LEAF EXTRACTS OF *LAWSONIA INERMIS* AS ANTIFUNGAL AGENT

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PLANTS contain a spectrum of secondary substances that are involved in defence mechanisms against phytopathogens[1]. The significance of the natural metabolites against macro- and microorganisms has been emphasized by Mahadevan[2]. In the present investigation, the effect of ethanol, methanol and water extracts of *Lawsonia inermis* leaves on spore germination of *Drechslera oryzae*, the causal agent of brown spot of rice was studied.

Fresh leaves of *L. inermis* (25 g) were separately ground in 100 ml ethanol, methanol and water. The extracts were filtered through cheese cloth and centrifuged at 5,000 rpm for 20 min. The pellet was discarded and the supernatant fluid was concentrated by evaporation in the case of ethanol and methanol extracts. Water extract was used as such. The residue was made up to 100 ml with sterile distilled water and used at different dilutions in the experiment.

Various dilutions of the ethanol, methanol and water extracts viz 1:50, 1:40, 1:30, 1:20 and 1:10 were prepared in double the strength to avoid reduction of the initial concentration upon adding aqueous spore suspension. Appropriate controls were maintained. One drop of spore suspension of the test fungus (2×10^5 conidia/ml) was placed in the cavity slides along with a drop of the leaf extract and incubated in moist petri dishes. Spore germination was observed and counted under microscope at hourly interval during 24 hr of incubation. From this, the percentage of spore germination was calculated.

The effect of ethanol, methanol and water extracts of the leaves on spore germination of *D. oryzae* is presented in figure 1. Results indicate that 1:10 and 1:20 dilution of both ethanol and methanol extracts caused a total inhibition of the spore germination at the end of 24 hr. Whereas at 1:30, 1:40 and 1:50 dilutions, spore germination was delayed by 15, 11 and 6 hr, respectively in both ethanol and methanol extracts (figure 1 A, B). The germination percentage did not reach 100% even at the end of 24 hr.

Water extract of leaf was less toxic than ethanol and methanol extracts. However, germination of spores was delayed by 11, 9, 8, 6 and 4 hr at 1:10, 1:20, 1:30, 1:40 and 1:50, respectively (figure 1 C).

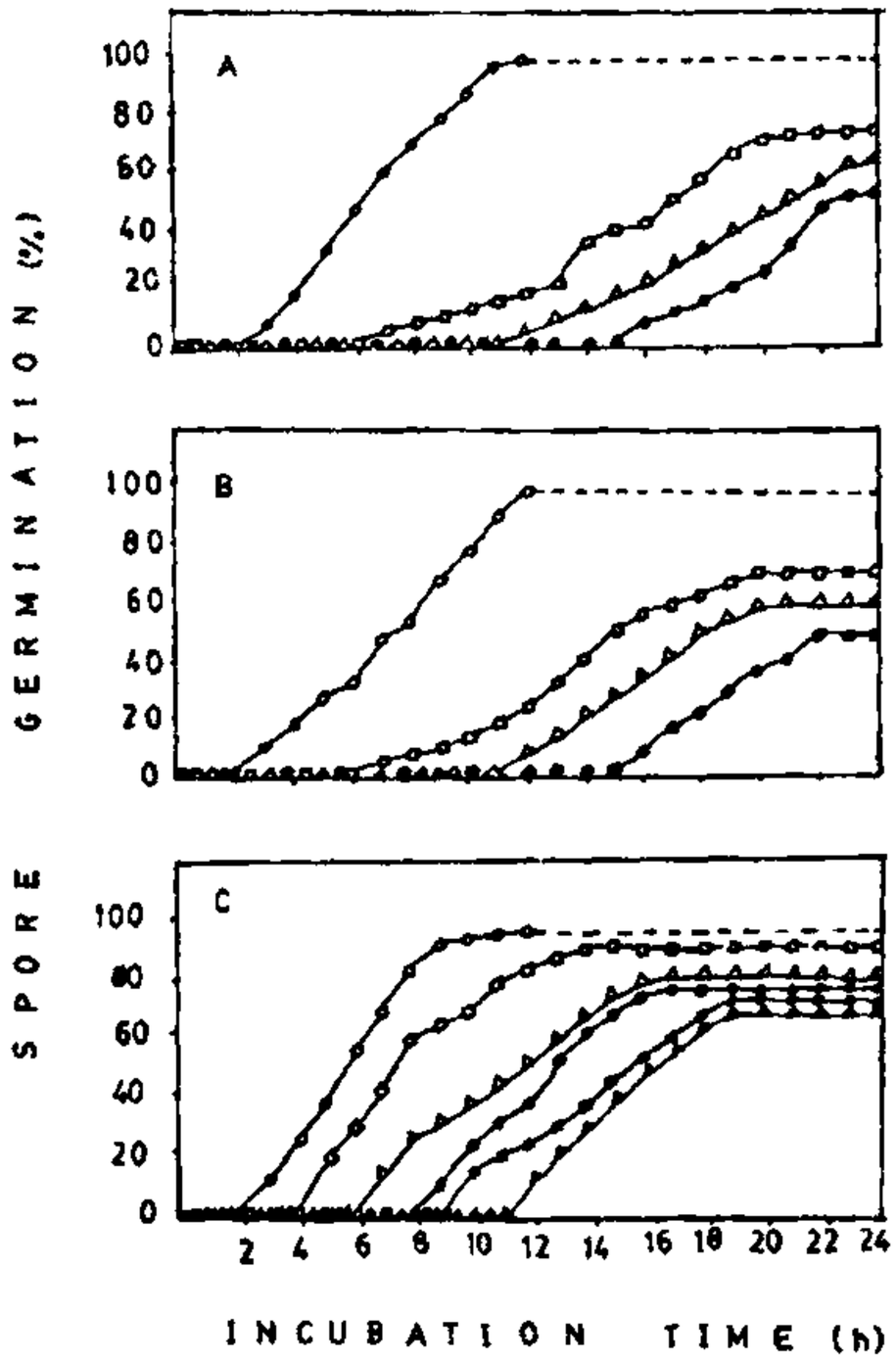

Figure 1 A–C. Effect of ethanol (A), methanol (B) and water (C) extracts of *L. inermis* leaves on the spore germination of *D. oryzae*. [○–○, control; □–□, 1:50 dilution; △–△, 1:40 dilution; ●–●, 1:30 dilution; ■–■, 1:20 dilution; ▲–▲, 1:10 dilution].

Since ethanol and methanol extracts effectively inhibited *D. oryzae* spore germination than water extract, ethanol extract was further used to study its effect on germ-tube elongation (figure 2). Significant reduction was observed in germ-tube length at the end of 24 hr with increase in the concentration of ethanol extract. At 1:20 dilution, there was no germ-tube growth.

The antifungal activity of the leaf extract of *L. inermis* to *D. oryzae* is evident from its inhibitory effect of spore germination. The differences in the per cent inhibition of spore germination in ethanol, methanol and water extracts might be due to difference in the concentration of lawsone present in the extract[3] and also shows the extracting ability of the three solvents used.

The total phenol content of the leaves was estimated to be 8.36 mg/g dry wt[4]. The level of phenol content was fairly high when compared with groundnut[5] (3 mg/g dry wt.) and rice[6] (2.6 mg/g dry

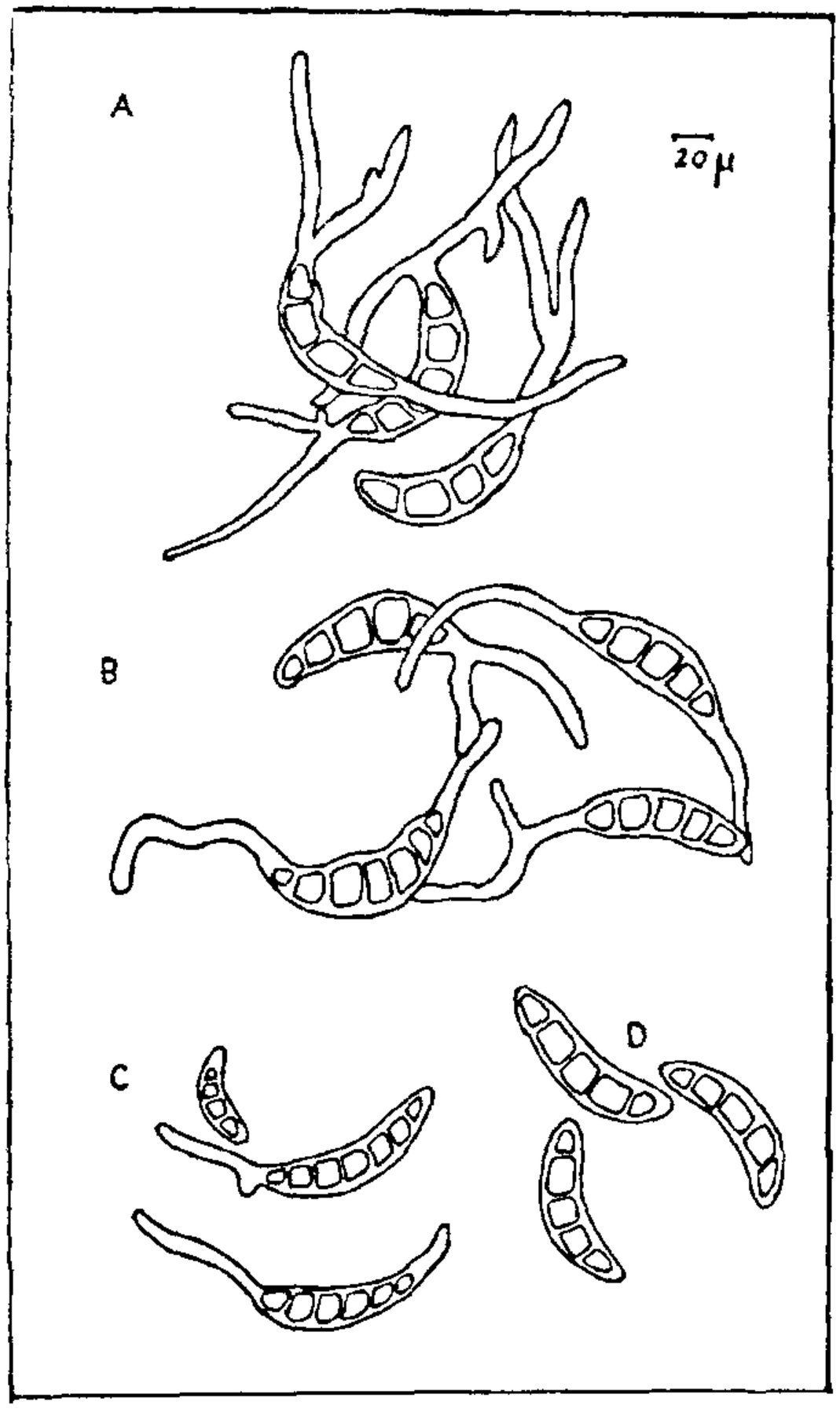

Figure 2 A–D. Effect of ethanol extract of *L. inermis* leaves on germination and germ-tube elongation of *D. oryzae*. **A.** control; **B.** 1:50 dilution; **C.** 1:30 dilution; **D.** 1:20 dilution.

wt.). Hence, the antifungal activity of the *L. inermis* leaf extract can be attributed to the high phenol content. This finding opens up the possible use of the leaf extract on exploring its possibility for use in the control of brown spot of rice.

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1. Kemp, M. S., *Falcarindiol Phytoche.*, 1978, **17,** 1002.
2. Mahadevan, A., *Biochem. Rev.*, 1979, **49,** 51.
3. Lal, J. B., and Dutt, S. B., *J. Indian Chem. Soc.*, 1933, **10,** 1577.
4. Bray, H. G. and Thorpe, W. V., *Meth. Biochem. Anal.*, 1954, **1,** 27.
5. Kalaichelvan, P. T., Ph.D. thesis, University of Madras, Madras, 1980.
6. Swaminathan, K., Ph.D. thesis, University of Madras, Madras, 1983.

NYSSOPSORA SCHEFFLERAE SP. NOV. FROM INDIA

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DURING a mycological survey at Shevaroy hills, Yercaud, Tamil Nadu, *Schefflera stellata* (Gaertn.) Harms, a member of the family, Araliaceae was observed showing rust infection mostly on young leaves. The sori were amphigenous, powdery and blackish brown in colour. Microscopic examination of the infected material revealed that the rust fungus belonged to a species of *Nyssopsora* Arth. The morphological characters of the teliospores particularly the glochidiate spines showing variation in branching and the presence of 3 or 4 germ pores in each teliospore cell warranted consideration of this rust as a new species of *Nyssopsora* and the same is described here.

Nyssopsora schefflerae Ramachar, Bagyanarayana, Subbalakshmi et Hosagoudar sp. nov. (figure 1).

Spermogoniis, aeciis et urediniis ignotis. Teliis amphigeniis, anthracina, subepidermalibus, erumpentis; teliosporis 28–40 × 22–30 μm, tricellulae, turtius cellulae ad basale, cinnamomeo-brunniae vel fuscae. Parietis fuscus 2–3 μm crassus; spinae glochidiatae 6–8, subbrunneae, obtusa vel bi, tri, tetra vel pentafurcatae ad apices, 10–16 μm longa; poris germinationis 3 vel 4; pedicello hyalino vel subbrunneae, 40–70 μm longo, 3–5 μm crossa, persistantae.

Telia amphigenous, charcoal black, 3-celled, two parallel and the third cell at the bottom, 28–40 × 22–30 μm; wall dark brown 2–3 μm thick; spines glochidiate, 6–8 per cell. Pale brown, simple, obtuse to pentafurcate at the apex, 10–16 μm long;