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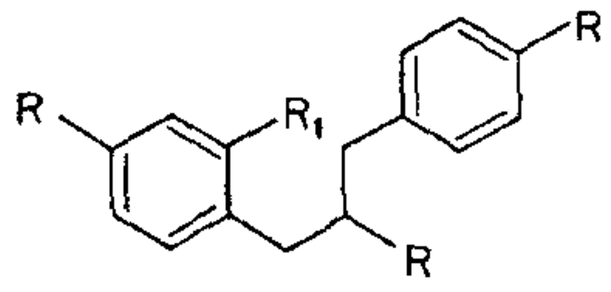
PROPTEROL—AN ANTIBACTERIAL AGENT FROM *PTEROCARPUS MARSUPIUM*

J. MATHEW, A. V. SUBBA RAO and
S. RAMBHAV*
Department of Chemistry, Department of Biochemistry, Osmania University, Hyderabad 500 007, India.*

PTEROCARPUS MARSUPIUM, commonly found in South India, is well known for its medicinal properties. The heartwood of this plant is durable and resistant to termites. Several crystalline compounds were isolated from the heartwood of this plant and structures for about eight compounds were elucidated[1-3]. They are pterostilbene, isoliquiritigenin, liquiritigenin, carpusin, propterol (1), propterol-B(2), oleanolic acid and marsupol. The present communication deals with the antibacterial activity of these compounds on two Gram-positive organisms, *Streptococcus faecalis* R (ATCC 8043) and *Staphylococcus aureus* R (NCIM 2079); and a Gram-negative organism, *Escherichia coli* (NCIB 8522).



1 R = OH , R_1 = H
2 . R = R_1 = OH

The growth medium for the two Gram-positive organisms was Henderson-Snell medium[4]. The medium for *E. coli* included the following components per litre: peptone—10 g, lactose—5 g, sodium chloride—5 g, dipotassium phosphate—4 g, monopotassium phosphate—1.5 g and sodium deoxycholate—0.75 g. The pH of the medium was 7. The inhibitory activity was assayed by adding varying amounts of the compound in 0.2 ml of 60% ethanol after sterilizing the tubes containing 5 ml of single strength medium. Later the tubes were inoculated with the test organism and the growth after 24 hr of incubation at 37°C was measured by turbidimetry in a Systronics double cell colorimeter using a red filter. The inhibitory activity towards the gram-positive organisms was compared on the basis of concentrations (μg/ml) necessary to obtain a 50% inhibition of growth and that towards *E. coli* as the minimal inhibitory concentrations (MIC) required to abolish growth. The results are summarised in table 1.

The compounds tested were effective *in vitro* against the two gram-positive organisms. Among the organisms studied, *Streptococcus* strain was more sensitive than the *Staphylococcus* strain. The antibacterial activity of these compounds in comparison with that of the standard drug, penicillin G, reveals that propterol is nearly 36 to 60% active in inhibiting the growth of two gram-positive organisms: *S. faecalis* R and *S. aureus* R. It was also found that the growth of these two organisms was not only inhibited but are

Table 1 *Antibacterial activity*[+] *of compounds from Pterocarpus marsupium*

Compound	*S. faecalis*-R[a] I_{50}% (μg/ml)	*S. aureus*-R[b] I_{50}% (μg/ml)	*E. coli* MIC (μg/ml)
Penicillin G	0.5	6	64
Propterol	8	16	124
Propterol B	54	68	114
Carpusin	64	72	140
Marsupol	60	68	138
Pterostilbene	24	38	196
Oleanolic acid	92	110	220
Liquiritigenin	18	30	164
Isoliquiritigenin	12	24	150

[+] The values expressed are the mean of three experiments.
[a] designated as *S. lactis* R or Rg1A strain in some early literature
[b] penicillin G-resistant strain.

actually killed by adequate concentrations (50–80 μg/ml) of these compounds. All these compounds are less active towards the gram-negative organism, *E. coli*. All the compounds lost nearly 30% of their antibacterial activity when they were added to the medium prior to sterilization, indicating partial destruction of the compounds during sterilization.

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RELATIVE RESISTANCE OF DIPLOID AND TETRAPLOID PLANTS OF *CATHARANTHUS ROSEUS* TO DIEBACK DISEASE

R. N. KULKARNI
Central Institute of Medicinal and Aromatic Plants, Belur, Bangalore 560 037, India.

CATHARANTHUS ROSEUS, also known as *Vinca rosea* or periwinkle, is an important medicinal plant. Alkaloids like vincristine, vinblastine, ajmalicine and serpentine extracted from this plant are used to treat human neoplasms and hypertension. This plant is generally free from pests and diseases. However, in recent years, a dieback disease caused by *Pythium butleri*[1] has extensively damaged this crop during the rainy season especially in and around Bangalore. Commonly used fungicides like Dithane Z-78, Cuprasol, Bavistin and Benlate failed to effectively control this disease.

As part of the genetic improvement programme on this crop, tetraploids were developed. In October 1982, 242 C_2 generation tetraploids and 149 diploids were individually randomized in the field to study the tetraploids. The plants were 3-months old during transplantation in the field. A severe epidemic of *dieback disease occurred following heavy rains* between 2 and 13 June 1983. All the plants were scored for disease severity on 21 June 1983. The disease incidence and plant mortality were recorded in diploids and tetraploids. There were distinct differences between diploids and tetraploids for their reaction to dieback disease (table 1). The tetraploids were about 8 times more resistant than the diploids. There was no mortality in tetraploids while about 42% of the diploids were killed during the epidemic. Although tetraploids had basically a susceptible reaction type, the disease severity in tetraploids was considerably less than that in diploids indicating that the resistance may be horizontal[2] in nature. The resistance of the tetraploids to dieback disease appeared to increase with increase in the age of plants (unpublished data). These

Table 1 *Disease incidence, disease severity and plant mortality in diploids and tetraploids of C. roseus.*

Observation	Diploids	Tetraploids
Disease incidence (%)	100.0	75.6
Disease severity (%) Mean	84.6	10.9
Range	15–100	0–6
Plant mortality (%)	42.3	0.0