SHORT SCIENTIFIC NOTES

Pentacyclic Triterpenoids from the Stem Bark of *Zanthoxylum acanthapodium* DC

In a previous communication[1] on the lignans of the stem bark of *Zanthoxylum acanthapodium* DC we reported three unidentified compounds having melting points 174–177°, 193–195° and 119–120°. All the three compounds were thought to be lignans, but on further examination the first two compounds turned out to be pentacyclic triterpenoids.

The compound with m.p. 174–177° crystallised as white flakes from methanol, M^+ 424, $[\alpha]_D$ + 107·6° ($CHCl_3$). It gave positive Leibermann-Burchard and Zimmermann reactions, analysed for $C_{30}H_{48}O$ and formed a 2, 4-DNP derivative, m.p. 225–228°. The i.r., n.m.r. and mass spectral data of the compound are in agreement with those of β-amyrenone[2]. The identity was confirmed by reduction of the compound with $LiAlH_4$ in tetrahydrofuran to β-amyrin. This is the first report of the occurrence of β-amyrenone in *Zanthoxylum* species.

The compound with m.p. 193–195° was crystallised from acetone, M^+ 426, $[\alpha]_D$ + 95·94° ($CHCl_3$). It analysed for $C_{30}H_{50}O$ and gave a pink colour in the Leibermann-Burchard reaction. It formed an acetate, m.p 237–239°, M^+ 468. These properties and the i.r., n.m.r. and mass spectral data of the compound and its acetate suggested that the compound is β-amyrin[2]. Comparison with authentic samples (m.m.p. and co-t.l.c.) confirmed the identity of the compound as β-amyrin.

The third compound with m.p. 119–120° is a lignan and a study of this and other lignans forms a part of a separate communication[3].

Dept. of Pharmaceutical Sciences, K. V. Sastry.
Andhra University, E. Venkata Rao.
Waltair 530 003, *July* 24, 1976.

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A New Leaf Blight of Garlic Caused by *Cladosporium echinulatum* (Berk) de Vries, from Varanasi, U.P.

In 1975–76 *rabi* season garlic (*Allium sativum* L.) plants in and around B.H.U. campus were severely affected by a leaf blight caused by *Cladosporium echinulatum* (Berk) de Vries[1]. Pure culture of the fungus on inoculation on healthy leaves reproduce the disease in 10–12 days leaving no doubt about the pathogenicity of the organism. The fungus sporulates abundantly on the dead leaves and spreads to the adjacent plants. Irrigation or rainfall appear to increase the disease. In the fields visited an infection of 20–30% of the plants was quite common and in a few cases it was upto 60%.

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Faculty of Agriculture, K. C. Basuchaudhary.
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Varanasi 221 005, *July* 23, 1976.

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Leptosphaerulina Leaf Spot of *Trifolium alexandrinum* L. A New Record in India

Trifolium alexandrinum L. locally called as '*Barseem*' is an important fodder crop of North India. During recent survey a severe disease hitherto unrecorded on this crop was observed in submountaneous areas of Hoshiarpur District (Punjab) during the month of March, 1976. During subsequent surveys it was observed widely distributed in other parts of Panjab.

The fungus of the infected material was identified as *Leptosphaerulina trifolii* (Rostr.) Petrak and the material has been deposited in C.M.I., Kew, Surrey, England, under I.M.I. No. 203299 and the Herbarium of Department of Plant Pathology, P.A.U., Ludhiana. The perithecia observed were black, long, papillate, measuring 219–390 × 130–185 μ; asci 2–5 broad and ellipsoidal, thick walled, 69–99 × 27·5–37 μ containing 8–6 ascospores in each ascus. The description of this fungus is similar to that of given by Mehrotra (1966)[1]. Earlier this fungus is reported by him from the soil but this is the first report in India on this host causing the disease on this host.

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Ludhiana, Punjab, India, J. S. Jhooty.
July 23, 1976. H. S. Rewal.

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On the Abnormal Carpellary Number in *Cassia fistula*

In the campus of our college, an abnormal condition of carpellary number was noticed in the flowers of *Cassia fistula*. Flowers showed bi-, tri-, tetra- and occasionally pentacarpellary condition. The incidence of abnormality was 24% of the total number of flowers. Analysis of numerical abundance of the bi-, tri-, and tetracarpellary condition (17%, 3·6% and 1·4% respectively) and statistical treatment[1] showed that the bicarpellary condition was of the highest incidence.

Failure of differentiation in the specialized parts of plants like flowers is known to be caused by pathogens such as virus[2] and mycoplasma[3–5]. The proliferation of the carpels reported here could be considered on the same basis: the "abnormal" flowers also showed "petaloid" modification of anther lobes, proliferation of petals, numerical proliferation or reduction of stamens, adnation of filaments and occasional "phyllody" of whole flowers.

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REVIEWS AND NOTICES OF BOOKS

Dual Resonance Models. By Paul H. Frampton. (Addison-Wesley, W.A. Benjamin, Inc., Reading, Massachusetts 01867), 1974. Price: $ 22.50.

The construction by Veneziano in 1968 of the beta function expression as a model four-particle scattering amplitude was the direct inspiration behind an enormous amount of activity in elementary particle theory in the succeeding years. New ways of thinking about particles and their interactions, the dual resonance models, emerged. One of the most interesting aspects of this whole body of work is the very intricate as well as pretty mathematics that it involves. *A priori*, one would hardly have suspected that there was scope here for so much inventive and clever use of mathematical tools familiar to any quantum mechanic. The book under review gives a very complete account of these developments.

The author begins by recalling some of the ideas in particle physics phenomenology that formed the motivation for Veneziano's work. The notions of superconvergence, finite energy sum rules and duality are briefly discussed. This part is too brief for one to be able to learn about these things here for the first time, but anyway the author's intention is to recapitulate and comment on these ideas. He then introduces the Veneziano model and discusses in detail its important features. The generalisation to the N-particle case after solving the duality constraint-equations follows. A large amount of manipulation is involved in handling the various expressions and the author guides one, carefully through it all. The Koba Nielsen form for the amplitudes of the conventional dual resonance model is then developed, displaying the cyclic symmetry and projective invariance of the model amplitudes. Alternatives to the conventional model are also discussed briefly.

The oscillator operator formalism is then introduced and a thorough discussion of gauge conditions, ghost-killing mechanisms and existence of a critical space-time dimension below which alone, one has sensible physical interpretation, is given. Inocrporation of other degrees of freedom like internal symmetry and spin are treated in successive chapters. The beautiful idea of relating the operator formalism to the quantum mechanics of a relativistic string evolving in space-time is explained. The book concludes with a survey of the use of dual model amplitudes in the analysis of the data.

The theory of dual models is both interesting and rich. This book is especially complete in giving references to the literature, and anyone interested in learning about this subject could do so very well from here, provided he is prepared to supplement reading the text with a rather large dose of algebra.

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