the convergence condition is immediately met. Battezzati and Garrone[6] have recently discussed the usefulness of the hyperbolic type of representation vis-a-vis the linear dependence of ΔC_p on T. In the present context, the use of a linear equation in T for ΔC_p in conjunction with (4) shows that only the third term need be considered since all further terms vanish.

Substituting (7) in (1) and rearranging we have:

$$\Delta G = \Delta S^m . \Delta T - \frac{\Delta C_p^m . \Delta T^2}{(T_m + T)} + B\left(\frac{T_m + T}{T_m}\right)\left[\frac{2 . \Delta T}{(T_m + T)} - \ln (T_m/T)\right] \quad (8)$$

If the approximation given by (5) is employed, (8) reduces to (6). This can be interpreted to mean that the contribution of the third and higher terms in (4) cancel each other. Thus, even when the temperature dependence is taken into account through (7), ΔG can still be expressed by (6) which is devoid of the parameters A and B. Further, the curvature in the ΔC_p versus T plots[6,7] as well as the condition for the convergence of (3) warrant the use of (7).

Equation (6) can also be derived by a Taylor expansion of ΔC_p around ΔC_p^m. The second term in (6) can be viewed as a correction to the commonly used expression $\Delta G = \Delta S^m . \Delta T$ due to Turnbull[1]. Such corrections are important in arriving at the magnitude of solid/liquid interfacial energies from undercooling measurements as well as the nucleation rates and estimating the critical cooling rates for the suppression of homogeneous nucleation. All these considerations point to an urgent need for the experimental determination of ΔC_p^m. Further, whenever measurements of ΔC_p are made over limited range of temperature in the undercooled regime of the liquid, attempts should be made to test if the data fit (7) so that (6) for ΔG can be used without any constraints over a larger range of temperature.

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ANTIFERTILITY SCREENING OF *RUELLIA PROSTRATA* POIR AND AN *AYURVEDIC PREPARATION.*

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RUELLIA PROSTRATA Poir is a wild herbaceous plant distributed throughout the country, belonging to family Acanthaceae. It is widely used in indigenous system of medicines to correct a depraved state of the humors and sometimes given with liquid copal as a remedy for gonorrhoea[1]. Considering its medicinal values and the fact that it has not been studied so far for its antifertility activity, the plant material was examined for its antifertility effects. Additionally, an *ayurvedic preparation* (consisting of Piper longum, Embellia ribes & borax) as mentioned in literature[2] was also studied for its antifertility effects.

The aerial parts of *Ruellia prostrata Poir* were collected from the surroundings of Aligarh district (U. P.) and identified by expert botanists. Besides, an *ayurvedic drug*[2] consisting of Piper longum (seeds), Embellia ribes Burm (seeds) and borax (equal amounts) was prepared. The plant material and the ayurvedic preparation was air-dried, ground and extracted with petroleum ether (60–80°), alcohol and distilled water by refluxing at their respective boiling points for 6 hr. After distilling the solvents under reduced pressure these extracts were tested on female albino rats for antifertility activity.

Adult female albino rats (70–90 days old) weighing 150–200 g of proven fertility showing 4–5 days estrus cycle were selected for testing[3]. The animals were maintained at 25–28° C and fed with pelleted diet obtained from Hindustan Lever Limited. The vaginal smears of these rats were examined daily. The rats in the proestrous phase (characterized by spherical nucleated epithelial cells in vaginal smears) of the estrus cycle were kept overnight for mating with adult males that had sired litters before. The vaginal smears were

Table 1 *Antifertility screening of various extracts of R. prostrata Poir and an ayurvedic preparation from day 1 to 7*

Name of plant screened	Nature of extract	No. of rats mated/ treated	Dose mg/kg	Mean No.** of implants (day 10)	Mean No. of delivered	% of rats having no implantation sites on day 10
Control group I (Vehicle-water)	—	5/5	—	9.6	8.4	0
Control group II (Vehicle-gumacacia)	—	5/5	—	9.4	8.6	0
(i) *R. Prostrata* Poir	P. E.	5*/5	500	5.8	—	0
		4*/5	100	5.8	—	20
	Alc.	5*/5	500	8.2	—	0
		5*/5	100	7.0	—	0
	Aq.	3*/5	500	2.6	—	40
		4*/5	100	4.2	—	20
(ii) Ayurvedic preparation	Alc.	3/5	500	3.6	2.8	40
		4/5	100	5.6	5.2	20
	Aq	2/5	500	2.8	2.4	60
		4/5	100	6.0	5.6	20

* All the rats were killed on day 10.
** Reference 5.

examined the following morning for evidence of copulation. The presence of thick clumps of spermatozoa in the vaginal smears indicated mating. They were further treated like pregnant rats and this day was taken as the first day of pregnancy.

The doses of the different extracts were prepared by making a solution or a suspension in 2% gum acacia or distilled water. The extracts were fed to the pregnant rats at doses of 500 mg and 100 mg/kg body weight respectively by an intragastric, polyethylene feeding tube from 1–7 day of pregnancy. The control group of animals received an equal amount of vehicle consisting of gum acacia and distilled water.

The animals in control group and test group were laprotomized under light ether anaesthesia and the number of foetuses was counted on the 10th day. The abdominal wound was sutured and the rats were allowed to go to full term. The screening results are summarized in table 1.

(i) *Ruellia prostrata Poir*: The roots of *Ruellia* species are given at a dose of 2 Ozs to pregnant women to produce abortion. Two different species of the plant were selected for antifertility screening. However, one of the species, *R. tuberosa* did not show significant activity[4]. Another species *R. prostrata Poir* was selected and the different extracts were screened for antifertility effects. In the present study only 40% activity was observed in the aqueous extract of the plant at a dose of 500 mg/kg body weight, while other extracts did not have any activity. None of the extracts appeared to be toxic as judged by changes in the general appearance and behaviour of the rats following administration of the drug. It was also found that the drug did not cause any mortality within 10 days.

(ii) *Ayurvedic preparation*: An ayurvedic preparation consisting of equal amounts of Piper longum (seeds), Embellia ribes Burm (seeds) and borax has been prescribed in Ayurveda from an early age for family planning[2]. It was thought relevant to test the above formula by scientific methods. The results indicated that 60% activity was found in aqueous extract at a dose 500 mg/kg and 40% in alcoholic extract at a dose 500 mg/kg body weight.

After full term the new-born pups were observed for one month to examine any evidence of gross teratogenic effect that the drug did not manifest gross malformation. During the course of experiment the drug appeared non-toxic at the given dose levels.

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ANTIVIRAL ACTIVITY OF α-(METHYL-PHTHALIMIDO)-α′-(SUBSTITUTED STYRYL)-CYCLOHEXANONE-THIOSEMICARBAZONES

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ONE of the areas where most encouraging antiviral activity has been encountered is that of thiosemicarbazones. The first report by Hamre and coworkers[1] demonstrated that *p*-amino-benzaldehyde thiosemicarbazones showed a significant antiviral activity. As a result of enhanced antiviral activity of thiosemicarbazone derivatives, a number of thiosemicarbazones incorporating various heterocyclic and polynuclear were screened for trial and a few exhibited remarkable antiviral activity[2-8]. The most effective and potent compound of this series is Methisazone or Marboran. This compound, chemically, N-methyl-isatin-β-thiosemicarbazone has been found to exhibit pronounced antiviral activity[9,10].

In view of the structural analogy, a few new thiosemicarbazone derivatives have been synthesised in the hope that the presence of thiosemicarbazone moiety in this class of compounds might render improved therapeutic results.

Antiviral screening against Sunnhemp rosette virus (SRV): The antiviral screening of the synthesised compounds was evaluated against the SRV both *in vitro* and *in vivo* by the method of Verma *et al*[11] in the plant *Cyamopsis tetragonoloba*.

Maintenance of virus culture and preparation of the virus inoculum: The culture of SRV was maintained on the systemic host *Crotolaria juncea*.

The virus inoculum was prepared by grinding young diseased leaves of *C. juncea* in a sterilized pestle and mortar using distilled water as a diluent (1 ml/g). The pulp so obtained was squeezed through two folds of muslin cloth and the filtrate centrifuged at 3000 g for 15 min. The resultant partially clarified supernatant thus obtained was diluted suitably with distilled water and used as a virus inoculum.

The solutions of the test compounds were prepared by dissolving 2 mg of the compound in 1 ml of ethanol and making up the volume to 4 ml with distilled water.

In-vitro activity: In *in-vitro* experiments, 1 ml of the test solution was mixed with 1 ml of the virus inoculum and incubated for 30 min, and then spread over the leaves of *C. tetragonoloba*. An equal number of leaves were rubbed with a mixture of virus and distilled water and served as controls.

In-vivo activity: To detect the viral inhibitory activity the compound was applied on the two basal leaves of the test plant *i.e. C. tetragonoloba*, whereas control sets were treated with a mixture of ethanol (1 ml) and distilled water (4 ml).

After an interval of 24 hr. the leaves of the test plant were washed with distilled water, blotted dry, dusted with 600 mesh carborundum powder and inoculated with the virus inoculum SRV. All the fully expanded leaves of hypersensitive hosts were inoculated with the virus.

At least five plants, with four leaves being of equal size were used in each experiment.

All the experiments were performed in insect-free glass house, kept at about 20–30°C. The phytotoxic symptoms, if any, and the number of local lesions were observed throughout the experiment. Local lesions were counted 3–4 days after virus inoculation. The percentage inhibition was calculated by the formula % inhibition $= [(C-T)/C] \times 100$ where C is the number of lesions in control plant and T is the number of lesions in treated plant. The activity exhibited by compounds against Sunnhemp rosette virus has been given in table 1.

The compounds exhibited broad spectrum antiviral activity against SRV both *in vitro* as well as *in vivo* in the same host *C. tetragonoloba*.

It is apparent from the result recorded in table 1 that when R = 2-OH, 1-CH=CH- and 4-Cl then the percentage inhibition against SRV is quite high. Also, N-(methyl phthalimido) cyclohexanone thiosemicarbazone shows 70% inhibition, indicating that the derivatives of this compound are less active than the parent moiety.

These thiosemicarbazones are more active *in vivo* against SRV than *in vitro*. When R = 2-OH and 1-CH=CH-, the compounds show 62 and 68% in-