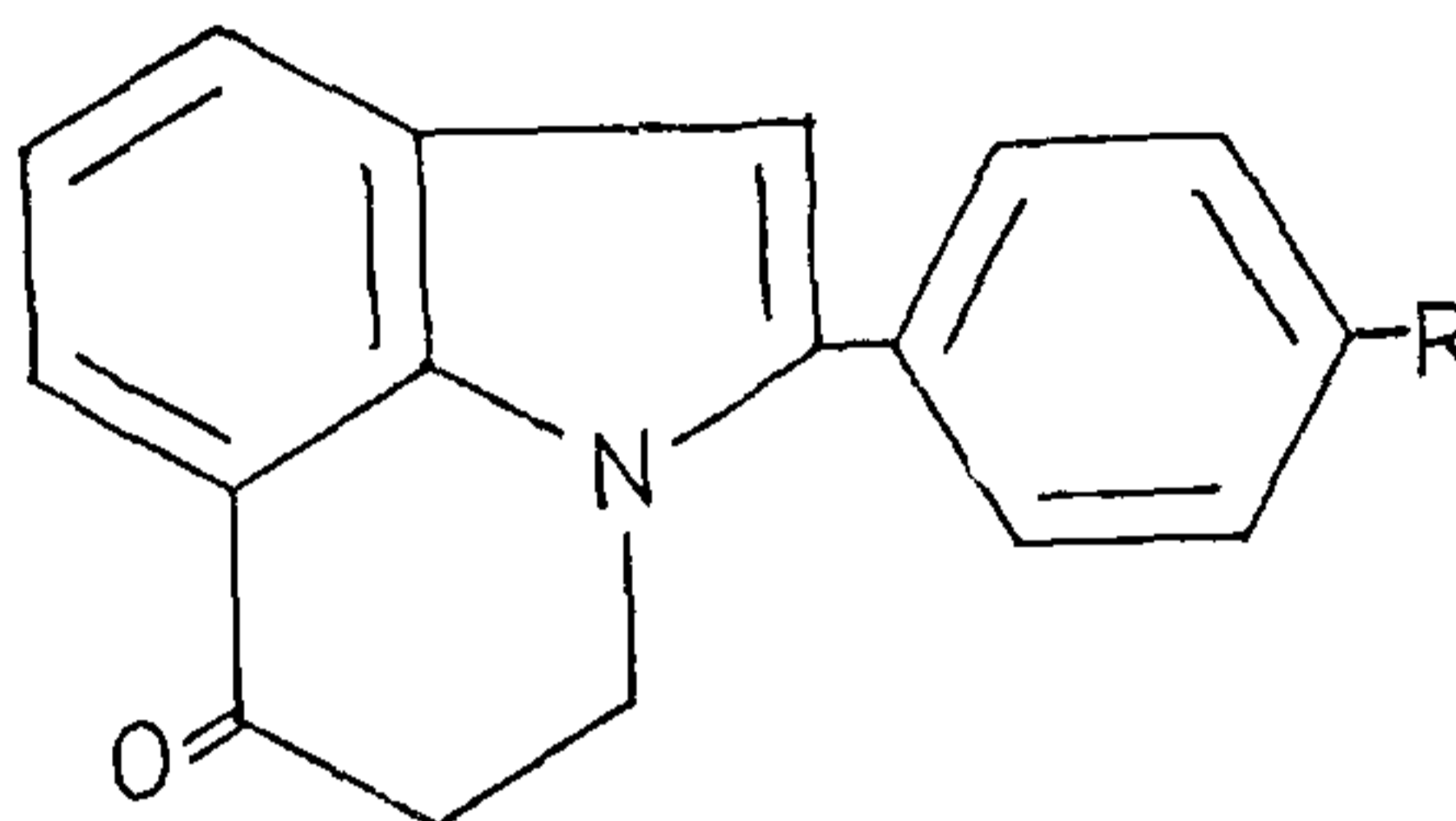


SYNTHESIS OF 2-PHENYL-4,5-DIHYDRO-6H-PYRROLO(3,2,1-ij) QUINOLIN-6-ONES: INTERMEDIATES IN THE SYNTHESIS OF BENZODIAZEPINES

IN the course of our project on the synthesis of polynuclear heterocyclic compounds, we synthesised some new 2-phenyl-4,5-dihydro-6H-pyrrolo(3,2,1-ij) quinolin-6-one derivatives by the application of the cyanoethylation reaction to 2-phenylindoles. The pyrroloquinolones could be utilised¹ for the synthesis of benzo-

in dry dioxane and keeping the mixture at room temperature for 24 h. Decomposition of the mixture with ice water afforded the corresponding propanenitriles in yields ranging from 70-85%. The latter were hydrolysed with alcoholic sodium hydroxide to the respective acids, crystallised from dilute alcohol or methanol in 50-60% yield. The acids on cyclisation with phosphorus pentoxide/xylene at 140-50° for 3-4 hrs afforded the pyrroloquinolones in 10-15% yield after chromatography over neutral alumina (Table I).

TABLE I



No.	2-Phenyl-indoles R =	Propane-nitriles m.p.	Propanoic acid m.p.	2-Phenyl-4,5-dihydro-6H-pyrrolo(3,2,1-ij)-quinolin-6-one m.p.	Crystallised from	D. N. P. m.p.
I	H	89-90°	129-30°	123-24°	Benzene-Petroleum ether (40-60°)	274-75°
II	CH ₃	124-25°	116-17°	134-36°	Petroleum ether (80-100°)	255-57°
III	OCH ₃	100-01°	139-40°	148-50°	Petroleum ether (80-100°)	267-68°
IV	Cl	150-51°	145-47°	155-56°	Alcohol	252-53°
V	Br	156-58°	158-60°	155-56°	Alcohol	270-71°

All the compounds gave satisfactory C, H and N analysis.

diazepines which are well known for their pharmacological properties. Literature survey reveals that indoles and 2-substituted indoles react with acrylonitrile at the '1' position² to give the corresponding N propanenitriles. However, no further work on the latter has been reported.

The reaction of 2-methyl- and 2-phenyl- indole derivatives³ with acrylonitrile was carried out by us by mixing equimolecular quantities of the reactants

The u.v. spectrum of quinolone I showed λ_{max}^{MeOH} : 210 nm (log ϵ 4.32), 240 nm (log ϵ 4.25), 350 nm (log ϵ 4.07). Its i.r. spectrum showed the carbonyl CO frequency at 1660 cm⁻¹ in addition to the aromatic frequencies.

The pyrroloquinolones readily formed 2,4-dinitrophenyl-hydrazones crystallised from alcohol in orange-red prisms.

The cyclisation of 1H-indolepropanoic acid using phosphorus pentoxide/ylene or polyphosphoric acid was unsuccessful. The direct cyclisation of indole with acrylic acid, in the presence of polyphosphoric acid, only afforded a tarry mass from which no pure compound could be isolated. Attempts to cyclise 2-methyl-1-H-indole-1-propanoic acid with the above reagents proved futile and the original acid was recovered unchanged.

The cyanoethylation reaction on 2-phenylindole with α -methylacrylonitrile under different conditions was unsuccessful.

Department of Organic
Chemistry,

Institute of Science,
Bombay 400 032,

April 7, 1979.

J. R. MERCHANT.

V. SHANKARNARAYAN.

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ON A NEW SPECIES OF *ANABAENOPSIS* FROM INDIA

A NEW species of *Anabaenopsis* was collected from the polluted fresh water tank in Varanasi. The alga was found to be a planktonic bloom forming species. Following Geitler¹, the alga can be placed under Section II of the genus *Anabaenopsis* on account of its unstricted cells and oblong heterocysts (Fig. 1). The two species already described under this section are *Anabaenopsis arnoldii* and *Anabaenopsis tanganyikae* do not possess gas vacuoles in their cells whereas gas vacuoles are present in the alga described here. All the species of *Anabaenopsis* so far described also possess spores which are ellipsoidal² while spores in the present alga are characteristically kidney-shaped (Fig. 1). Moreover, the trichomes of this alga are considerably narrower than all other species².

The most distinguishing features of this alga are the unstricted trichomes, presence of gas vacuoles and kidney-shaped spores. It is, therefore, considered as a new species of the genus *Anabaenopsis* and it is named as *Anabaenopsis indica* sp. nov. This *Anabaenopsis indica* sp. nov. belongs to the sub-family

Anabaenae and family *Nostocaceae* in the order *Nostocales* of *Cyanophyceae*.



FIG. 1

The diagnostic characteristics of this species are: "Trichomes circular, short and regularly spirally coiled 1-1½ spiral; spiral 40.0-49.0 μ in diameter, with diffuent mucilage; trichomes unstricted, consist of a number of vegetative cells; cells cylindrical, 3.5 μ broad, twice longer than broad, 5.25 to 7.0 μ long, filled with refractile reddish gas vacuoles; heterocysts terminal, either at one end or at both ends, oblong 3.0 to 3.5 μ broad and 3.5 to 7.0 μ long, spores either subterminal or intercalary, single or 2-3 in chains characteristically kidney-shaped, possess 3-8 prominent cyanophycin granules, wall thick and smooth, larger than vegetative cells and heterocysts, 5.95 μ to 6.8 μ broad and 8.5-18.7 μ long (Fig. 1)."

The alga was subsequently obtained in pure clonal and axenic cultures, employing the medium of Allen and Arnon³ and retained its above characteristic features. Preliminary studies on the mineral nutrition of this alga and its vacuole formation has been reported elsewhere⁴.

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argi College (Univ. of Delhi), AHALYA CHINTAMANI,
Siri Fort Road,
Panchsheel Marg,
New Delhi 110 049,
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