PAKISTAN JOURNAL
OF
SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 8, No. 4 October 1965

CHEMICAL EXAMINATION OF ROOT BARK OF ALANGIUM LAMARCKII THWAITES

SALIMUZZAMAN SIDDIQUI, M. AMJAD ALI
AND VIQAR UDDIN AHMAD

Drugs and Pharmaceutical Division, Central Laboratories, Pakistan Council of Scientific and Industrial Research, Karachi

(Received January 13, 1965)

From the root bark of the plant two new alkaloids, marckine, $C_{28}H_{35}O_3N_3$, and marckidine, $C_{28}H_{35}O_3N_3$, have been isolated. The former has been characterised through the preparation of its several salts and drivatives; the absorption spectra of both the alkaloids have also been studied. From the same source a new sterol, alangiosterol, $C_{29}H_{48}O$, has also been isolated, and characterised through its derivatives.

STUDIES IN THE STRUCTURE OF MARCKINE

VIQAR UDDIN AHMAD, M. AMJAD ALI AND
SALIMUZZAMAN SIDDIQUI

Drugs and Pharmaceutical Division, Central Laboratories, Pakistan Council of Scientific and Industrial Research, Karachi

(Received February 28, 1965)

The alkaloid marckine, $C_{28}H_{35}N_3O_3$, isolated from *Alangium lamarckii* Thwaites, has been found to yield harman, $C_{12}H_{10}N_2$, on selenium dehydrogenation. On dehydrogenation with palladised asbestos, a base, $C_{18}H_{17}N_3O$, m.p. 122°, was obtained which has been named as marckyrine. Oxidative degradation with permanganate yields a mixture of compounds from which meta-hemipinic acid, oxamic acid and oxalic acid have been isolated. The N. M. R. spectrum of mono-N-acetyl marckine has been studied. On the basis of the information obtained from the degradative experiments as well as the physical evidence, two alternative structures have been proposed for marckine. The identity of marckine with tubulosine, $C_{29}H_{37}N_3O_3$, and the possibility of a C_{29} formulation for marckine have been discussed.

STUDIES ON DELPHINIUM DENUDATUM WALL

Examination of the Petroleum Ether Extractive of the Roots

A. WADOOD QURESHI AND A.M. AHSAN

Central Laboratories, Pakistan Council of Scientific and Industrial Research, Karachi

(Received December 10, 1964)

In addition to β-Sitosterol and its glucoside, an unsaturated hydrocarbon, $C_{32}H_{58}$, b.p. 200°/0.1 mm. n_D^{34} 1.4800 with no rotation and a monohydric unsaturated alcohol, $C_{16}H_{30}O$. b.p. 156-60°/0.1 mm., n_D^{34} 1.4646, with rotation nil, have been isolated from the petroleum ether extractive of the roots of *Delphinium denudatum* Wall.

COMPARATIVE MEASUREMENTS OF THE TEMPERATURE DERIVATIVES OF VISCOSITY, DENSITY AND REFRACTIVE INDEX OF PURE LIQUIDS AND SOLUTIONS

Part IV.—The Coefficient of Dilatation and its First Derivative for 9% and 14% Aqueous Ethyl Alcohol Solution

TAYEB M. QURESHI AND S. WAJAHAT ALI

Physics Division, Central, Laboratories, Pakistan Council of Scientific and Industrial Research, Karachi

AND

M. M. QURASHI

Defence Science Organization, Ministry of Defence, Government of Pakistan, Karachi

(Received May 18, 1965)

Some accurate dilatometric measurements are reported on two dilute aqueous ethanol solutions, containing 8.7 percent and 13.5 percent (by weight) of ethanol in the temperature range of 20°C. to 50°C. The measurements have been made at intervals of 1°C., using a dilatometer with a very long capillary, with which a reproducibility of the order of 1 percent of β, the coefficient of dilatation, is obtained. Measurements on jumps in activation energy of flow, $E\eta$, are also presented for 13.8 percent aqueous ethanol.

Four separate graphs of β, each based on a separate set of measurements show a series of marked undulations, with regions of nearly constant β, separated by sharp rises in β,. The mean plots of β confirm these features, and the plots of $\Delta\beta/\Delta T \times 10^5$ bring these out even more markedly. The values of $\Delta\beta/\Delta T \times 10^5$ oscillate over a range of about 0.5 for each solution. An examination of the temperatures at the minima of $\Delta\beta/\Delta T$ shows a certain correspondence with the positions of the jumps in E/R observed in the corresponding solutions. This correspondence is exact below 35°C., while above this temparature, the jumps in E/R are 1.2 °C. $\pm$ 0.2°C. ahead of the minima in $\Delta\beta/\Delta T$, and therefore agree with the minima in the cyclic component of β itself, as in the case of ethylene glycol. Further experiments on other solutions are in progress.

TEMPERATURE DEPENDENCE OF THE INTERMOLECULAR ACTIVATION ENERGY FOR FLOW IN LIQUIDS AND SOLUTIONS

Part VII.—Investigation of Steps in the Activation Energy for Some Light Aliphatic Hydrocarbons (C=6 upto C=12)

TAYEB M. QURESHI AND S.A. BARI

Physics Division, Central Laboratories, Pakistan Council of Scientific and Industrial Research, Karachi

AND

M.M. QURASHI

Defence Science Organization, Ministry of Defence, Government of Pakistan, Karachi

(Received April 2, 1965)

Further accurate measurements of activation energy E_η, of viscous flow have been made on several light hydrocarbons, namely n—Hexane, n-Octane, Iso-Octane, n-Decane and Kerosene oil (Molecular weight=165). With the only exception of Iso-Octane, these results show a regular step-wise structure in E_η at lower temperatures, and cyclic behaviour at fairly high temperatures.

A plot of temperature for this transition versus the number of Carbon atoms, n, gives a smooth curve with the maximum curvature at n=15. An approximately linear graph for log(n) against this transition temperature has been plotted, together with the freezing and boiling points. These graphs suggest the presence of a transition between two *differently ordered* states of the liquids.

The behaviour of iso-Octane is anamolous in that it shows a cyclic variation at the *lower* temperatures, going over into a constant value of E above the transition temperature.

A STUDY ON 'STATIC' FLUIDIZATION

SHABBIR AHMED QURESHI AND SALIM REZA

Engineering Division, Central Laboratories, Pakistan Council of Scientific and Industrial Research, Karachi

(Received December 10, 1964)

Of all the variables which affect the onset of fluidization, the particle size, the true-density and the viscosity of the material and the fluidizing agent, are the most important. The present investigation relates to the study of these variables with reference to the 'static-fluidization' (defined later), for both the vesicular and non-vesicular materials, such as coal, coke, bentonite, sand, limestone, felspar, and iron-ore, over a wide particle size spectrum namely $-10+12$, $-16+18$, $-30+36$, $-60+72$, $-85+100$, $-120+150$, $-150+170$, $-170+200$ mesh B. S. S., using air as fluidizing agent. It has been shown graphically that the pressure drop, ΔP, across the bed is related to the modified Reynolds' number Re and is influenced by the particle size. Re is shown proportional to dp^2, and a function of the density and voids of the materials used. No correlation is given.

EXTRACTION OF STIBNITE WITH SODIUM SULPHIDE SOLUTIONS*

A.L. BHUIYAN

Jagannath College, Dacca

(Received April 4, 1963; revised October 1, 1964)

Extraction of pure Sb_2S_3 and stibnite ore with aqueous sodium sulphide has been studied under different sets of conditions and the effect of Na_2S concentration and temperature have been examined. It was found that both the pure sulphide and the ore reacted with Na_2S in the same way. At the initial stage different reactions are involved but the main reaction responsible for extraction in the final stage can be represented as: $3Na_2S$ aq. $+ Sb_2S_3 \rightleftharpoons Na_3SbS_3$ aq. In support of the proposed reaction, almost complete recovery of the dissolved antimony sulphide could be achieved in the form of pure crystals of $Na_3SbS_3.9\ H_2O$(I). Results suggest that the method can be used for bulk leaching of stibnite ore and also for preparation of the pure sulpho-antimonite (I).

COLORIMETRIC DETERMINATION OF MICRO-AMOUNTS OF SILVER WITH POTASSIUM FERROCYANIDE AND $\alpha\alpha'$ DIPYRIDYL

S.M. Ali and Mohammad Ajmal Khan

North Regional Laboratories, Pakistan Council of Scientific and Industrial Research Peshawar

(Received December 1, 1964)

A Colorimetric method, for the estimation of micro-gram amounts of silver, based on the reaction between K_4 (Fe(CN)6 and ammoniacal AgCl has been developed. The quantitative determination of silver by this method can be carried out at pH 7.5 at 70°C. The colour developed by this method is stable and obeys Beer-Lambert's law in the silver concentration range 5-80γ. This method is also applicable for the determination of silver in galena.

EFFECT OF DIFFERENT LEVELS OF PROTEIN AND CALCIUM ON GROWTH, EFFICIENCY OF FOOD AND PROTEIN UTILIZATION AND BODY COMPOSITION OF RATS

S. Maqsood Ali, A. Rauf Aziz and Nazar Muhammad

West Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Lahore

(Received January 1, 1965)

The effect of adding varying levels of calcium carbonate to six semi synthetic diets containing high and low level of protein has been investigated. It was found that at low level of protein intake the addition of calcium does not improve growth and body performance of rats. At a higher protein intake there is a significant improvement in the growth and body performance by increasing the level of calcium in the diet. Protein content of the rats on different dietary regimens remains the same while body water and fat content varies. The significance of these findings in relation to food enrichment programme in Pakistan is discussed.

NOTES ON THE LIFE HISTORY AND HABIT OF THE GREENISH SPIDER MITE, PORCUPINYCHUS ABUTILONI G. NOV., SP. NOV., (ACARINA: TETRANYCHIDAE)

M. Anwarullah, Tasneem Akhtar and M. Irshad

Pesticide Research Section, Central Laboratories, Pakistan Council of Scientific and Industrial Research, Karachi

(Received August 23, 1964)

Porcupinychus abutiloni, a new genus and species reported from Karachi* is an extremely destructive pest of *Abutilon indicum*. The rearing technique for tracing the life history is given. A detailed account of the immature stages is also described and illustrated. The incubation period of the egg ranges from 4-7 and the larval stage lasts 4-6 days. The protonymphal period varies from 5-6 days and the deutonymphal from 4-6. The longevity of female ranges from 11-13 days. The complete life cycle from egg to adult takes an average of 21 days.

THE ROLE OF MITOCHONDRIA IN THE OOCYTES OF MACACUS RHESUS AND CANIS FAMILIARIS

H.K. YOSUFZAI

Department of Zoology, Dacca University, Dacca

(Received September 30, 1964)

In the oocytes of *Macacus rhesus* the mitochondria are granular in nature. The juxta-nuclear stage of mitochondria gives rise to perinuclear rings. Later a clear archoplasm is observed. When the egg grows in size and age, the layer of mitochondria breaks up into large number of patches, which arrange themselves in the form of a peripheral band. Later, these patches are observed scattered in the whole cytoplasm.

In *Canis familiaris* the mitochondrial aggregation is at first at the juxta-nuclear position; then they are seen concentrated at the yolk-nucleus area. Later, the mitochondria increase in number so much on one side that the nucleus is pushed away from the centre and becomes eccentric. The mitochondria, in the initial stages, are granular, but in advanced oocytes, they become finer and dust-like. Soon the cap of dust-like mitochondria disintegrates and the mirochondria are seen uniformly distributed in the ooplasm.

MALE STERILITY AND POLLEN SIZE IN THE GENUS MENTHA (MINT)*

S. R. BAQUAR

Central Laboratories, Pakistan Council of Scientific and Industrial Research, Karachi

(Received March 4, 1965)

Sterility and pollen size, in five pure species namely: *Mentha pulegium L., Mentha aquatica L., Mentha longifolia (L.) Huds., Mentha spicata L., Mentha arvensis L.*, and six interspecific hybrids namely: *M. piperita L. (M. aquatica X M. spicata); M. niliaca Juss. ex Jacq. (M. longifolia X M. rotundifolia); M. alopecuroides Hull (M. rotundifolia X M. longifolia); M. verticillata L. (M. aquatica X. M. arvensis); M. dumetorum Schult (M. aquatica X M. longifolia); M. gentilis L.* M. (spicata *X.M. arvensis*) have been studied. All the hybrids show a complete male sterility while fertility in the various pure species varies from 20 percent to 80 percent. Degeneration of male reproductive organ was found to be a constant feature in the hybrids. Stages from complete anther-abortion to those bearing normal-looking but unstainable pollen grains were noted in the hybrids. In all those hybrids where anthers were at all formed, pollen grains were found to be invariably of a dwarf size.

UTILIZATION OF 'BALCRETE' FOAMING AGENT

Part IV.—Production of Lightweight Cellular Plaster Boards

S. Tehzibul Hasan

Building Materials Research Division

AND

M. Aslam and Hasan Imam

Chemical Research Division,
Central Laboratories, Pakistan Council of Scientific and Industrial Research, Karachi

(Received January 27, 1965)

This paper describes the use of 'Balcrete' for the production of lightweight cellular plaster boards. It is possible to make these boards having a density ranging from 20 to 60 lbs. per cubic foot using 0.1-0.2 percent of 'Balcrete' by weight of plaster and with water: plaster ratio of 0.5-0.7. The flexural strength of these boards is about the same as cellulur concrete or clay bricks, but the compressive strength is comparatively less. The thermal conductivity rises sharply in the density range of 20-40 lbs. per cubic foot and gradually thereafter. Treatment of these boards with sodium silicate makes them water resistant.

LOW-LEAD BORO-SILICATE GLAZES FOR ARTWARE

MAHMUD AHMAD QAZI AND F. A. FARUQI

Glass and Ceramics Division, West Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Lahore

(Received September 10, 1963; revised January 6, 1965)

Systematic studies have been made of the substitution of zinc oxide by magnesium oxide in the low-lead boro-silicate glazes maturing at cone 06(980°C.). in vestigations have been extended to the study of the effect of zinc oxide when included in frit or in mill batch. Glazes of excellent visual and phycical properties have been produced with magnesia as a glaze ingredient. Zinc oxide has proved to give its full effect when included in mill batch rather than when it is a part of the frit. Some really good glazes for practical purposes have been developed.

STUDIES ON THE UTILIZATION OF "SPENT" OXIDE

S.M. Ali, Mohammad Younis and Bashir Ahmad

North Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Peshawar

(Received September 1, 1964)

Utilization of "Spent" oxide-a waste product of the Fertilizer Factory, Daud Khel (West Pakistan), has been investigated. "Spent" oxide can be reactivated with 40 percent sodium hydroxide solution and on sintering with sodium carbonate (1:1 by weight) at 850°C.

Recovery of sulphur from "Spent" oxide by treatment with 5 percent of sulphuric acid solution yielded sulphur of 99.8 percent purity. 70 percent of total iron oxide present in "Spent" oxide is recoverable as hydrated iron oxide and sulphuric acid used originally is converted into ammonium sulphate, an important nitrogen fertilizer.

MINERALOGY OF ALLUVIAL SAND OF THE KABUL RIVER NEAR CHARSADDA

S. Mansoor Akhtar and Fazal Ahmad Siddiqi

North Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Peshawar

(Received September 15, 1964)

Heavy minerals, from washed alluvial sand of the Kabul river in the Doab area near Charsadda are described. The main minerals present are magnetite, garnet and ilmenite but hypersthene, clinopyroxene, hornblende are also present. Radioactive minerals are either absent or present in very insignificant amounts.

SHORT COMMUNICATION

INVESTIGATIONS ON FARIDPUR PEAT

Part II.—Fraction and Infra-Red Studies of Peat Bitumen

M. QUDRAT-I-KHUDA, S. A. SAMAD AND A. RASHID
Fuel Research Division, East Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Dacca

(Received November 16, 1964)

STUDIES ON FAGONIA CRETICA LINN

M. EHSANUL HUQ, WASIF HUSSAIN, M. IKRAM AND S. A. WARSI
North Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Peshawar

(Received January 25, 1965)

SELECTIVE OXIDATION OF STEROIDAL ALCOHOL BY DIMETHYL SUPHOXIDE

M. A. SAEED
West Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Lahore

(Received April 8, 1965)

THE REACTION BETWEEN 3α, 5 α - CYCLOCHOLESTAN - 6β - CHLORIDE AND DIMETHYL SULPHOXIDE*

M. A. SAEED
West Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Lahore

(Received April 8, 1965)

INVESTIGATION ON AN UNKNOWN GROWTH FACTOR IN COW MILK*

H. N. DE
Food and Fruit Research Division, East Laboratories, Pakistan Council of Scientific and Industrial Research, Dacca

(Received November 24, 1964)

DETERMINATION OF THE BAKING VALUE OF CERTAIN INDIGENOUS WHEATS BY PHYSICAL METHODS

MUHAMMAD HANIF, A. S. ALVI

AND

S. MAQSOOD ALI
West Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Lahore

(Received July 14, 1964)

VITAMIN C CONTENTS OF WILD ROSE HIPS OF WEST PAKISTAN

AHMAD IFTIKHAR AJMAL, MUSTAQ AHMAD CHATTHA, M. ILYAS QURESHI, M. K. BHATTY

AND

KARIMULLAH
West Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Lahore

(Received February 1, 1965)

STUDIES ON THE TENSILE CHARACTERISTICS OF THE WAZIRI WOOL

M. IQBAL KHATTAK, TAJ ALI WAZIR AND MIAN TAJ YOUNIS
North Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Peshawar

(Received August 28, 1964)

ON HELMINTH PARASITES OF VENOMOUS SNKES OF WEST PAKISTAN

MARYAM SALEH AND ZAHIR AHMED
Central Laboratories, Pakistan Council of Scientific and Industrial Research, Karachi

(Received July 6, 1965)

TRANSISTORIZED FREE-RUNNING MULTIVIBRATOR

MANSOOR AHMAD AND ABDUL RAUF ANWAR
West Regional Laboratories, Pakistan Council of Scientific and Industrial Research, Lahore

(Received August 11, 1964)