Structure activity relationship

An examination of enzyme inhibitory activity in relation to the structure shows the following pattern.

1. A substitution at position 2 of the indole nucleus does not show any appreciable effect on inhibitory activtiy.

2. The presence of a –OH group or its absence in the benzene of the side chain does not affect the inhibitory activity.

3. It is clearly brought out that increase in the side chain from acetyl to butyryl at the 3–position of indole, causes a gradual increase in the inhibitory activity, and finally, the carboethoxy derivatives are more active than the carbomethoxy derivatives.

Department of Pharmacology, V. GUJARATI.
King George Medical College, N. SRIVASTAVA.
Lucknow University, K. SHANKER.
Lucknow 226 003, India. K. KISHOR.
July 3, 1977. K. P. BHARGAVA.

1. Srivastava, N., Nath, R., Shanker, K., Kishore, K. and Bhargava, K. P., (In press).
2. Grieg, M. E., Seay, P. M. and Freyburger, W. A., *J. Neurophychiat. Suppl.*, 1961, 2, 131.
3. Davis, E. J. and de Ropp, R. S., *Nature* 1961, 190, 636.
4. Zeller, E. A., Barsky, J., Fouta, J. R., Krishheimer, W. F. and Van Orden, L. S., *Experientia*, 1952, 8, 349.
5. Mighael, K., *Biochemical Pharmacology*. 1965, 14, 1684.

CHEMICAL EXAMINATION OF THE HEARTWOOD OF *ABROMA AUGUSTA* LINN. F.

THE root and root-bark of *Abroma augusta* Linn. F. are used as emmenagogue, uterine tonic and in dysmenorrhoea[1]. The leaves, stem-bark and heartwood of this plant are used in the treatment of gonorrhoea and in painful menstruation. Although the roots, leaves and stem-bark of *A. augusta* have been investigated by several workers[2–6], yet no phytochemical work has been done on the heartwood of this plant. We now report the results of systematic chemical investigation of the heartwood of this plant.

The dried and powdered heartwood was successively extracted with petroleum ether (60°–80°) and chloroform.

The petroleum ether (60°–80°) extract was chromatographed over Brockmann alumina using petroleum ether (60°–80°), benzene and chloroform as eluents. The fraction eluted with benzene on evaporation left a white solid (·002%) which crystallised from methanol in shining flakes (m.p. 136°–137°). It gave positive Liebermann-Burchardt test for sterol and its IR spectrum showed absorption at 3400 cm^{-1} (–OH-stretching). The identity of this sterol as β–sitosterol has been confirmed by m.m.p. determination, co–TLC with authentic sample of β–sitosterol and by the preparation of its acetate (m.p. 128°) and benzoate, (m.p. 145°).

The concentrated chloroform extract of the heartwood was chromatographed over Brockmann alumina. The benzene : chloroform (1 : 1) eluted fraction, furnished a white solid (·0005%) m.p. 112°. It does not respond to Liebermann–Burchardt test for sterol and triterpene. The IR spectrum shows absorption peaks at 3420 (–OH-stretching), 2940, 2860 (C–H stretching) 1465 ($-CH_3$-bending), 1060 (C–O stretching due to primary alcohol) and doublet at 730 and 720 cm^{-1} [$-(CH_2)$ n bending vibration due to straight chain methylene]. These data indicated the compound as octacosane–1, 28–diol (Lit. m.p. 112°) which was confirmed by its acetate[7] (m.p. 81°).

The authors wish to express their sincere thanks to the University Grants Commission, New Delhi for financial support and to Dr. S. P. Ghosh of Indian Association for the Cultivation of Science, Calcutta for IR spectra.

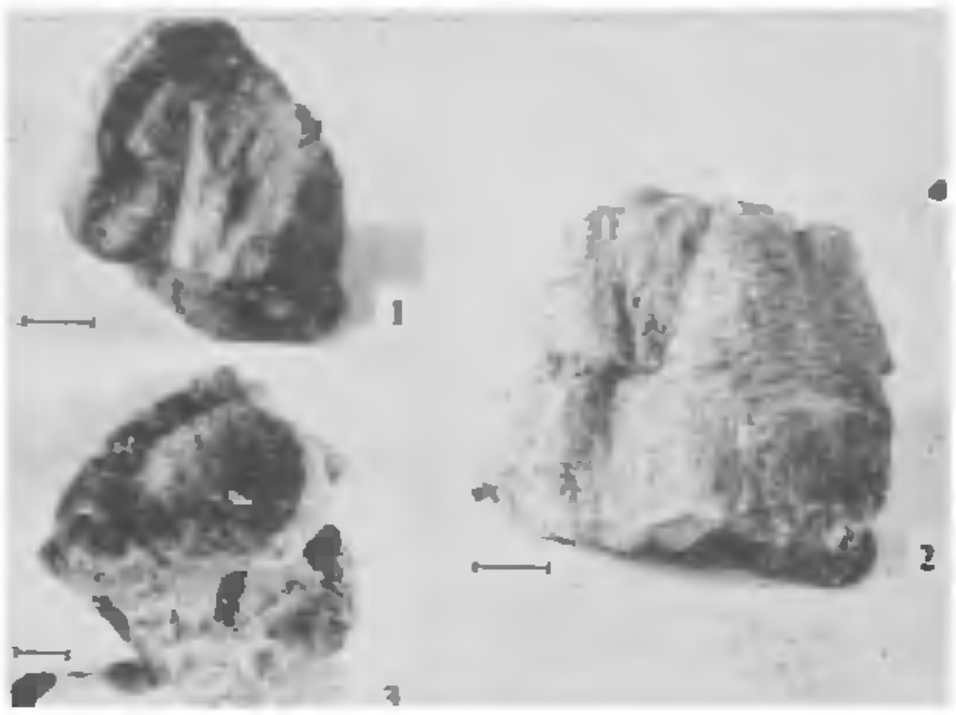
Department of Chemistry, K. S. MUKHERJEE
Visva-Bharati, Santiniketan, SAH BADRUDDOJA
West Bengal, *August* 31, 1977.

1. Chopra, R. N., Nayar, S. L. and Chopra, I. C., "Glossary of Indian Medicinal Plants", C.S.I.R. (India), 1956, p. 1.
2. Srivastava, G. P. and Basu, N. K., *Indian J. Pharm.*, 18, 472.
3. Ali, Sadiq, Ahmed, M. A. and Hahn, G., *Pak. J. Sci. Ind. Res.*, 1956, 1, 305.
4. Das Gupta, B. and Basu, K., *Experientia*, 1970, 26 (5), 477.
5. Aditya Chaudhury, N. and Gupta, P. K., *J. Indian Chem. Soc*, 1969, 46, 849.
6. Mukherjee, K. S. and Badruddoja, S., *Ibid.*, 1977, (in press).
7. Heilborn, I. and Burnbury, H. M., "Dictionary of Organic Compounds", London; Eyre and Spottiside. 1969, 5th and Cummulative supplement, p. 706.

CONE-IN-CONE STRUCTURE IN THE UPPER FLYSCH SERIES (UPPER CRETACEOUS) MALLA JOHAR AREA PITHORAGARH DISTRICT, UTTAR PRADESH

CALCAREOUS cone-in-cone structures are minor features of some shales and are characterised by abundance of right circular cones (Pettijohn)[3]. These structures are of much help in establishing the diagenetic history of the sedimentary succession (Franks)[1]. This note records the occurence of calcareous cone-in-cone structure from the Upper Flysch Series of Upper Cretaceous age (see Heim and Gansser)[2], Sancha Malla area, Pithoragarh district, Uttar Pradesh. It is the first record of this structure from India.

The cone-in-cone structure is seen in the calcareous sandstone/shale succession exposed on the slopes, northeast of Sancha Malla. In this succession it occurs in lenticular concretions and is made up of nested and interfering cones (Figs. 1–3). The individual cone ranges in height from 3 to 6 cm and the apical angle varies from 30° to 50°. The base of the cone is circular to elliptical. A thin clay film commonly separates the individual cones. The axes of the cones are more or less parallel to each other. Their apices point either in the same direction or in opposite direction.



FIGS. 1–3. Figs. 1 and 2. Cone-in-cone structure in the Upper Flysch Series, Sancha Malla, Pithoragarh district, U.P. Mark is equal to 1 cm. Fig. 3. Basal section of the cone-in-cone structure, Upper Flysch Series, Sancha Malla, Pithoragarh district, U.P. Mark is equal to 1 cm.

In thin section the cone-in-cone structure is made up of fibrous calcite. The calcite fibers are 0·08 mm in diameter and upto about 1 cm in length.

The Upper Flysch Series of Sancha Malla is a deep sea deposit (Heim and Gansser)[2]. It appears that the cone-in-cone structure was formed during diagenesis of the sediments under some special conditions which favoured precipitation of fibrous calcite.

The financial assistance from State Council of Science and Technology, Lucknow, is thankfully acknowledged.

Department of Geology, Lucknow University, Lucknow, U.P., *February* 15, 1978.

S. KUMAR.
I. B. SINGH.
S. K. SINGH.

1. Franks, P. C., *Jour. Sedim. Petrol.*, 1969, 39 (4), 1438.
2. Heim, A. and Gansser, A., *Dankchr. Schweiz. Naturf. Gessel.*, 1939, p. 73.
3. Pettijohn, F. J. *Sedimentary Rocks*, Harper Brothers, New York, 1959.

TRANSPIRATION IN RUST INFECTED LEAVES OF GROUNDNUT

THE rust (*Puccinia arachidis* Speg.) of groundnut (*Arachis hypogaea* Linn.) is a very destructive parasite and a menace to groundnut crop in many countries[2]. The disease has been reported from almost all groundnut growing areas of India[3]. Rust infection is generally known to be accompanied by an increase in transpiration[4,6,7]. The present investigation deals with the effect of rust infection on the rate of transpiration in groundnut.

Groundnut plants (cv TMV 2) were inoculated with freshly collected uredospores as described earlier[8]. The fourth leaf (counted from the tip), having uniformly distributed uredosori was sampled at different stages of disease development as outlined below:

Stage 1: Four days after inoculation; no visible symptoms on leaves.

Stage 2: Eight days after inoculation; small and circular white flecks on *abaxial* surface of the leaves.

Stage 3: Ten days after inoculation; the pustules were orange red with mature uredospores; epidermis on the sorus is unruptured.

Stage 4: Twelve days after inoculation; pustules ruptured and brown in colour.

Stage 5: Fifteen days after inoculation; pustules turn dark brown in colour.

The transpiration rate was determined by the method described by Padhi and Aruna Misra[6] for *Jatropha*. The rate of transpiration at each stage of disease was determined and the results are expressed as water loss in mg per sq. dm of leaf area per hour.

After determining the water loss at every stage, the epidermal peelings of upper and lower surfaces of both healthy and infected leaves were fixed and mounted in Heath's reagent and the perimeter of stomata was calculated from the measurements of length and breadth of the stomata.

In another experiment, the relaion between the intensity of the disease and the rate of transpiration was measured. Ten days after inoculation, leaves showing 4, 8, 15, 20, 25 and 30 uredosori per sq. cm. area were collected from the infected plants and their rates of transpiration were determined.

Water loss from infected leaves was significantly lower than that from controls during early stages of the disease (Fig. 1). The rate of water loss increased very rapidly from the third stage onwards, when the pustules were well developed and the host epidermis was ruptured. Durbin[4] reported that water loss from rust infected bean plants was significantly lower than that from healthy plants until the time of sporulation,