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Physical Sciences Section

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ORGANIC REACTIONS IN AQUEOUS SOLUTION

Part I. Influence of Various Parameters on the Reaction of Ethyl Acetoacetate and Hydroxylamine Hydrochloride in the Formation of 2,2-Di(3-Methylisoxazol-5-one-4-yl) Propane, 3-Methylisoxazol-5-one Anhydride and 4-Isopropylidene-3-Methylisoxazol-5-one

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The reaction of ethyl acetoacetate and hydroxylamine hydrochloride has been thoroughly investigated particularly in the aqueous medium. Effects of variations of parameters like molar concentration, molar ratio, pH changes and temperature variation have been studied. Optimum conditions for the formation of 4-isopropylidene-3-methylisoxazol-5-one, 3-methylisoxazol-5-one anhydride and 2,2-di(3-methylisoxazol-5-one-4-yl) propane have been determined. The maximum yields of these compounds were 67.3, 57.5 and 63.0 % respectively. A possible mechanism for the formation of these compounds has also been suggested.

Key words: Synthesis, Isoxazolones, Derivatives.

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KINETICS OF THE ACETYLATION OF CITRONELLOL BY ACETIC ANHYDRIDE IN GLACIAL ACETIC ACID

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(Received July 2, 1986; revised October 10, 1988)

The acetylation reaction of citronellol with acetic anhydride has been studied by two different methods and has been found to be of the first order with respect to each citronellol and acetic anhydride when the concentrations of the reactants were of the same magnitude. The energy of activation of the reaction between citronellol and acetic anhydride in glacial acetic acid was found to be 57.29 KJ/mole (G.C. method) and 57.29 KJ/mole (Titrimetric method).

Key words: Acetylation, Kinetics, Citronellol.

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POTENTIAL ENERGY CALCULATIONS OF METYRAPONE

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(Received January 20, 1987; revised October 13, 1988)

Metyrapone is one of the potent inhibitor of cytochrome p-450. The potential energy of non-bonded interaction is calculated for metyrapone. The possible allowed conformation is found to be in the region $W_1 = 30^\circ$ to 85° and $W_2 = 0^\circ$ to 90° and 200° to 360° .

Key words: Adrenaline, Noradrenaline, Tryptophan.

TEMPERATURE DEPENDENCE STUDIES OF BIO-EMF-DEVICES

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(Received June 5, 1988; revised October 18, 1988)

BEDs, the low power sources, have recently been developed using plant leaves. A study based on temperature as a probe shows that the biological activities play dominant role and the energy producing reactions in BEDs seem to be enzyme catalysed bio-chemical reactions. The results are compared with the cell-free system.

Key words: Temperature, Bio-emf-devices.

PROTON MAGNETIC RELAXATION AND INTRA-MOLECULAR DYNAMICS IN SOLID POLY-L-GLUTAMIC ACID

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Proton spin-lattice relaxation times (T_1 s) have been measured in solid polycrystalline poly-L-glutamic acid at three different frequencies 60, 30 and 18 MHz in the temperature range 10K to 400K. Two well resolved and one partially resolved minima have been observed in the relaxation curves (T_1 -versus temperature) of poly-L-glutamic acid. The comparison of the relaxation behaviour of poly-L-glutamic acid with those of other homopolypeptides suggests considerable amount of motion in the side chains even in the absence of free rotors such as $-CH_3$ and $-NH_3^+$ groups.

The data have been analysed by computer using the Kubo-Tomita relaxation theory modified to include log-normal distribution of correlation times. Parameters characterizing the molecular dynamics have been determined.

Key words: Poly-glutamic acid, Polypeptide, Molecular dynamics.

EFFECT OF DIELECTRIC CONSTANT OF MEDIUM ON THE CONDUCTANCE MEASUREMENTS FOR ACETYLCHOLINE HALIDES AND PERCHLORATE AT 25°C

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(Received May 5, 1988; revised October 20, 1988)

The conductance parameters, Λ_0 (equivalent conductance at infinite dilution) and K_A (association constant) for acetylcholine chloride, bromide, iodide, and perchlorate in methanol, ethanol, and *n*-propanol at 25°C have been evaluated from the conductance measurements. The values of Λ_0 for different salts decrease with decreasing the dielectric constant of medium (D) in the order $\text{MeOH} > \text{EtOH} > n\text{-PrOH}$, while the association constants of the same salts in different alcohols increase with decreasing the dielectric constant of medium following to the trend $n\text{-PrOH} > \text{EtOH} > \text{MeOH}$.

Key words : Conductance measurement, Acetylcholine halidesperchlorate.

Biological Sciences Section

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A REVISION OF THE GENUS *BRACHYNEMA* MULSANT AND REY (PENTATOMIDAE: PENTATOMINAE: CARPOCORINI) FROM PAKISTAN

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(Received August 31, 1988)

The genus *Brachynema* Mulsant and rey is redescribed from Pakistan with the species *virens* Klug and *cinctum* (fabricius) with special reference to their metathoracic scent complex and male and female genitalia. A key is provided to species and their relationships are briefly discussed.

Key words: Revision, *Brachynema* Pakistan.

EFFECT OF CORTISONE ON THE LIPID COMPOSITION OF ADIPOSE TISSUE, PLASMA AND LIVER IN A LIZARD

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(Received July 12, 1988; revised October 29, 1988)

The effect of Cortisone on the lipid composition of adipose tissue, plasma and liver was studied in a lizard, *Uromastix hardwickii*. The total lipid was analysed for triglycerides, cholesterol and phospholipid content spectrophotometrically. The fatty acids of adipose tissue (free and esterified) were determined by a combined technique of thin-layer and gas liquid chromatography.

In the adipose tissue a significant reduction in the concentration of both triglycerides and free fatty acids fractions was observed after cortisone administration indicating the mobilization of fat from the tissue. The reduced level of glycerides and FFA in the adipose tissue and simultaneously increased level of triglycerides in liver and plasma indicates that the mobilized fat is transported to the liver where it is re-esterified. There seems to be very little effect on the hepatic cholesterol level. The hepatic phospholipid turn over rate is, however, increased due to the increased lipid transportation process. The major fatty acids in the adipose tissue were palmitic, stearic and oleic acid. The changes in the fatty acid pattern of the adipose tissue after cortisone treatment revealed the fatty acid specificity in the process of mobilization.

Key words: Lipids, Cortisone, Lizard.

CONTROL OF PINK BOLLWORM, *PECTINOPHORA GOSSYPIELLA* (SAUNDERS) BY MATING DISRUPTION TECHNIQUE*

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(Received September 17, 1987; revised October 26, 1988)

Three commercial formulations of gossypure viz; NoMate PBW, PB-ROPE and pectone were evaluated for their efficacy in controlling the pink bollworm, *Pectinophora gossypiella* (Saunders) by mating disruption technique on a private farm. An area of 8.1 hectare of cotton was sub-divided into 4 blocks of 2 ha: for each treatment. The samples of flowers and green bolls were observed weekly from five plots (0.4 ha each) in each treated block. PB-ROPE treated plots showed the least infestation in flowers (0.90%) and green bolls (1.67%) followed by NoMate PBW (1.81%, 2.52%) and pectone (2.32%, 3.06%) treated plots respectively. The infestation differences between the three pheromone treatments however, were found to be statistically non-significant. The percent larval infestation in bolls was significantly lower in plots treated with PB-ROPE (1.67%) and NoMate PBW (2.52%) than conventional insecticide plots 4.52%). Similarly the moth population was also lower in pheromone treatments than in plots treated with insecticide.

Key words: Pink bollworm, Cotton, Mating disruption.

ISOLATION OF FURNACE OIL UTILIZING BACTERIA CAPABLE OF PRODUCING BIOSURFACTANT

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(Received August 7, 1988; revised October 26, 1988)

Oil polluted soil samples, collected from various petrol pumps and around furnace oil underground storage tanks, were analysed for their total bacterial population and the frequency of oil utilizing bacteria. It was found that the amount of oil utilizing bacteria ranged from 28.1 % to 71.4 % of the total bacterial population. Air lift percolators having furnace oil impregnated soil, proved useful for enrichment of oil utilizing bacteria and studies on their succession. The individual growth behaviour of six oil utilizing bacteria in air lift percolators is reported. When a mixture of six bacterial strains was employed, furnace oil was used for the production of biosurfactant, which could completely emulsified the oil in the water phase.

Key words: Isolation, Biosurfactants, Oil utilizing bacteria, Furnace oil.

STUDIES ON BABY FOOD FROM MARINE RESOURCES

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Feeding trials on weaning babies showed that FPC made baby food is effective for feeding the weaning babies in gaining weight, height, haemoglobin. Amino acids pattern is found fairly comparable with the standard pattern of FAO. The PER values are also identical as compared to casein.

It is therefore concluded that FPC made baby food will provide adequate nutrition to weaning babies for proper nourishment.

Key words: Marine resources based baby food.

INFLUENCE OF SIMULTANEOUS SUPPLEMENTATION OF JAGGERY ON LEAD INTOXICATION IN RATS

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(Received September 23, 1988; revised November 13, 1988)

Beneficial effects of gur (Jaggery), a solidified product of sugarcane juice, on lead induced biochemical changes in blood and urine and on lead absorption in blood and tissues were investigated in rats. A daily single oral administration of gur along with lead for six weeks restored the inhibited activity of δ -aminolevulinic acid dehydratase, mean cell hemoglobin content, elevation of urinary δ -aminolevulinic acid excretion, blood zinc protoporphyrin and reduced the uptake of lead in liver, kidney and blood. The results suggest that many adverse effects of lead can be favourably reduced by simultaneous supplementation of gur (Jaggery).

Key words: Jaggery (Gur), Lead toxicity, δ -aminolevulinic acid dehydratase.

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CHEMICAL EVALUATION OF THE GENUS *ACACIA* OF PAKISTAN

Part I. Fatty Acid Composition of the Total Lipids and Lipid Classes of *Acacia albida* Del. and *Acacia modesta* Wall.

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(Received December 20, 1987; revised October 13, 1988)

Acacia albida Del. seed oil (3.64%) and *Acacia modesta* (6.5%) were examined for their fatty acids composition. The oils were fractionated by TLC into lipid classes; which were neutral lipids (39.0, 55.3%) and polar lipids (60.9%, 44.7%) respectively. Further fractionation of the neutral lipids resulted hydrocarbons, wax-esters, triglycerides, free fatty acids, 1:3-diglycerides, 1:2-diglycerides and mono-glycerides. Fatty acids composition of the whole oil and its fractions were determined by GC. This is the first report of the detection of margaric acid in *Acacia albida* seed oil.

Key words: Leguminosae, Genus *Acacia*, Lipid composition.

NEMATODES ASSOCIATED WITH NURSERIES IN KARACHI

Part I. Rose

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One hundred nurseries situated in Karachi were surveyed for nematode infestation in rose (*Rosa damascena*). *Pratylenchus brachyurus*, *P. coffeae*, *P. zaeae*, *Helicotylenchus indicus*, *H. multicinctus*, *H. pseudorobustus*, *Basirolaimus indicus*, *Hoplolaimus pararobustus*, *Tylenchorhynchus annulatus*, *Rotylenchulus reniformis* and *Xiphinema americanum* were found associated with rose in the nurseries surveyed. Spiral nematodes (*Helicotylenchus indicus*, *H. multicinctus*, *H. pseudorobustus*, *H. exallus*) and lesion nematodes (*Tylenchorhynchus annulatus*, *T. martini*, *T. mashhoodi*) were found in greater numbers.

Key words: Rose, spiral nematodes, lesion nematodes, lance nematodes, nurseries.

Short Communication

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AN UNUSUAL TAIL REGENERATION IN AGAMA

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Embritility of tail is very common in many lizards which

Technology Section

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A LOW COST POLAROGRAPH*

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(Received March 12, 1987; revised October 26, 1988)

Details of fabrication of a low cost polarograph is described. Price of components, electronic circuitry, the procedure and performance are detailed. The total cost of the fabrication of the polarograph, if assembled from the local resources, should be around US\$ 100. The polarograph, composed of a power supply and a potentiostat, is small (dimensions $2 \times (20 \times 15 \times 15 \text{ cm})$), light weight (4 kilos), stable and accurate enough for routine and educational work. The polarograph was tested with Cd^{2+} , Pb^{2+} , Zn^{2+} , Cu^{2+} and MV^{2+} and found to reproduce satisfactorily the literature values of $E_{1/2}$'s.

Key words: Low-cost polarograph, Potentiostat, Power supply.

STUDIES ON BIOCONVERSION
Part V. Conversion of Cotton Waste into Compost

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(Received January 27, 1988; revised November 1, 1988)

Cotton waste with 83-84% organic matter was degraded using Chinese method of composting. Compost thus produced had 76% yield, a pH of 7.5; organic matter 65%; ash 35% nitrogen 2.87%, potassium 1.62%, phosphorous 1.07% and a C/N value of 13/1. This compost was chemically compared with cow dung manure, and it was observed that it had 1.18%, 0.527% and 1.1% more nitrogen, phosphates, and potassium respectively. Microbiological evaluation of compost showed presence of 4.9 billion micro-organisms per gram of compost; 2.6 billion bacteria, 2.0 billion fungi and 0.3 billion actinomycetes.

Key words: Cotton waste, Biodegradation, Compost.

FATTY ACIDS OF INDIGENOUS RESOURCES FOR POSSIBLE INDUSTRIAL APPLICATIONS

Part XVI. Fatty Acid Composition of the Seed Oils of *Citrus limon* Var. Lemon and
Citrus aurantifolia Var. Khagzi Nimbu

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(Received July 12, 1988; revised November 8, 1988)

The physico-chemical evaluation of the seed oils of the local varieties of *Citrus limon* var. Lemon and *Citrus aurantifolia* var. Khagzi Nimbu was carried out. The yield of seed oil from the two varieties was 31.2% and 33.7% respectively. The gas chromatographic analysis of the methyl fatty esters derived from the two seed oils revealed the presence of C_{10:0} (0.8%, 0.9%), C_{12:0} (0.3%, 0.8%), C_{14:0} (0.5%, —) C_{16:0} (20.9%, 26.3%), C_{18:0} (7.8%, 6.1%), C_{18:0} (27.8%, 23.0%), C_{18:2} (34.8%, 24.4%), C_{18:3} (5.7%, 11.5%) and C_{20:0} (1.0%, 6.8%) respectively.

Key words: Seed oils, N.O. Rutaceae, *Citrus limon* var. Lemon, *Citrus aurantifolia* var. Khagzi Nimbu.