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A REINVESTIGATION OF THE ALKALOIDAL CONSTITUENTS OF PEGANUM HARMALA

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**PHARMACOGNOSTIC STUDY OF THE STEM AND LEAF OF ANDROGRAPHIS
PANICULATA NEES**

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STUDIES ON ABRUS PRECATORIUS LINN

Part II.—Biochemical and Pharmacological Studies on Abrulin

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AND

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Some of the biochemical and pharmacological properties of abruin have been reported. The toxin is quite stable up to 80°C. and is not appreciably digested by trypsin and pepsin. Abrulin causes haemagglutination and is toxic in an amount of 50 mg./kg. when given orally. The toxicity of abruin is enhanced through the addition of proteins.

HEAT TRANSFER ANALYSIS OF A HEAT EXCHANGER PLATE*

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(Received May 21, 1962)

The objective of this study was to measure and evaluate the variation of the temperature and the overall heat transfer coefficient over a single plate.

Tests were conducted in the actual operating conditions, with the test plate in the regenerator section of a high-temperature short-time milk pasteurizer.

Copper-constantan thermocouples were used to obtain the data. The plotted contours of the temperature and the overall heat transfer coefficient showed pronounced variation near the inlet and the outlet ports. The overall heat transfer coefficient was observed to vary between 300 and 800 B.t.u./hr. ft.²F., with a weighted average value of 550 B.t.u./hr. ft.²F. over the surface of the plate. The temperature varied linearly along the length of the plate.

THE ANOMALOUS BEHAVIOUR OF SOLUTIONS OF SIMPLE AROMATIC COMPOUNDS IN STRAIGHT-CHAIN HYDROCARBONS AND MINERAL OILS

Part I.—Viscosity Depression Measurements at Various Temperatures in the Binary Systems: Benzene-Heptane and Heptane-Cyclohexane

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In continuation of previous investigations on long-chain phenolic additives for oils, accurate measurements of viscosity depression have been made every 5° C. from 15° C. to 40°C. over the full range of concentrations in the binary system of benzene-heptane; for comparison, the heptane-cyclohexane system has been similarly measured. Viscosity depressions of the order of 12% of the ideally interpolated viscosity are observed in the benzene-heptane system, and the maximum relative viscosity depression ($\Delta v/v$) appears to show an anomalous variation with temperature. The heptane-cyclohexane control gives only 4% depression and does not show the temperature variation anomaly.

A quantitative estimate of the excess free energy of mixing is made at about 180 cal./mole for benzene-heptane, and the phenomena are consistent with the existence of an appreciable interaction between benzene molecules, which might be of the order of 1/4 of that in most polar molecules. Further investigations on benzene and on related binary systems are in hand.

DISINTEGRATION OF HYPERFRAGMENTS

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A search has been made for the hyperfragments produced by 500 MeV/c K-meson in nuclear emulsion. A large number of events have been found. The present paper reports an analysis of five of them. This includes one case of non-mesonic decay of a helium hyperfragment. The binding energy found in each case is in agreement with the value obtained at other laboratories.

BIOCHEMICAL AND NUTRITIONAL STUDIES ON EAST PAKISTAN VEGETABLES**Part I.—Total Ascorbic Acid in East Pakistan Vegetables, its Co-existence with Plant Pigments and the Effect of Traditional Cooking Habit on its Retention**

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(Received November 27, 1961)

The total ascorbic acid content, including the dehydroascorbic acid, of some leafy tuberous and fruity vegetables grown and consumed in East Pakistan have been investigated.

As in a previous report, the relationship in the co-existence of ascorbic acid with anthocyanin pigments was also observed in many vegetables like red-skinned sweet potato and violet-skinned brinjal (*Solanum melongena*), in the red pepper, and in ripe fruits like utche *Memordica balsamina* and Kakrol (*Memordica cochinchinenses*) with pigmented skin. In the study of the influence of utensils on the loss due to cooking it was observed that this loss depends partly on the nature of the utensil and partly on the total time required, which on the other hand, is related with the nature of the vegetables and size of their slices.

BIOCHEMICAL AND NUTRITIONAL INVESTIGATION ON RICE AND RICE PRODUCTS OF EAST PAKISTAN

Part I.—Differential Study of the Change of the Size of the Paddy* and Rice and Photomicrographic Investigations on the Alteration of Starch Constituents due to Parboiling

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(Received November 27, 1961)

Fourteen improved strains of unboiled and sun-dried paddy (*Oryzae sativa*, var. *indica*) of East Pakistan so far studied revealed a variation of their length from 6.10 mm. in the case of Badshahbhog to 10.72 mm. in the case of Patnai. The dorsiventral diameters varied from 2.30 mm. to 3.58 mm. The ratio between the length and the dorsiventral diameter ranged from 2.18 to 3.93.

Due to parboiling and subsequent drying, there is a decrease in the length by 1.7% and an increase in the dorsiventral diameter by only 2.3%. Due to dehusking of paddy to rice there was a decrease in the length by 23 to 29% and in the dorsiventral diameter by 13 to 20%, in the case of both paddy and rice.

Photomicrographic study shows a partial degradation of the starch graules due to parboiling but the degree of change depends on the variety of paddy.

By iodine staining there is definite change of the colour from deep blue and violet to light blue and pink depending on the variety of paddy. The significance of this change in colour has been discussed in the light of the shifting of the amylose and amylopectin ratio due to parboiling.

**BIOCHEMICAL AND NUTRITIONAL INVESTIGATION ON RICE AND RICE PRODUCTS
OF EAST PAKISTAN**

**Part II.—Differential Autoamylolytic Activity of Parboiled and Unboiled Rice*
for Evaluation of their Storage and Cooking Character**

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(Received November 27, 1961)

Several varieties of homepound unboiled and parboiled rice samples, referred to in Part I of this series of paper were examined in respect of their autoamylolytic activity. In every variety the parboiled sample showed less reducing sugar content in the original grain before incubation and also after incubation for 5 hours. The milled samples collected from the market also showed similar low values for parboiled milled rice as compared to unboiled milled samples. The milled products both unboiled and parboiled showed lower values as compared to homepound products. The significance of these data in explaining the longer storage life and better cooking properties of parboiled rice and sweeter taste of homepound products vis-a-vis the milled products has been discussed in the light of difference in the autoamylolytic activities in their grains.

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STUDIES ON INDIGENOUS STARCHES OF PAKISTAN

Part IV.—Comparative Microphotographic Investigations in the Digestive Disintegration of Starch Granules

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(Received November 27, 1961)

The salivary digestion of heated swollen granules of shati, cassava, round potato (white and red skin), wheat and banana starches were studied on microscope slide and the course of digestion evaluated by microphotographs taken at frequent intervals following the discharge of iodine-stained blue colour. From the microphotographic observations it appeared that in case of potato, cassava and wheat starch probably the walls of the granules are ruptured by the centripetal force of the enzymes and the digestion, starting from the outer zone, gradually proceeds towards the centre. The wall of the banana starch granule, instead of being ruptured by the above process, allows the passage of the enzymes through the pores and digestion in the granules of this starch starts from the centre and proceeds towards the outer zone. Shati starch granule, because of its stronger boundary wall is not digested by any of the above processes. In this case the enzyme penetrates through a hole at the hilum end, which is formed during swelling by boiling, and the digestion then starts from the hilum end and gradually proceeds towards the other end.

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**EFFECT OF PECTIN ON PROTOPECTINASE PRODUCTION BY RHIZOCTONIA SPECIES
ASSOCIATED WITH ROOT ROT OF COTTON**

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CONTROL OF VENEER THICKNESS

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Statistical quality control techniques for the collection and analysis of thickness data have been shown to be feasible and profitable in research or production processes for peeling veneer from tropical woods of Pakistan. Shewhart's \bar{x} and R charts are well suited for this purpose. Once having indicated the existence of an assignable cause or of having demonstrated the effect of a deliberate manipulation of a veneering operation, the charts can be cited as statistical evidence in drawing inferences about the phenomenon. Examination of veneer peeling lathes revealed that nosebar pressures, knife angles, temperature of logs, properties of the wood embodied in species differences, maintenance of machinery, and care during operation all affect the control of veneer thicknesses.

These effects can be observed on the charts and adverse manufacturing minimized by making corrective adjustments as noted in the paper.

STUDIES IN THE ELECTRICAL INSULATION OF NATURAL AND SYNTHETIC MATERIALS**Part I.—Breakdown Voltage and Variation of Specific Conductance for Paper, Wood and Jutoid* of Various Water Contents**

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Measurements of electrical specific conductance have been made on various samples of paper, wood and Jutoid (bituminous composition on a jute base) at various applied fields up to breakdown. The effect of absorbed moisture has been studied. The conductance at small fields apparently shows a quadratic dependence on water content from zero up to about 2% by weight of water.

SHORT COMMUNICATION

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PROSPECT OF DEW-RETTING OF JUTE IN PAKISTAN

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PECTIC ENZYMES IN JUTE RETTING

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(Received April 2, 1962)

SYNERGISTIC EFFECT OF PENICILLIN IN THE PRESENCE OF CYANOCOBALTAMINE

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A NOTE ON EXCHANGE FORCES IN NUCLEI

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