

BIOCHEMICAL AND NUTRITIONAL STUDIES ON EAST PAKISTAN FISH

Part III.—Investigation on the Mechanism of Fish Spoilage by Study of the Influence of Visceral Contents and Boiling Treatment on the Autodehydrogenase Activity of Fish Tissues

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(Received December 14, 1959)

It has been found that both viscera and the fillet of a fish act in a symbiotic manner, with the onset of spoilage by generation of dehydrogenases. The liver in normal condition possesses high dehydrogenase activity, indicating its rapid autolysis; and the spoilage in the fleshy portion is partly due to the influence of visceral autolysis and partly due to bacterial invasion from air.

STUDIES ON COLCHICINE INDUCED TETRAPLOIDS IN RICINUS COMMUNIS L.

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(Received November 18, 1959)

On the assumption that duplication of chromosomes would increase the oil content of the seeds of *Ricinus Communis L.* tetraploids were obtained by colchicine treatment. It was however found that in spite of the fact that the size of the seed had increased the process is uneconomical due to late flowering, the failure of tetraploid to form fruits without hand pollination and very small number of seeds produced.

DEVELOPMENT OF RAPID METHODS FOR THE ESTIMATION OF THE OIL CONTENT OF SINGLE COTTONSEEDS

Part III.—Critical Examination of the Oil-expression Method

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(Received February 8, 1960)

The method utilizing the expression of oil between several discs of filter paper has been exhaustively tested, and a detailed assessment of the conditions governing its accurate utilization is made. The law connecting the area of the oil spot with crushing load is obtained and a technique of correcting for the varying water content of the kernel is worked out. The influence of the wetness of the filter discs has been separately determined, and measurements at an optimum relative humidity of about 80% are recommended.

While the diameter and grade (i.e. coarseness or fineness) of the filter paper are shown to have a very small effect, of the order of $\pm 3\%$, on the results, the size of the oil spot is found to be inversely proportional to weight per unit area of the discs, as was anticipated from theory. This makes it possible to directly correlate measurements made with different types of filter papers. The most favourable conditions for reproducibility and accuracy are noted, and a constant is obtained for direct conversion of area of oil spot into milligrams of oil present in the kernel.

THE RELATIONSHIP BETWEEN VISCOSITY AND MOLECULAR STRUCTURE**Part IV.—Observation of Energy-level Structure in the Intermolecular Potential Energy of Activation for Viscous Flow of Water**

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(Received February 22, 1960)

The earlier measurements on the activation energy, ϵ , of glycerol and ethylene glycol have now been followed up by similar accurate measurements in the case of water, based on the logarithmic derivative of the Andrade equation, viz.,

$$\epsilon/k = -T^2 \Delta \ln \eta / \Delta T$$

using a Beckmann thermometer for accurate measurement of the 2°C. interval, ΔT . Preliminary experiments in the range of 35°C. to 75°C. have indicated the presence of a series of more or less sharp, regularly occurring steps in the energy, ϵ . The temperature interval between successive steps is 6°C. on the average, as against 12.1°C. in the case of ethylene glycol. More refined and extensive measurements on water are in hand.

**NOTE ON A FULLY DYNAMICAL VARIANT OF LEES' DISC METHOD FOR THE
RAPID DETERMINATION OF THE THERMAL CONDUCTIVITY OF POOR
CONDUCTORS**

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(Received February 5, 1960)

As an extension of the previously reported semi-dynamical method utilizing the linearity of the plot of $\partial\theta/\partial t$ against θ , the temperature of the standard brass disc, a fully dynamical variant has been developed by extrapolating this linear plot backwards to the initial condition at $t=0$. The experimental results indicate the necessity for a significant correction for loss of heat from the periphery of the sample disc, an expression for which is derived. The experimental values obtained from the fully dynamical measurements are shown to be in satisfactory agreement (within $\pm 4\%$) with that obtained by the equilibrium method. The resulting formula contains a small term involving the specific heat of the sample disc, which can thus be determined from two measurements, with a thin disc and a thick one.

STUDIES IN THE RELATIONSHIP BETWEEN VISCOSITY AND MOLECULAR STRUCTURE

Part V.—Preliminary Investigation of Periodicity in the Temperature Variation of the Activation Energy in Aqueous Ethyl Alcohol in the Temperature Range of 5°C. to 55°C.

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(Received February 5, 1960)

As a sequel to the discovery of well-defined steps in the temperature variation of inter-molecular activation energy of viscous flow in poly-hydroxylic liquids like glycerol, ethylene glycol and water, the investigations have been extended to the case of ethyl alcohol, which has one hydroxyl group. Preliminary results obtained with a 2°C. measuring interval are reported here, and they show the presence of a fairly regular sinusoidal variation with a period of 10.4°C. and a peak-to-peak amplitude of about 0.102 units of $(\eta/k)/1000$ for redistilled rectified spirits (ethyl alcohol containing 6.5% water). Similar experiments on ethyl alcohol containing 12.3% water indicate a much smaller variation of peak-to-peak amplitude nearly 0.02 units with a period of about 8.8°C. These results are generally compatible with the extensive measurements already existing on the water-ethyl alcohol system, but the standard data is not accurate enough to indicate the small variations described in the present communication.

**CHEMICAL STUDIES IN RELATION TO THE BIOSYNTHESIS OF SOME NATURAL
BENZOFURANS AND RELATED COMPOUNDS. PART I***

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(Received December 2, 1959)

6-Methoxycoumaranone (I) on reduction with sodium borohydride gives 6-methoxybenzofuran (IV). Condensation of acetone with (I) gives (III), also obtained from (II) by the action of alkali. On the basis of these reactions and of structural relations in natural furanocoumarins and furanoquinolines and related compounds, the hypothesis is put forward that the furan ring is biogenetically related to an *isoprenoid* side-chain.

Cyclisation of the epoxide of suberosin results in the formation of (XV). Methyl ester of coumarilic acid on reduction with lithium aluminium hydride gives (XX). Further reduction of (XX) with sodium in alcohol results in the formation of (XXI). The epoxides (X) and (XVII) on treatment with alcoholic alkali give (XVI) and (XVIII), respectively. On the basis of these reactions and of structural relationship the hypothesis is put forward that epoxidation of *isopentenyl* and probably *allyl* side-chains is an essential phase in the process of development of furan ring fused to benzene nucleus and that coumarilic acid is involved in a different route in the biogenesis of these compounds.

STUDIES ON CENTAUREA BEHEN LINN. (COMPOSITAE). PART II

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(Received February 29, 1960)

The alcohol, water and piperidine extracts of *Centaurea behen* Linn. have been investigated. A glucoside, m.p. (dec.) 210-285°C., and $[\alpha]_D^{30} = -48^\circ$ (0.5% solution in tetrahydrofuran), has been isolated from the alcohol extract. On hydrolysis the glucoside yielded glucose and the new centaurea sterol A (C₂₇-28 H₄₄-48 O), m.p. 133-134°C., $[\alpha]_D^{25} = -31^\circ$. The alkaloid was present in the plant in a very small amount and did not yield sufficient material to be characterised. The reducing sugars were obtained in 23.4% yield from the aqueous extract. From the residual roots, inulin was obtained up to 38% of the fresh roots.

AN EXAMINATION OF AMOORA ROHITUKA

Part I.—Constituents of the Seed

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(Received February 26, 1960)

Constituents of the seed of the plant *Amoora Rohituka* have been investigated. An essential oil and a sterol have been obtained. The fixed oil after removal of the essential oil consisted of a mixture of saturated and unsaturated acids.

SHORT COMMUNICATIONS

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A NEW METHOD FOR REFINING OF SHARK LIVER OIL, ON COMMERCIAL SCALE AND RECOVERY OF VITAMIN 'A' BY PARTIAL SAPONIFICATION

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(Received February 28, 1960)

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(Received December 1, 1959)

**ESSENTIAL FATTY NUTRIENTS IN DIETS AND THEIR
EFFECTS ON LIVER AND HEART DEGENERATION IN MICE**

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Research, Tejgaon, Dacca.*

(Received December 1, 1959)