/137/004/029/031
B103/B208

AUTHORS: Kuzin, A.M., Corresponding Member AS USSR, and Kryukova, L.M.

TITLE: Mutagenic action of metabolites formed in an irradiated plant

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 4, 1961, 970 - 971

TEXT: The authors found in previous papers (Ref. 7, Biofizika, 4, no. 3, 1959; Ref. 9, ibid. 5, no. 4, 1960; Ref. 8, Fiziol. rast., 7, no. 2, 1960) that "antimitotic" metabolites are formed in the leaves of irradiated plants, which are supposed to inhibit mitoses and to prevent cell division. Now they wanted to clarify the problem as to whether these substances also exert a mutagenic effect. Like in Ref. 8, 12 - 14 - dayold plants of horse-bean (Vicia faba) were irradiated in the РУМ-3 (RUM-3) X-ray apparatus with 440 r/min. Extracts were prepared from irradiated and non-irradiated (controls) leaves, and 3 - 4 -dayold roots of V.faba were placed on these extracts for 24 hr. After fixation in ethanol with acetic acid (3 : 1), the roots were colored with acetocarmine, and the anaphases, telophases, chromosome aberrations (bridges) and micronuclei were counted in

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S/020/61/137/004/029/031
B103/B208

Mutagenic action of ...

temporary preparations. Table 1 presents the results. The authors conclude therefrom that roots dipped into an extract of non-irradiated leaves exhibit no statistically reliable deviations from the control sample. However, the roots placed on extracts of irradiated leaves, showed a statistically veliable increase of chromosome aberrations (mainly bridges). Also the number of micronuclei increased. These phenomena indicate that stable substances are formed in irradiated leaves, which exert a mutagenic effect. It is further concluded therefrom that chromosome aberrations may result from a disturbance of metabolic processes due to irradiation, without a photon directly entering into a chromosome, as was frequently assumed in Western publications. V.V. Khvostova is thanked for advice. There are 1 table and 10 references: 5 Soviet-bloc and 5 non-Soviet-bloc. The reference to the English language publication reads as follows: Ref. 4, F. Haas, E. Dudgeva et al., Genetics, 39, 453 (1954).

ASSOCIATION: Institut biologicheskoy fiziki Akademii nauk SSSR
(Institute of Biophysics of the Academy of Sciences USSR)

KOLOMIYTSEVA, I.K.; KAYUSHIN, L.P.; KUZIN, A.M.

Free radicals in rat tissues under normal conditions and following gamma irradiation by Co^{60}. Dokl. AN SSSR 140 no.1:230-231 S-O '61. (MIRA 14:9)

1. Institut biologicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Kuzin).
(GAMMA RAYS--PHYSIOLOGICAL EFFECT) (RADICALS (CHEMISTRY))

KUZIN, A.M.

SESSION D - 5 - 4 : Plants : Effects on Seeds

(a)

The Influence of γ-Irradiation of the Seeds on the Development and Metabolism of the Plant

A. M. Kuzin and N. M. Berezina

Physical and chemical heterogeneity of different tissues of seeds causes different initial processes in them after γ-irradiation (lifetime of free radicals, formation of peroxides, etc.)

Investigation of the oxidation processes in a germinating seed after irradiation showed considerable changes in the activity of peroxidase, of polyphenoloxidase and of catalase in different parts of the seed. Changes of oxidation processes are reflected in the rate of accumulation of some of the active regulators of oxidation processes, namely ascorbic acid and lipid peroxides. Change of the oxidation processes in an irradiated seed and change of the DNA structure cause further changes in the rates of the development and of the metabolism of the plant.

The dose-dependence has a two-phase character for many species of plants. Irradiation causes acceleration of the development of the plant below a definite dose, and changes of the regular distribution of growing points which lead to branching, and also increases the numbers of regenerating organs. Increased doses cause increasing damage to development and finally its full inhibition. Changes in morphogenesis lead to changes of metabolic processes. This results in an increased accumulation in tissues of one or another metabolite.

Institute of Biophysics, USSR Academy of Sciences, Moscow

report presented at the 2nd Intl. Congress of Radiation Research,
Harrogate/Yorkshire, Gt. Brit. 5-11 Aug 1962

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R000928010

KUZIN, A. M.

(d)

Dynamics of Free Radicals in Cell Constituents of Organisms Exposed to Radiation

I. K. Kolomiitseva, L. P. Kayushin and A. M. Kuzin

The ESR method was used to investigate the relative numbers of free radicals in dried specimens of homogenates, nuclei and mitchondria of rats' spleens. After drying, the irradiation was carried out in a N_2 atmosphere. The highest concentration of free radicals was found in the homogenate; in the nuclei and mitochondria, the numbers of free radicals were about the same but less than those in the homogenate.

In the spleen nuclei separated immediately after a whole-body irradiation of the animal with a dose of 1000 r, the number of free radicals did not show any change relative to controls. In the mitochondria, a certain decrease of the relative content of free radicals was found. The significance of the observed changes for the study of the primary mechanisms of radiation injury is discussed.

Institute of Biophysics, Academy of Sciences, Moscow, USSR

report presented at the 2nd Intl. Congress of Radiation Research,
Harrogate/Yorkshire, Gt. Brit. 5-11 Aug 1962

KUZIN, A.M., glav. red.; GEL'FAND, I.M., red.; LIVANOV, M.N., red.; GERSHUNI, G.V., doktor med. nauk, red.; KHURGIN, Ya.I., doktor fiz.-matem. nauk, red.; KOCHEREZHKIN, V.G., kand. biol. nauk, red.; GURFINKEL', V.S., red. izd-va; POLENOVA, T.P., tekhn.red.

[Biological aspects of cybernetics]Biologicheskie aspekty kibernetiki; sbornik rabot. Moskva, Izd-vo Akad. nauk SSSR, 1962. 237 p. (MIRA 16:1)

1. Akademiya nauk SSSR. Nauchnyy sovet po kompleksnoy probleme "kibernetika." 2. Chlen-korrespondent Akademii nauk SSSR (for Kuzin, Gel'fand, Livanov).

(CYBERNETICS)

KUZIN, Aleksandr Mikhaylovich; DEMIN, N.N., doktor biol. nauk, otv. red.; GORBACHEVA, L.B., red.izd-va; GUS'KOVA, O.M., tekhn. red.

[Radiation biochemistry]Radiatsionnaia biokhimiia. Moskva, Izd-vo Akad. nauk SSSR, 1962. 333 p. (MIRA 16:2)
(BIOCHEMISTRY) (RADIATION)

ENGEL'GARDT, V.A., akademik, glav. red.; KUZIN, A.M., zam. glav. red.; NUZHDIN, N.I., red.; ALIKHANYAN, S.I., doktor biol. nauk, red.; SHAPIRO, N.I., kand. biol. nauk, red.; KOCHEREZHKIN, V.G., kand. biol. nauk, red.; ARSEN'YEVA, M.A., red. izd-va; PRUSAKOVA, T.A., tekhn. red.

[Radiation genetics] Radiotsionnaia genetika; sbornik rabot. Moskva, Izd-vo Akad. nauk SSSR, 1962. 367 p. (MIRA 15:2)

1. Akademiya nauk SSSR. Otdeleniye biologicheskikh nauk. 2. Chlen-korrespondent AN SSSR (for Kuzin, Nuzhdin). 3. Institut biologicheskoy fiziki AN SSSR, Moskva (for Kuzin).
(GENETICS) (RADIATION--PHYSIOLOGICAL EFFECT)

LEPIN, T.K.; ALEKSANDROVA, L.F.; KUZIN, A.M., otv. red.; MAKOGONOVA, I.A., tekhn. red.

[Bibliography on the use of radioactive and stabile isotopes in biology for 1950-1958]Ukazatel' literatury po primeneniiu radioaktivnykh i stabil'nykh izotopov v biologii za 1950-1958 gg. Moskva, Izd-vo Akad. nauk SSSR, 1962. 406 p. (MIRA 16:2)

1. Akademiya nauk SSSR. Sektor seti spetsial'nykh bibliotek.
2. Chlen-korrespondent Akademii nauk SSSR (for Kuzin).
(Bibliography--Radiobiology) (Bibliography--Isotopes)

S/747/62/000/000/017/025
D296/D307

AUTHOR: Kuzin, A. M.

TITLE: The biological effect of the increased concentration of C^{14} in the atmosphere

SOURCE: Radiatsionnaya genetika; sbornik rabot. Otd. biol. nauk AN SSSR. Moscow, Izd-vo AN SSSR, 1962, 274-278

TEXT: The article reviews Western and Soviet literature for the period 1955 - 1960 with regard to the possible consequences of a new factor in the external environment to which man and animals have become adapted in the course of phylogenesis: The content of C^{14}, which in the last 15,000 years has not changed by more than 1.5 - 2%, but has recently increased, from the first nuclear tests in 1954, by 31% in 1959. At this rate the increase would reach 700-800% in about 30 years or one generation. To this one must add the higher biological efficacy of C^{14} incorporated into living tissues

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The biological effect ... S/747/62/000/000/017/025
D296/D307

as compared to the effect of exposure to radiation from external sources in equal doses. There are 15 references.

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR, Moskva (Institute of Biological Physics, AS USSR, Moscow)

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S/747/62/000/000/016/025
D296/D307

AUTHORS: Kuzin, A. M., Isayev, B. M., Khvostova, V. V., Tokarskaya, V. I. and Bregadze, Yu. I.

TITLE: The biological effect of C^{14} incorporated into living tissues

SOURCE: Radiatsionnaya genetika; sbornik rabot. Otd. biol. nauk AN SSSR. Moscow, Izd-vo AN SSSR, 1962, 267-273

TEXT: After the performance of nuclear tests the content of radioactive carbon in the atmosphere increased between 1955 and 1958 at 5% annually. When assessing the possible biological effects of these doses they are usually estimated by the radiosensitivity of living tissues exposed to the external source of radiation. These calculations fail, however, to take into consideration the special geometry of incorporation of C^{14} into radiosensitive structures such as chromosomes as well as the so-called transformation effect in DNA molecules ($C^{14} \rightarrow N^{14}$). These effects may lead to more frequent aberra-

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tions than expected from calculations on the basis of the dose to which the cells are exposed. The authors compared the biological effect of C^{14} incorporated into plant seedlings, with the effect of exposure to external gamma radiation emitted by Co^{60}. Normally growing 10-day old plants were placed into a photosynthesis chamber containing $C^{14}O_2$ (total activity 100 μ C, volume of chamber 22.5 dm^3); radioactivity of the inner layer of the plants was estimated on scintillation counters and the tissues were investigated cytologically, counting the proportion of micronuclei and the mitotic index. The percentage of cells with chromosome aberrations increased from 0.16% in the control plants to 0.26% in the experimental plants. Plant cells exposed to more than double the dose of radiation (Co^{60}) showed a slight increase in the number of aberrations but calculation revealed that the mutagenic effect of incorporated C^{14} was ten times higher than that of an equal dose of external irradiation. This fact shows that the transformation effect $C^{14} \rightarrow N^{14}$ as well as

the special geometry of the incorporation of C^{14} are factors to be considered further. There is 1 figure and 1 table.

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR, Moskva (Institute of Biological Physics, AS USSR, Moscow)

Card 3/3

27.1220

39555
S/205/62/002/003/001/015
I021/I221

AUTHOR: Kuzin, A. M.

TITLE: The role of metabolic changes in cellular injury induced by radiation

PERIODICAL: Radiobiologiya, v. 2, no. 3, 1962, 340-355

TEXT: The first change induced in the cell by radiation is radiolysis of water with formation of such active radicals as OH,H and HO_2. They react with high molecular substances of the cellular membrane, potentiating the effect of direct radiation. There reactions may result in the following chemical changes: 1. Suppression of oxidative phosphorylation in the nucleus and mitochondria. 2. Loss of cytochrome c by mitochondria 3. Suppression of DNA synthesis. 4. Changes in the synthesized DNA. 5. Enzymic depolymerization of DNA 6. Enzymic breakdown of protein structures and mucopolysaccharides. The above changes result in the formation of abnormal metabolites with toxic properties able to block normal metabolic processes. They are associated also with the final effects of radiation: morphologic changes, mutations, formation of giant cells or cell death. It is emphasized that the final biological effects depend on the dose of radiation. Due to regulatory metabolic processes of the cell there is also a possibility of recovery and protection after ionizing radiation. There are 7 figures.

ASSOCIATION: Institut biologicheskoi fiziki AN SSSR (Institute of Biophysics AS USSR Moscow)

SUBMITTED: January 12, 1962

Card 1/1

41618
S/205/62/002/005/005/017
D268/D308

27.1220

AUTHORS: Kuzin, A.M., and Kopylov, V.A.

TITLE: The formation and role of quinones in the initial processes following radiation damage to animal tissue

PERIODICAL: Radiobiologiya, v. 2, no. 5, 1962, 681 - 684

TEXT: Quinoid substances were studied in white rats after a 14.3 minute exposure to x rays at 1,000 r. A quick and regular progressive increase in the quinone content was determined, although there was no direct connexion between increase and time lapse. Quinone increase noted in liver tissue in vivo after irradiation was also observed in liver tissue homogenates maintained in vitro, and with access to O_2. A rapid increase in quinones was determined in liver homogenates during the first 15 - 30 minutes of incubation. These quinones are thought to be formed by increased oxidation of phenols in irradiated tissue. The addition of DPN (diphosphopyridine nucleotide) to liver homogenates of irradiated rats caused an almost two-fold increase in the absorption of O_2, apparently as the result of

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an excess of newly formed quinones and the development of an unusual electron transfer path. Quinone increase and the DNP effect noted in irradiated tissue account for the depression of oxidizing phosphorylation in the tissue of irradiated animals. There are 4 figures.

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR, Moskva (Institute of Biological Physics, of the AS USSR, Moscow)

SUBMITTED: April 9, 1962

X

KUZIN, A.M.; TRINCHER, K.S.

Enzymatic analysis of the surface layer of erythrocytes.
Biofizika 7 no.5:599-601 '62. (MIRA 17:8)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.

KUZIN, A.M.

First biophysics congress. Vest. AN SSSR 32 no.1:96-99 Ja '62.
(MIRA 15:1)

1. Chlen-korrespondent AN SSSR.
(BIOPHYSICS--CONGRESSES)

27.1220

39590
S/020/62/145/002/018/018
B144/B180

AUTHORS: Kopylov, V. A., and Kuzin, A. M., Corresponding Member AS USSR

TITLE: Effect of diphosphopyridine nucleotide on the respiration of liver homogenates from γ-irradiated rats

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 145, no. 2, 1962, 438 - 439

TEXT: The suggestion has been made that quinones forming in irradiated tissues may take part in the electron transfer in tissue respiration. Since they substitute partly natural naphtoquinones, an inhibition of oxidative phosphorylation must be expected and has in fact been observed by D. W. Bekkum (Chem. Weekbl., 53, no. 19 (1957)). Excess formation of quinones may, however, increase the O_2 absorption. The test material was obtained from rats subjected to x-ray irradiation with 1000 r by homogenizing 1 g of liver for 2-3 min. at 4°C in 10 ml of phosphate-citrate buffer (pH 7.3). The O_2 absorption was measured in a Warburg apparatus for 30 min. at 37°C and was the same as in non-irradiated rats, which means that the newly formed quinones have no effect on tissue respiration. To

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Effect of diphosphopyridine ...

find out the effect of DPN on oxidation rate, $1.6 \cdot 10^{-5}$ M of DPN was added per 2 ml of homogenate. Whilst respiration in the control preparations remained almost the same, in homogenates from irradiated rats it increased 60 - 100%. DPN accelerates the rate of electron transfer only when excess quinones are present as a result of irradiation. It is suggested that this electron transfer may by-pass the normal mechanism. Studies of the DPN effect after irradiation are being continued in other tissues and individual organelle cells. There is 1 figure.

ASSOCIATION: Institut biologicheskoy fiziki Akademii nauk SSSR (Institute of Biological Physics of the Academy of Sciences USSR)

SUBMITTED: April 9, 1962

Card 2/2

BEKETOVA, A.A.; KUZIN, A.M.

Effect produced by gonadotropin on the state of DNA in the thumus of sexually immature rats. Dokl. AN SSSR 146 no.5:1201-1202 O '62.
(MIRA 15:10)

1. Moskovskiy tekhnologicheskiy institut myasnoy i molochnoy promyshlennosti. 2. Chlen-korrespondent AN SSSR (for Kuzin).
(GONADOTROPIN) (NUCLEIC ACIDS) (THYMUS GLAND)

S/020/62/147/004/026/027
B144/B186

27.1107

AUTHORS: Kolomiytseva, I. K., Kayushin, L. P. Kuzin, A. M., Corresponding Member AS USSR

TITLE: Free radicals in the liver lipids of rats under normal conditions and at different intervals after gamma irradiation

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 4, 1962, 951-953

TEXT: The concentration of free radicals in liver lipids was measured and compared with published data on disturbances of the lipid metabolism in the liver produced by gamma irradiation. The e.p.r. spectra of the liver lipids of rats were recorded 5 min, 24, 48 and 66 hrs after Cs^{137} irradiation with a total dose of 1000 r. The lipids were extracted from liver homogenates with a 3:1 alcohol-ether mixture. The resulting mixture was filtered and evaporated in a flow of N_2, the residue then treated in a vacuum exsiccator on P_2O_5 and cooled at 10^{-1} mm Hg. Since the number of radicals proved highly dependent on the purity of the

Card 1/2

Free radicals in the liver...

reagents it was expressed in percents of the control measurements obtained from lipids treated with the same reagents. Conclusions on comparing the lipid quantity in total, the incorporation rate of tagged acetate in the lipids in total as published by M. F. Vinogradova (Vestn. Len. univ., ser. biol., 3, no. 1 (1962)), and the quantity of free radicals: (1) the change in radical concentration is not consistent with the change of the lipid content in total. (2) The highest content of free radicals (236%) observed after 48 hrs coincides with the highest rate of acetate incorporation. (3) After 66 hrs the content of free radicals as well as the incorporation rate dropped sharply. Hence, a causal connection between number of free radicals and liver metabolism can be assumed. There are 2 figures and 1 table.

ASSOCIATION: Institut biologicheskoy fiziki Akademii nauk SSSR (Institute of Biophysics of the Academy of Sciences USSR)

SUBMITTED: August 30, 1962

PAVLOVSKIY, Petr Yevgen'yevich, dots.; PAL'MIN, Viktor Vasil'yevich, dots.; DEMIN, N.N., doktor biol. nauk, prof., retsenzent; FEL'DMAN, A.L., kand. tekhn. nauk, dots., retsenzent; KUZIN, A.M., red.; KOSSOVA, O.N., red.; SATAROVA, A.M., tekhn. red.

[Biochemistry of meat and meat products] Biokhimiia miasa i miasoproduktov. Moskva, Pishchepromizdat, 1963. 324 p. (MIRA 16:4)

1. Chlen-korrespondent Akademii nauk SSSR (for Kuzin).
(MEAT) (BIOCHEMISTRY)

KUZIN, A.M., red.; SOLOPOV, G.P., red.izd-va; RYLINA, Yu.V., tekhn. red.

[Irradiation of farm crop seeds before sowing] Predposevnoe obluchenie semian sel'skokhoziaistvennykh kul'tur; materialy. Moskva, Izd-vo Akad. nauk SSSR, 1963. 213 p. (MIRA 16:4)

1. Nauchnaya konferentsiya po predposevnomu obluchen'yu semyan, 1961. 2. Chlen-korrespondent Akademii nauk SSSR (for Kuzin).

(Plants, Effect of radiation on) (Seeds)

ACCESSION NR: AT4008638 S/3039/63/000/000/0166/0176

AUTHOR: Kuzin, A. M.

TITLE: Biochemical mechanism of radiation disturbances in cell division

SOURCE: Pervichnyye i nachal'nyye protsessy biologicheskogo deystviya radiatsii. Moscow, 1963, 166-176

TOPIC TAGS: cell division, deoxyribonucleic acid, mitotic activity, irradiation induced mitotic change, mitotic index, antimitotic activity, mitosis, mitotic delay, plant metabolism, plant irradiation, tyrosine, tyrosine oxidation, melanin, radioprotector, mitosis radiation effect

ABSTRACT: After a brief review of the effect of irradiation on cells and on cellular DNA, the author reports some results obtained by the irradiation of single leaves of the plant Vicia faba at doses of 10-25,000 r. Irradiation of single leaves produced profound changes in the remainder of the plant, including a significant inhibition of mitoses observed at 24-48 hours, and a retardation in the rate of plant growth. This effect was dependent on the presence of the leaf on the plant, since removal of the irradiated leaf immediately after irradiation prevented the mitotic inhibition, and removal 4 hours after irradiation reduced the changes to slight inhibition in the root tips only, but removal 48 hours after irradiation

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ACCESSION NR: AT4008638

permitted marked inhibition of mitosis both in roots and in root tips. Exposure of 4-day-old plants to extracts of irradiated leaves for 20 hours produced a marked reduction in their mitotic index. The change in mitotic index was dose related between 100 and 500 r. Attempts at characterization of the diffusible material produced in irradiated leaves indicated that irradiation stimulates the rate of oxidation of phenolic compounds in leaf extracts. The factor responsible for depression of mitotic activity in extracts is heat-resistant and dialyzable, and purification by column chromatography showed a phenolic compound, with a maximum absorption peak at 280 mμ. Inhibition of mitosis has been produced by exposure of plants to products from the enzymatic oxidation of tyrosine. Orig. art. has: 8 tables and 7 figures.

ASSOCIATION: Institut biofiziki AN SSSR. Moscow (Institute of Biophysics AN SSSR)

SUBMITTED: 00 DATE ACQ: 20Dec63 ENCL: 00

SUB CODE: LS NO REF SOV: 011 OTHER: 004

Card 2/2

IVANIKAYA, Ye.A.; KUZIN, A.M.

Effect of irradiation on the activity of tyrosinase in the skin of mice and rats. Radiobiologiia 3 no.1:17-20 '63.
(MIRA 16:2)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.
(TYROSINASE) (GAMMA RAYS—PHYSIOLOGICAL EFFECT)

KUZIN, A.M.; KOSTIN, I.G.; SHERSHUNOVA, L.N.; ZUBAREVA, L.A.

Use of ionizing radiations in poultry farming. Radiobiologiia 3 no.2:311-316 '63 (MIRA 17:1)

1. Institut biologicheskoy fiziki AN SSSR, Moskva i Radiobiologicheskaya laboratoriya Tomilinskoy ptitsefabriki.

L 11252-63 EWT(1)/EWT(m)/BDS--AFFTC/AMD/ASD
ACCESSION NR: AP3001077 S/0205/63/003/003/0472/0476

AUTHOR: Kuzin, A. M.; Kasy'mov

TITLE: Formation of substances in gamma irradiated potato tubers which inhibit growth and development of plants

SOURCE: Radiobiologiya, v. 3, no. 3, 1963, 472-476

TOPIC TAGS: polyphenoloxidation, gamma radiation, growth inhibiting substances

ABSTRACT: Earlier works indicated that polyphenoloxidizing activity in potato tubers increases with large doses of ionizing radiation. The authors examine polyphenoloxidizing activity in potato tubers in connection with the formation of substances inhibiting growth and development of plants. Studies were conducted on potato tubers that were gamma irradiated from a Cs sup 137 source at 700 r/min. Polyphenoloxidic activity was measured 24 hrs after irradiation. To determine the biological properties of the substances formed in the tuber due to increased polyphenoloxidic activity, extracts were prepared from the leaves of the potato 24 hrs after irradiation. Then corn seeds were soaked in the extract for 24 hrs and placed on moist filter paper and allowed to germinate in a luminostat under normal conditions. On the 7th day the number of seeds that germinated, length of stem and

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L 11252-63
ACCESSION NR: AP3001077

root, and weight of stem and root were determined. The potato extract was also used for experiments on pumpkins, peas, and beans. Results indicate that in the irradiated potato tissue during the first 24 hrs substances form which sharply inhibit the growth and development of the seeds tested. The study also confirms that oxidizing processes are disturbed by irradiated plant tissue and this leads to metabolic changes that affect nuclear cell processes by inhibiting cell division and ultimately seed germination. These conclusions make it necessary to follow up with further investigations of the action of irradiated nutritive products on organisms. Orig. art. has: 3 figures, 1 table.

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR, Moscow (Institute of Biological Physics, AN SSSR)

SUBMITTED: 26Jun62 DATE ACQD: 01Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 011 OTHER: 005

lb/wm
Card 2/2

KUZIN, A.M.; SILAYEV, M.P.

New possibility for using ionizing radiation in the meat industry. Radiobiologiia 3 no.4:545-548 '63.
(MIRA 17:2)

1. Moskovskiy tekhnologicheskiy institut myasnoy i molochnoy promyshlennosti.

KUZIN, A.M.; UZORIN, Ye.K.; CHIRKOVSKIY, V.I.

Study of remote radiation aftereffects in some species of the genus Nicotiana following gamma irradiation of seeds. Radiobiologiia 3 no. 6:903-908 '63. (MIRA 17:7)

1. Institut biologicheskoy fiziki AN SSSR, Moskva, i Vsesoyuznyy nauchno-issledovatel'skiy institut tabaka i makhorki imeni A.I. Mikoyana, Krasnodar.

IVANOV, V.P.; MININ, K.F.; KUZIN, A.M.

Wide-range roentgenometer. Prib. i tekh. eksp. 8 no.5:65-69 S-O '63. (MIRA 16:12)

KUZIN, A.M.; BAKH, N.A. doktor khim. nauk

Congress on radiation research. Vest. AN SSSR 33 no.3:113-116 Mr '63. (MIRA 16:3)

1. Chlen-korrespondent AN SSSR (for Kuzin).
(Radiation—Congresses)

SISAKYAN, Norayr Martirosovich, akademik; SEVERIN, Sergey Yevgen'yevich; PARIN, Vasiliy Vasil'yevich; EL'PINER, Isaak Yefimovich, doktor biol. nauk; KUZIN, Aleksandr Mikhaylovich; ISAYEV, I.B.; SOROKO, Ya.I., red.

[Biology and its allies] Biologiia i ee soiuzniki; sbornik. Moskva, Izd-vo "Znanie," 1964. 77 p. (Novoe v zhizni, nauke, tekhnike. VIII Seriia: Biologiia i meditsina, nos.17-18) (MIRA 17:10)

1. Deystvitel'nyy chlen AMN SSSR (for Severin, Parin). 2. Chlen-korrespondent AN SSSR (for Kuzin).

KUZIN, Aleksandr Mikhaylovich; BEREZINA, N.M.

[Atomic energy in agriculture] Atomnaia energiia v sel'-skom khoziaistve. Moskva, Atomizdat, 1964. 79 p.
(MIRA 19:1)

BEREZINA, Nina Mikhaylovna; KUZIN, A.M., red.; [illegible], T.V., red.

[Radiation of farm crop seeds before sowing] Predposevnoe obluchenie semian sel'skokhoziaistvennykh rastenii. Moskva, Atomizdat, 1964. 210 p. [illegible]

1. Chlen-korrespondent AN SSSR (for Kuzin).

GRAYEVSKIY, E.Ya.; KOROGODIN, V.I.; KUZIN, A.M., ; MOSKALEV, Yu.I.; SMIRNOV, K.V.; STRELITSOVA, V.N.; SHAPIRO, N.I., doktor biol. nauk; SHIKHODYROV, V.V.; EYDUS, L.Kh.; ALEKSAKHIN, R.M., red.

[Principles of radiobiology] Osnovy radiatsionnoi biologii. Moskva, Nauka, 1964. 402 p. (MIRA 18:1)

1. Akademiya nauk SSSR. Institut biologicheskoy fiziki.
2. Chlen-korrespondent AN SSSR (for Kuzin).

FRANK, G.M., otv. red.; KUZIN, A.M., otv. red.; KUZNETSOV, I.V., doktor filos. nauk, red.; LIVSHITS, N.N., doktor biol. nauk, red.; VEDENOV, M.F., kand. filos. nauk, red.; SHATALOV, A.T., mlad. nauchn. sotr., nauchn. red.; KREMYANSKIY, V.I., mlad. nauchn. sotr., nauchn. red.

[The essence of life] O sushchnosti zhizni. Moskva, Nauka, 1964. 350 p. (MIRA 17:8)

1. Akademiya nauk SSSR. Nauchnyy sovet po filosofskim voprosam yestestvoznaniya. 2. Institut filosofii AN SSSR (for Kremyanskiy, Shatalov). 3. Chlen-korrespondent AN SSSR (for Frank, Kuzin).

ACCESSION NR: AP4015079 S/0205/64/004/001/0018/0022

AUTHOR: Kuzin, A. M.

TITLE: Certain problems of the fast neutron biological action theory

SOURCE: Radiobiologiya, v. 4, no. 1, 1964, 18-22

TOPIC TAGS: fast neutron radiation, fast neutron biological action, small chronic radiation dose, fast neutron RBE, gamma-ray RBE, structure-metabolism theory, regeneration process

ABSTRACT: This study of fast neutron biological action under acute and chronic radiation conditions is based on the literature. Fast neutron RBE is found to increase markedly under chronic action of small neutron doses. The earlier theory that fast neutron radiation only gives rise to a large number of nonrestorable injuries in the cell is not confirmed by more recent investigations. According to the structure-metabolism theory the biological effects observed in the living organism after radiation are based on the interaction of three factors: structure, metabolsim, and regeneration. Gamma-ray and fast neutron RBE are practically equal, with large radiation doses under acute conditions. But fast neutron RBE sharply increases with small

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ACCESSION NR: AP4015079

chronic radiation doses, indicating a considerable difference between fast neutron and gamma-ray action on regeneration processes. These processes appear to be depressed by small chronic doses of fast neutron radiation, but not be gamma-radiation in the same doses. A quantitative comparison of dose-effect curves is insufficient for understanding the specific action mechanisms of fast neutrons in relation to regeneration processes. Specificity of neutron action on various aspects of metabolism affecting regeneration processes should be investigated first, particularly oxidative phosphoryllation and macromolecular synthesis depression. Orig. art. has: 1 table.

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR, Moscow
(Institute of Biological Physics AN SSSR)

SUBMITTED: 16Nov63 DATE ACQ: 12Mar64 ENCL: 00

SUB CODE: LS NO REF SOV: 004 OTHER: 023

Card 2/2

ACCESSION NR: AP4015082 S/0205/64/004/001/0036/0040

AUTHOR: Trincher, K. S.; Kuzin, A. M.

TITLE: Significance of water in erythrocyte radiation damage

SOURCE: Radiobiologiya, v. 4, no. 1, 1964, 36-40

TOPIC TAGS: erythrocyte radiation damage, gamma-irradiation, erythrocyte water medium, closely packed erythrocytes, optical density change, active water radical, erythrocyte radioprotection, erythrocyte water film, direct radiation injury, erythrocyte water distribution

ABSTRACT: The possibility that the active water radicals surrounding erythrocytes play a dominant role in erythrocyte membrane radiation damage has been suggested by the authors' earlier investigations. To test this possibility, radiosensitivity of erythrocytes suspended in a physiological solution was compared with closely packed erythrocytes produced by centrifuging the same suspension for 5 min. The erythrocyte samples were gamma-irradiated (Cs^{137}, 700 r/min) with 5000 r doses. Radiation damage was determined photometrically by optical density change. Close packing of erythrocytes was found to be

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ACCESSION NR: AP4015082

responsible for approximately 20% radioprotection. Additional experiments were conducted with closely packed erythrocytes to find whether this protective action can be attributed to depression of metabolic processes. Findings showed that radioprotection of closely packed erythrocytes is not caused by metabolic processes, but by the reduced volume of water surrounding the erythrocyte and the subsequent reduced number of water radicals reaching the erythrocyte. To find whether the remaining 80% erythrocyte radiation damage is caused by radiation acting directly on the erythrocyte structure or only on the water film enveloping the erythrocyte, erythrocyte samples were irradiated in an isotonic medium containing 0.5% glucose. Radioprotection increases to 55% in the presence of glucose which does not penetrate into the erythrocyte. This protective action can be attributed to interception of the shortlived water radicals formed in the water films enveloping the erythrocytes and is related to radiation acting indirectly on erythrocyte structure. On the bases of water distribution within the erythrocyte and also on the basis of the literature, it is estimated that 20% of radiation damage is caused by direct injury of erythrocyte membrane macromolecules. Shortlived water radicals in the water film enveloping the erythrocyte or direct radiation action on the lipoprotein complexes of the cell surface layer may account for the remaining

Card 2/3

ACCESSION NR: AP4015082

25% radiation damage. The mechanisms which increase erythrocyte membrane radiosensitivity in a physiological solution are applicable to other cellular structures. Orig. art. has: 5 figures.

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR, Moscow (Institute of Biological Physics AN SSSR)

SUBMITTED: 25Sep63 DATE ACQ: 12Mar64 ENCL: 00

SUB CODE: LS NO REF SOV: 005 OTHER: 011

Card 3/3

KUZIN, A.M.; KASYMOV, A.; KRYUKOVA, L.M.

Mechanism of stimulating and inhibiting action of radiation on potato tubers. Radiobiologiia 4 no.1:144-149 '64. (MIRA 17:4)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.

KUZIN, A.M.; LUBONOSOV, T.S.; [illegible]; KIZA-ZADE, R.E.; TARKOV, S.K.

Possibilities for utilization of ionizing radiations in hydroponics. Radiobiologiia 4 no.3:457-459 '64. (MIRA 17:11)

1. Institut biologicheskoy fiziki AN SSSR, Moskva i Krasnodarskiy nauchno-issledovatel'skiy sel'skokhozyaystvennyy institut, gidroponicheskoye khozyaystvo.

KOPYLOV, V.A.; KUZIN, A.M.

Role of dioxyphenols in the mechanism of action of γ rays on plants. Radiobiologiia 4 no.4:508-512 '64. (MIRA 17:11)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.

KUZIN, A.M.; GLEMBOTSKIY, Ya.L.; LAPKIN, Yu.A.; KALENDO, G.S.; BREGADZE, Yu.I.; MAMUL', Ya.V. [deceased]; MYASNYANKINA, Ye.N.

Mutagenic effectiveness of incorporated C^{14}. Radiobiologiia 4 no.6: 804-809 '64. (MIRA 18:7)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.

BEKETOVA, A.A.; KUZIN, A.M.

Effect of gonadotropin on the state and synthesis of DNA and on the intensity of cell division in the thymus of sexually immature rats. Dokl. AN SSSR 155 no. 4:978-980 Ap '64. (MIRA 17:5)

1. Moskovskiy tekhnologicheskiy institut myasnoy i molochnoy promyshlennosti. 2. Chlen-korrespondent AN SSSR (for Kuzin).

L 1398-66 EWT(m)

ACCESSION NR: AP5017763 UR/0216/65/000/004/0507/0520
577.391

AUTHOR: Kuzin, A. M.; Plyshevskaya, Ye. G.; Kopylov, V. A.; Ivanitskaya, Ye. A.; Lebedeva, N. Ye.; Kolomiytseva, I. K.; Tokarskaya, S. K.; Mel'nikova, S. K.

TITLE: Role of the "orthophenol-orthoquinone" system in the primary mechanisms of radiation effect on the organism

SOURCE: AN SSSR. Izvestiya. Seriya biologicheskaya, no. 4, 1965, 507-520

TOPIC TAGS: radiation biologic effect, phenol, quinone, enzyme, desoxyribonucleic acid, tyrosine, oxidation

ABSTRACT: A hypothesis stating that the oxidation reaction of orthophenols in response to high energy irradiation is closely related to the formation of orthoquinones (semiquinones) has evolved from the experimental work of the laboratory with which the authors are associated. In the present study the immediate effects of X-irradiation on enzyme process rates were investigated in a tyrosine+tyrosinase model system under strictly controlled conditions

Card 1/3

(210 kv, 15 ma, no filter, 100 to 1000 r doses, 10 min incubation). Change in enzyme process rate was determined by the concentration of newly formed orthophenols and orthoquinones. With irradiation of the whole system, the concentration was 5 times higher than for controls. Irradiation of only the tyrosine solution led to a lesser concentration, and the concentration decreased still further with irradiation of only the tyrosinase. When the irradiated mixture was incubated with a suspension of mouse thymus nuclei, the tyrosine oxidation products (orthoquinones) were completely absorbed by the nuclei. Fluorescence tests with acridine-orange on thymus nuclei of mice immediately after irradiation and tests on thymus nuclei treated with tyrosine oxidation products demonstrated the similarity of irradiation effect and orthoquinone effect. The same effect was demonstrated with quinone extracts from gamma-irradiated plant tissue (potato). Treatment of carbon-labeled plant sprouts with extracts from irradiated plants depressed DNA synthesis by 50 to 60%, the same as after gamma-irradiation. Injection of purified orthoquinones, extracted from irradiated plant tissues, into young mice caused loss of weight, growth inhibition, and a sharp decrease in leukocyte level of the peripheral blood. These study data demonstrate the importance of the

L 1398-66
ACCESSION NR: AP5017763

"orthophenol-orthoquinone system" in the primary mechanisms of radiation effect. Orig. art. has: 10 figures and 4 tables.

ASSOCIATION: Institut biologicheskiy fiziki AN SSSR (Institute of Biophysics AN SSSR)

SUBMITTED: 22Jan65 ENCL: 00 SUB CODE: LS

NR REF SOV: 021 OTHER: 010

Card 3/3

PLYSHEVSKAYA, Ye.G.; KUZIN, A.M.

Change in sorption properties of thymus cell nuclei immediately following gamma irradiation. Radiobiologiia 5 no.1:17-20 '65.
(MIRA 18:3)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.

KUZIN, A.M.; KOPYOVA, V.A.; MELIKHOVA, S.E.

Effect of ionizing radiation on the metabolism of phenol compounds in plants. Radiobiologiia 5 no.1:35-39 '65.

(MIRA 18:3)

1. Institut biologicheskoy fiz ki AN SSSR, Moskva.

UZORIN, Ye.K.; KUZIN, A.M.

Study of optical properties of the natural chlorophyll in Pisum sativum leaves grown from gamma-irradiated seeds. Radiobiologiia 5 no.1:119-125 '65. (MIRA 18:3)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.

AUTHOR: Trinchar, K. S.; Kuzin, A. M.; Pruzedze, Yu. T.; Gintsburg, E. L.

TITLE: Radiation damage produced by different types of radiation in [illegible]

[illegible]

ABSTRACT: [illegible]

L 54042-65
ACCESSION NR: AP5010331

the RBE of fast neutrons accompanied by gamma rays is approximately 1.3

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR, Moscow
(Biological Physics Institute, AN SSSR)

SUBMITTED: 02Nov64 ENCL: 00 SUB CODE: LS

KUZIN, A.M.; MERKULOV, A.S.

Lipoxidase activity in γ-irradiated seeds. Radiobiologiia 5 no.4:571-575 '65. (MIRA 18:9)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.

KUZIN, A.M.

Gamma rays and fertilizers. Priroda 54 no.4:27-31 Ap '65.
(MIRA 18:5)

1. Chlen-korrespondent AN SSSR.

KUZIN, A.M.; NARBAYEV, N.

Quantitative characteristics of the formation of quinones in a gamma-irradiated plant tissue. Dokl. AN SSSR 164 no.6:1409-1412 O '65. (MIRA 18:10)

1. Institut biologicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Kuzin).

VAYNSON, A.A.; KUZIN, A.M.

Synthesis of DNA induced by irradiation of cytoplasm and nucleus of FeLa cells with a microbeam of α-particles. Dokl. AN SSSR 165 no.4:933-936 D '65. (MIRA 18:12)

1. Institut biologicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR (for Kuzin).

L 38251-66 EWT(1)/EWT(m)/T JK

ACC NR: AP6028675 SOURCE CODE: UR/0020/66/167/003/0678/0680

AUTHOR: Kalendo, G. S.; Kuzin, A. M. (Corresponding member AN SSSR)

ORG: Institute of Biological Physics, AN SSSR (Institut biologicheskoy fiziki AN SSSR)

TITLE: Effect of gamma-radiation on the metabolism of fast labelled RNA in HeLa cells

SOURCE: AN SSSR. Doklady, v. 167, no. 3, 1966, 678-680

TOPIC TAGS: RNA, gamma radiation, radiation biologic effect, cytoplasm, biochemistry

ABSTRACT: The authors set up experiments to confirm their earlier hypothesis that periodic fluctuation in the level of labelled RNA in the nucleus and cytoplasm of irradiated HeLa cells was associated basically with periodicity in the decomposition of fast labelled RNA. After impulse labelling with H^3 uridine further RNA synthesis was halted by the addition of actinomycin D, which made it possible to follow the RNA which had formed at the moment of blocking in the cell nucleus. The experiments confirmed the existence of at least two fast labelled RNA fractions, one of which was more sensitive to actinomycin D and had a life of about 10 minutes, and the other of which was resistant. It was shown that with gamma radiation the content of the latter of these two fractions began to undergo regular fluctuations. Orig. art. has: 3 figures. [JPRS: 36,932]

SUB CODE: 06 / SUBM DATE: 08Dec65 / ORIG REF: 002 / OTH REF: 006

Card 1/1 UDC: 577.391+611.018+611.006.04 539.199

L 31195-66 EEC(k)-2/EWT(1)/EWT(m)/FSS-2 TT/RD/GW
ACC NR: AP6022566 SOURCE CODE: UR/0216/66/000/002/0177/0182

63
B

AUTHOR: Kuzin, A. M.

ORG: Institute of Biophysics, AN SSSR, Moscow

TITLE: Status and tasks of radiobiology today

SOURCE: AN SSSR. Izvestiya. Seriya biologicheskaya, no. 2, 1966, 177-182

TOPIC TAGS: radiobiology, radiation biologic effect, radiation protection, manned space flight, biologic ecology

ABSTRACT: The article examines the reasons for the swift development of radiobiology during the past 20 years, the main accomplishments, and the most urgent problems facing radiobiologists at the present time. It emphasizes the importance of fundamental research on the primary mechanisms governing the biological action of high-energy radiation at the molecular and cellular levels, its effects on the transmission of information in cells and on autoregulation. There is also a brief discussion of radiosensitivity and repair, with emphasis placed on the use of protective agents against acute and chronic radiation, a matter of considerable practical interest in manned space flight.

Although considerable progress has been made in the field of radioecology, much remains to be learned about the migration of natural and artificial radionuclides under different ecological and geographic conditions and about the impact on the health of man and animals.

Advances in theoretical radiobiology will have great practical implications for agriculture, medicine, the economy, and national defense. [JPRS]

SUB CODE: 06, 05 / SUBM DATE: none UDC: 577.391

Card 1/1 0925 0577

L 23811-66 EWT(1)/EWT(m)/T JK

ACC NR: AP6015925 SOURCE CODE: UR/0216/65/000/004/0507/0520

69

B

AUTHOR: Kuzin, A. M.; Plyshevskaya, Ye. G.--Plyshevskaya, E. G.; Kopylov, V. A.; Ivanitskaya, Ye. A.--Ivanitzkaya, E. A.; Lebedeva, N. Ye.--Lebedeva, N. E.; Kolomiytseva, I. K.--Kolomiytzeva, I. I.; Mel'nikova, S. K.--Melnikova, S. K.; Tokarskaya, V.I.

ORG: Institute of Biophysics, AN SSSR, Moscow (Institut biologicheskoy fiziki AN SSSR)

TITLE: Function of the orthophenol-orthoquinone system in the early mechanism of action of ionizing radiation on the organism

SOURCE: AN SSSR. Izvestiya. Seriya biologicheskaya, no. 4, 1965, 507-520

19

TOPIC TAGS: ionizing radiation, radiation biologic effect, radiation plant effect, tyrosine, sorption, oxidation, DNA, biosynthesis, radiation sickness

ABSTRACT: The authors concluded from a variety of experiments on plants and animals that the initial processes in the irradiated organism develop in the following sequence:

(1) During irradiation the formation of active radicals causes very slight radiochemical oxidation of the phenols present in the cell, chiefly tyrosine.

(2) The resultant oxidation products activate tyrosinase, which immediately after irradiation leads to the formation of large quantities of biologically active orthoquinones.

(3) The resultant orthoquinones are actively sorbed by the cell nuclei.

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UDC: 577.391

Card 1/2

L 25811-66

ACC NR: AP6015925

(4) The orthoquinones sorbed by the nuclei inhibit DNA synthesis, block the incorporation of thymidine into newly synthesized DNA, and alter their fluorescence in the presence of acridine orange.

(5) The blocking of nuclear DNA by the orthoquinones sharply inhibits cell division, giving rise to leukopenia, arrested growth, weight loss, chromosomal aberrations, and, in sufficiently high concentrations, death of the organism. Orig. art. has: 10 figures and 4 tables. [JPRS]

SUB CODE: 06, 07 / SUBM DATE: 22Jan65 / ORIG REF: 021 / OTH REF: 010

Card 2/2 CC

L 25753-66 EWT(m)

ACC NR: AP6016384 SOURCE CODE: UR/0020/65/164/006/1409/1412

42
B

AUTHOR: Kuzin, A. M. (Corresponding member AN SSSR); Narbayev, N.

ORG: Institute of Biological Physics, AN SSSR (Institut biologicheskoy fiziki AN SSSR)

TITLE: Quantitative principles of quinone formation in gamma-irradiated plant tissue

SOURCE: AN SSSR. Doklady, v. 164, no. 6, 1965, 1409-1412

19

TOPIC TAGS: quinone, polarographic analysis, radiation plant effect, plant chemistry, chemical kinetics

ABSTRACT: Potentiometric measurement of the oxidation potential in the three-millimeter surface layer of irradiated potato tubers indicated that there is a regular increase in the oxidation potential in these tubers as a function of the irradiation dose and time after irradiation. A polarographic investigation of extracts from the surface layer of irradiated potato tubers established an increase in the quinone content (half-wave potential -0.35 volt) according to an exponential curve as a function of the irradiation dose. It was demonstrated that the exponential shape of the survival curves in radiobiology may be taken as a basis for kinetic analysis of the formation of toxic substances, without using the hypothesis of a single hit in a unique structure. Orig. art. has: 4 figures and 1 table. [JPRS]

SUB CODE: 06, 07 / SUBM DATE: 04Feb65 / ORIG REF: 008 / OTH REF: 002

2

Card 1/1 CC

L 26687-66 EWT(1)/EWT(m)/T JK

ACC NR: AP6016901 SOURCE CODE: UR/0020/65/165/004/0933/0936

AUTHOR: Vaynson, A. A.; Kuzin, A. M. (Corresponding member AN SSSR)

ORG: Institute of Biological Physics, AN SSSR (Institut biologicheskoy fiziki AN SSSR)

TITLE: DNA synthesis following irradiation of the cytoplasm and nuclei of HeLa cells with an alpha-particle microbeam

SOURCE: AN SSSR. Doklady, v. 165, no. 4, 1965, 933-936

TOPIC TAGS: DNA, biosynthesis, radiation biologic effect

ABSTRACT: The study deals with the effect of radiation on the synthesis (replication) of DNA molecules in the cytoplasm and nuclei of HeLa cells in culture tissue. The cells were synchronized with respect to the S-period by adding thymidine for 21 hours ($G_1 + M + G_2$), and the data -- necessary for the synchronization -- on the duration of individual stages of the mitotic cycle were obtained by the tracer method. Local irradiation of the cells was carried out for a period of from 3 to 5 hours when the maximum number of cells was in the S-period, and was performed at room temperature with alpha-particles of Po^{210}. It was found that irradiation of the part of cytoplasm located at a distance of 2-3 microns from the cell nucleus, i.e., when the direct incidence of alpha-particles onto the unique

Card 1/2 UDC: 578.088:5

L 26687-66
ACC NR: AP6016901

structures of the nucleus is completely precluded, leads to a definite suppression of the rate of DNA synthesis (by 18% at a 6,300-rad dose) as established by Ag-granule counts. The rate of this suppression markedly increases with time. Considering that the toxic products, with their low molecular weight, take a few minutes to spread through the cell, it is logical to assume that the observed intensification of the effect is due to the prolonged post-radiation formation of new radiotoxins rather than to their slow diffusion toward the nucleus. It is thus concluded that the formation of radiotoxins is a major factor in the suppression of DNA synthesis. Orig. art. has: 4 figures and 2 tables. [JPRS]

SUB CODE: 06 / SUBM DATE: 16Jul65 / ORIG REF: 004 / OTH REF: 015

Card 2/2 Bk.G

L 20693-66 EWT(1)/EWT(m)/T JK/RM

ACC NR: AP6007761 SOURCE CODE: UR/0205/66/006/001/0003/0008

AUTHOR: Tokarskaya, V. I.; Kuzin, A. M.

ORG: Institute of Biological Physics AN SSSR, Moscow (Institut biologicheskoy fiziki AN SSSR)

TITLE: The effect of fast neutrons on DNA synthesis in seedlings

SOURCE: Radiobiologiya, v. 6, no. 1, 1966, 3-8

TOPIC TAGS: neutron irradiation, irradiation damage, gamma irradiation, cytoplasm, plant injury

ABSTRACT: Dry pea seeds of the Pobeditel' variety were irradiated with fast neutrons at 1, 3, and 10 krad, and the absorption of C^{14} in 4—7 day old seedlings grown from the irradiated seeds was studied. An IRT-100 reactor with a mixed beam comprising 30+ % gamma rays was used for the irradiation. In seeds irradiated with fast neutrons at 1—10 krad, C^{14} was found in 4—7 day old seedlings. Under neutron irradiation, the rate of DNA synthesis dropped 90% (compared with the control samples). Gamma irradiation of the seeds at the same dosage lowered DNA synthesis in

UDC: 539.125.5 : 58.039.1

Card 1/2

L 20693-66
ACC NR: AP6007761

the seedlings by 30%. Unlike gamma irradiation, neutron irradiation lowered high polymer DNA yield by 50%—60%. It is concluded that under gamma irradiation, the destruction of DNA is largely due to the damage to cytoplasm metabolism, while under neutron irradiation, the cells are damaged owing to the disruption of the adenine structure in DNA. The DNA synthesis rate as a function of dosage and kind of irradiation is graphed. Orig. art. has: 4 figures and 2 tables. [14]

SUB CODE: 06/ SUBM DATE: 23Oct64/ ORIG REF: 007/ OTH REF: 007/
ATD PRESS: 4223

Card 2/2 BK

KUZIN, A.N.
AID Nr. 976-1 28 May

WETTING OF WC AND TiC BY MOLTEN Cu AND Cu-Ni ALLOYS (USSR)

Kislyakov, I. P., L. V. Beylina, and A. N. Kuzin. Izvestiya vysshikh uchebnykh zavedeniy. Tsvetnaya metallurgiya, no. 1, 1963, 117-120.
S/149/63/000/001/005/008

The Moscow Institute of Fine Chemical Technology has studied the wetting of solid WC and TiC by molten Cu, Cu-Ni alloys (with up to 30% Ni), Ni, and Co at 1080 to 1250° C in a pure Ar atmosphere. It was found that WC is readily wet by both Cu and Cu-Ni alloys. The contact angle θ in these systems is less than 90°, even at temperatures only 10-20° C above the melting point of the lowest-melting component. The θ decreases with increasing exposure time at a constant temperature or with increasing temperature. The temperature of complete wetting ($\theta = 0$) was found to be 1220-1250° C for Cu, and 1200-1220° C for the Cu-Ni alloys. The Cu-Ni alloys wet WC at a lower temperature, and more rapidly at the same temperature, than Cu; the higher the Ni content, the more rapid the wetting. No wetting of TiC by

Card 1/2

WETTING OF WC AND TiC [Cont'd] S/149/63/000/001/005/008

Cu or Cu-Ni alloys was observed at temperatures up to 1250°C and exposure time up to 2 hrs. It is believed, however, that a higher purity of TiC or increased exposure time would facilitate wetting. Complete wetting of TiC with Ni or Co takes place at temperatures 20 and 30°C higher than the melting temperature of Ni and Co, respectively. Melting at lower than the melting temperatures of pure Ni and Co, observed at the Ni-TiC and Co-TiC interfaces, is associated with the eutectic nature of the pseudobinary TiC-Ni and TiC-Co systems. The qualitative effect of the exposure time and temperature on the wetting of TiC by Ni and Co is similar to that in the wetting of WC by Cu and Cu-Ni alloys. [MS]

KUZIN, A.N.

Gorkiy Veterinary Research Station. Trudy VIEV 23:370-371 '59.
(MIRA 13:10)

(Gorkiy Province--Veterinary research)

YERIN, V. V. and KUZIN, A. N.

"The struggle against hypodermic gadfly."

Veterinariya Vol. 37, No. 2, 1960, p. 10

(YERIN, V. V.) - Nachal'nik veterinarnogo otdela Gor'kovskogo oblastnogo upravleniya sel'skogo khozyaystva.

(KUZIN, A. N.) - Zamestitel' direktora Gor'kovskoy NIVS

KUZIN, A. N., Cand. Veter. Sci. (diss) "Epizootology and Methods of Elimination of Fowl Tuberculosis," Gor'kiy, 1961, 30 pp. (Kazan State Veter. Inst.) 200 copies (KL Supp 12-61, 281).

ACC NR: AP7002845 SOURCE CODE: UR/0136/66/000/012/0084/0086

AUTHOR: Dergunova, V. S.; Timonin, P. L.; Kuzin, A. N.; Tseytlin, V. Z.

ORG: none

TITLE: Properties of tantalum diboride-zirconium diboride alloys containing chromium

SOURCE: Tsvetnyye metally, no. 12, 1966, 84-86

TOPIC TAGS: alloy composition, hardness, porosity, metal melting, chromium containing alloy, tantalum base alloy, boride, zirconium base alloy

ABSTRACT:
TaB_2-ZrB_2-Cr alloys containing 20, 25 and 30% of ZrB_2 and 3—10% Cr were obtained from ZrB_2 (79.6% Zr, 19.67% B, 0.01% C) TaB_2 (89.18% Ta, 9.97% B, 0.01% C) and 99.9%-pure Cr powders by compacting at 2100—2200C under a pressure of 220 kg/cm^2 and homogenization at 2000C in an argon atmosphere. Depending on the composition, the porosity of alloys varied from 0.5 to 3—4%. The alloys consisted mainly of a solid solution of zirconium boride in tantalum boride with a microhardness of 2900—3300 kg/mm^2, and a solid solution of chromium boride in tantalum boride with a microhardness of 1000—1200 kg/mm^2. In addition, fine grains of a third phase,

Card 1/3 UDC: 669.294/296

ACC NR: AP7002845

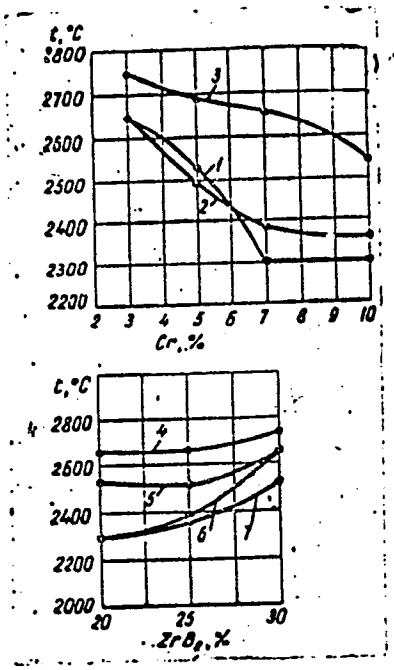

Fig. 1. Composition dependence of the melting point of TaB_2-ZrB_2-Cr alloys

TaB_2:ZrB_2 ratio: 1 - 80:20; 2 - 75:25; 3 - 70:30; Cr additions: 4 - 3%; 5 - 5%; 6 - 7%; 7 - 10%.

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ACC NR: AP7002845

probably chromium boride, were observed along the second phase grain boundaries. The composition dependence of the melting temperature of TaB_2-ZrB_2-Cr alloys is shown in Fig. 1. Increasing the chromium content from 3 to 10% lowered the strength (hardness) of the alloys both at room and at elevated temperatures, but increased their oxidation resistance. Orig. art. has: 5 figures and 1 table.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 007/ OTH REF: 005/ ATD PRESS: 5113

Card 3/3

RODZEVICH, N.V., inzh.; TULYAKOV, P.M., tekhnik; KUZIN, A.F., tekhnik

Experimental testing of the operative capacity of the end roller axle bearings of the high-speed TEP60 diesel locomotive truck under the conditions of pulsed axle load. Trudy VNIITI no.19:136-151 '64. (MIRA 18:3)

AUTHOR: Kuzin, A.P., Engineer SOV/117-58-12-5/36

TITLE: The Automation of Cold Punching (Avtomatizatsiya kholodnoy shtampovki)

PERIODICAL: Mashinostroitel', 1958, Nr 12, pp 5 - 7 (USSR)

ABSTRACT: Practice has shown that the majority of punching machines can be transformed into automatic devices by equipping them with automatic roll, gripper and revolving feed-attachments and "mechanical hands" as have been introduced at the Gor'kiy Automobile Plant for various work operations. A series of attachments for the automatic feeding of strip metal for crank presses of 40; 45; 60; 80 and 150 ton force was introduced, raising labor efficiency by 2 - 3 times. The only deficiency of such attachments is the unstable functioning of electric counters for controlling automatic work cycles. Therefore a new counter device will be introduced. Revolving feed devices attached to 26; 35; and 88 ton punching presses are being used (for punching blank pieces), as well as "mechanical hands" which, however, need a more simplified design to be used on small-size machines. The use of 26 - 150 ton force multiple-action machines for punching parts of different contours has been considerably developed. The

Card 1/2

main deficiencies of such machines are: 1) the long setting time (4 - 6 hours) of the punch, which will be reduced to 1 - 1.5 hrs by preliminary setting of the punch on a special support plate off the press; 2) the considerable fatigue of the operator. This deficiency will be eliminated by the use of a servomechanism. There are 4 photos.

KUZIN, Aleksandr Stepanovich; KRASHENINNIKOV, Ye.M., retsenzent; PROKHOROV, V.B., dots., kand. tekhn. nauk, otv. red.; BEZGODOVA, L.V., red.; URITSKAYA, A.D., tekhn. red.

[Operation of machines; maintenance of engines. A laboratory manual] Ekspluatatsiia mashin; tekhnicheskoe obsluzhivanie dvigatelei. Posobie k laboratornym zaniatiiam dlia studentov lesomekhanicheskogo i lesoinzhenernogo fakul'tetov. Leningrad, Vses. zaochnyi lesotekhnicheskii in-t, 1962. 80 p. (MIRA 16:5)

1. Zaveduyushchiy kafedroy tyagovykh mashin Petrozavodskogo universiteta (for Krasheninnikov).

(Engines--Maintenance and repair)

USSR/Cultivated Plants - Fodders. M.

Abs Jour : Ref Zhur - Biol., No 16, 1958, 74168

Author : Kuzin, A.T.
Inst : -
Title : Corn in Murgabsk Oasis.

Orig Pub : V sb.: Kukuruza v 1955 g Vyp. 6, M., Sel'khozgiz, 1956, 178-180.

Abstract : The results of the corn sowings carried out for the first time in 1955 on the Bairam-Ali experimental field showed that it is possible to obtain high yield of grain (56 centners/ha) and of the green bulk of corn under the conditions of Murgabsk oasis. With irrigation it is possible to harvest two crops of the green bulk of corn in the milky-waxy stage.

Card 1/1