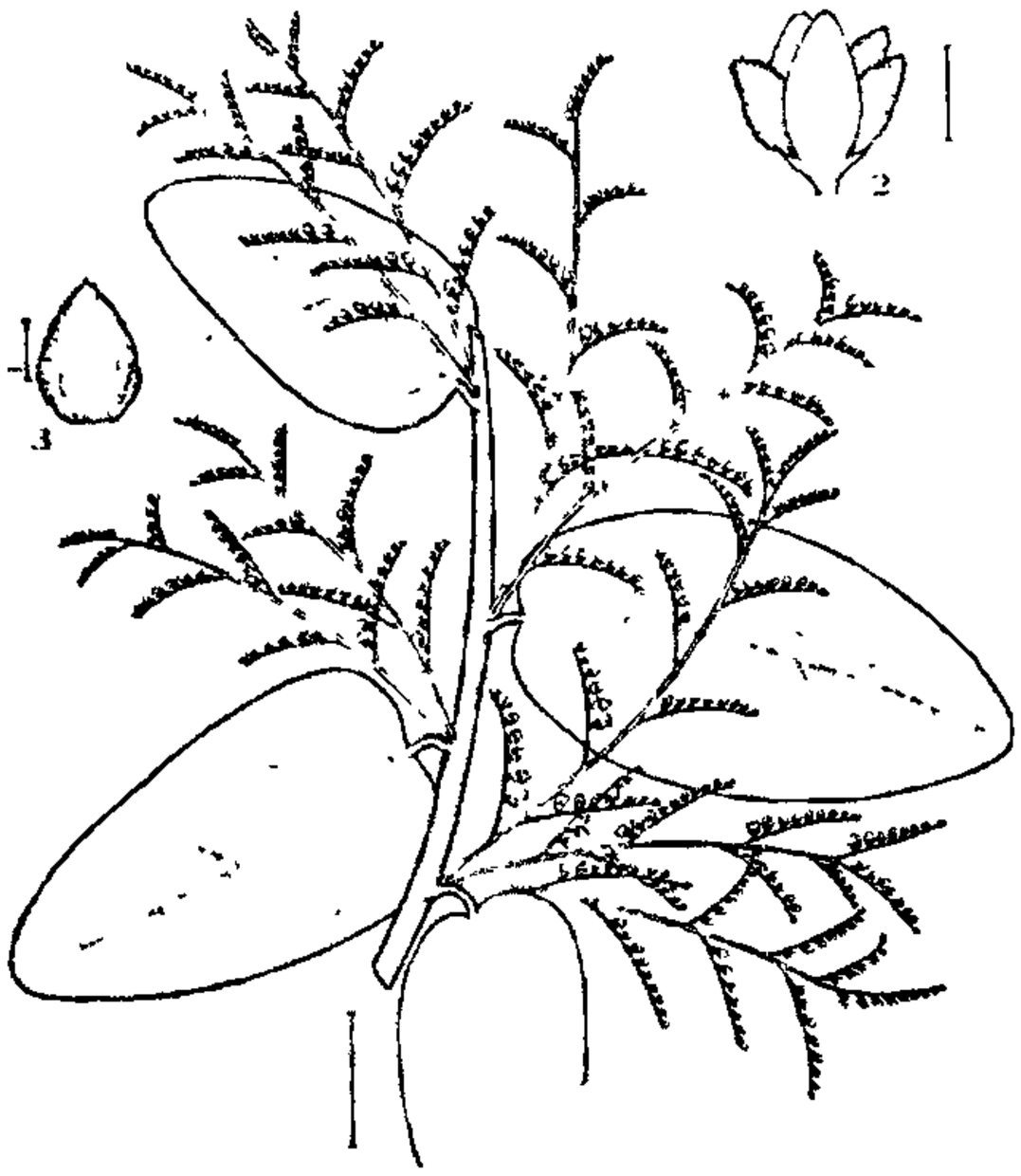

Figures 1 to 3. *Hopea ponga* (Dennst.) Mabberly var. *cauveriana* Keshav. et Yog. var. nov. **1.** Flowering twig; **2.** Flower enlarged; **3.** Inner calyx lobe.

ponga, calyce lobis interioribus 3 manifeste serratis et ciliatis differt.

Allied to *H. ponga* (Dennst.) Mabberly var. *ponga* but differs in having distinctly serrate, ciliate inner three calyx lobes.

Large trees (25 m tall) with dark brownish-black, smooth bark and slender branchlets. Leaves 7–15 × 3.5–8 cm, oblanceolate, obtuse at apex, truncate to slightly cordate at base, margins entire, glabrous; lateral nerves 6–9 pairs; petiole 1–1.5 cm long, channelled. Flowers 5–6 mm long in 13–15 cm long, glabrous, axillary and terminal paniculate racemes; pedicels up to 1 mm long. Calyx lobes 5, triangular-ovate; outer two lobes 3–4 mm long, with entire margins; inner 3 lobes 2–3 mm long, margins serrate and ciliate. Corolla lobes 5–6 mm long, oblong, acute, pubescent without. Stamens 15; filaments dilated at base; connective produced into 2 mm long subulate appendage. Ovary ovoid, pubescent, 3-locular, with two ovules in each locule; style short, fleshy, minutely 3-lobed (figures 1 to 3).

Holotype K. R. Keshava Murthy & party 4818A, and *Isotypes* 4818B-C, collected in flowering along the banks of Barapole river, Makut, Coorg District, on 17 March, 1984, at an altitude of 600 m are deposited at the herbarium of the Regional Research Centre, Bangalore (RRCBI).

The species is named after the main river Cauvery flowing in the district.

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α-AMYLASE ACTIVITY OF *ROLLANDINA CAPITATA*

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ALPHA-amylase is an important enzyme in so far as its industrial uses are concerned. The enzyme produced by dermatophytes belonging to the family Gymnoascaceae, which contributes to their pathogenic nature, has been well studied. But there are only a few reports[1–4] on α-amylase of *Rollandina capitata* although it is a potential pathogen of the same family. In the present investigation identification and analysis of some physicochemical properties of α-amylase secreted by *R. capitata* are reported.

A strain of *R. capitata* was obtained from the American type culture collection catalogue, Rockville, Maryland, USA. The fungus was grown in starch-neopeptone solid or liquid medium for 10 days. The homogenized mycelial suspension (1 ml) from an approximately one-week-old culture was used as the inoculum as and when required. Amyloytic activity was revealed by the formation of a clear zone around the colony on solid media by flooding of iodine.

α-amylase assay: The enzyme was assayed in the culture filtrate by the method of Noelting and Bernfeld[5]. Culture filtrate was separated from the mycelial mat by filtration. The filtrate was then centrifuged at 10,000 rpm for 20 min in a cold centrifuge to get rid of mycelial debris. The super-

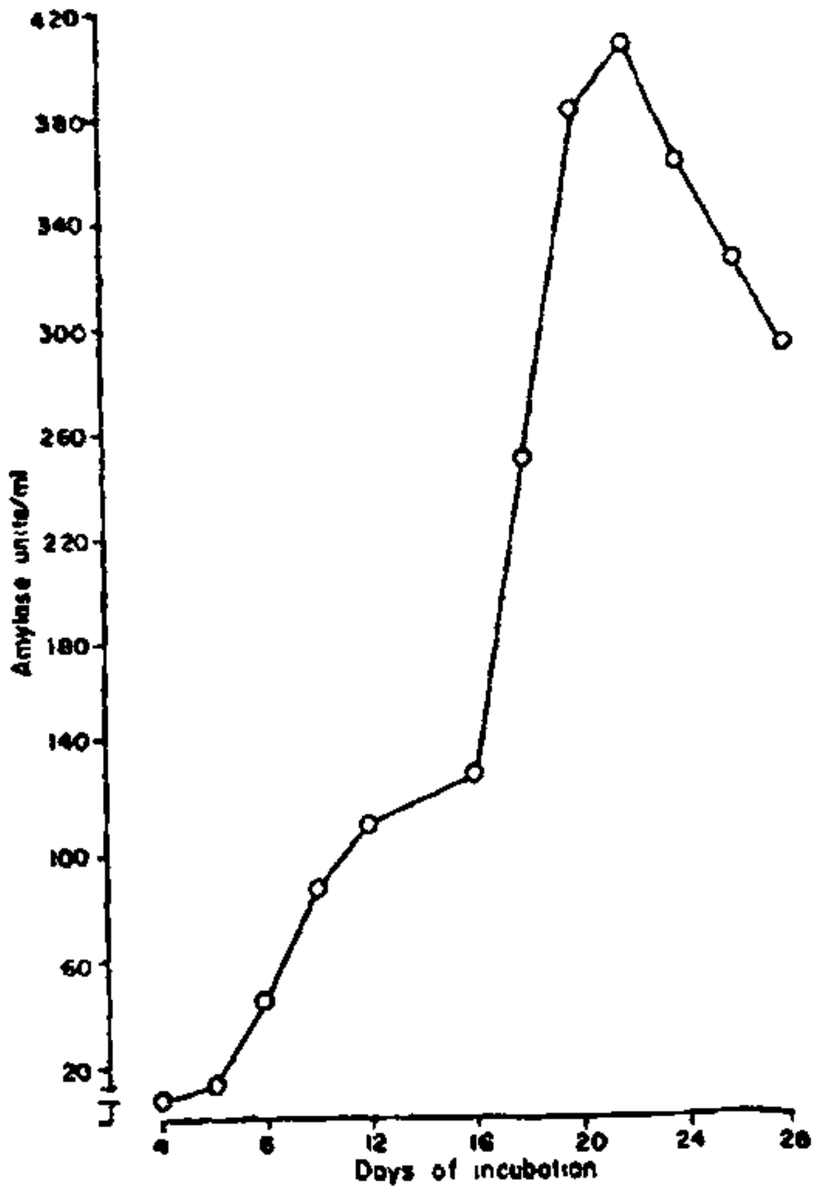

Figure 1. Effect of incubation time (in days) on the α-amylase production by *R. capitata* in stationary culture.

natant was stored at −5°C and used for enzyme assays. The assay system consisted of 0.2 ml of culture filtrate, 0.5 ml of 1% starch solution and 0.3 ml of Na-phosphate buffer (pH 7.0). The reaction was stopped by adding 1 ml of 3,5-dinitrosalicylic acid reagent. The tubes were then heated and the enzyme was quantitated as described by Sumner[6] Assays were conducted at different temperatures and pH to establish the respective optima for the enzyme.

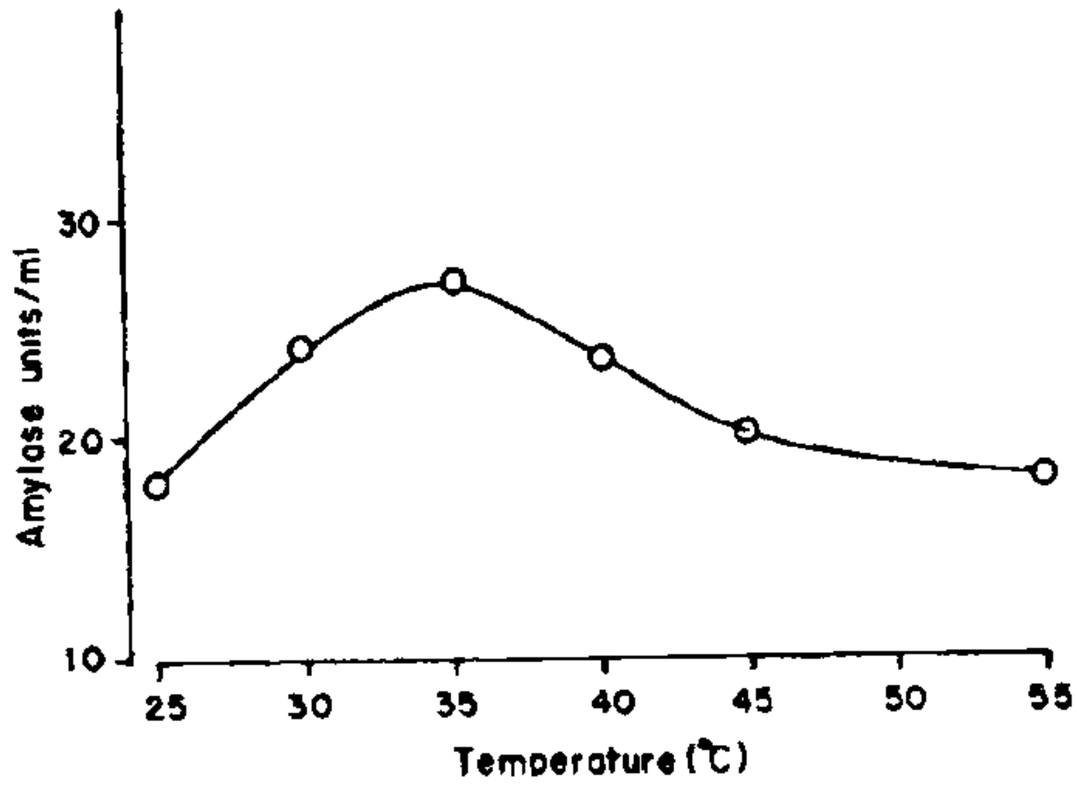

Figure 3. Effect of assay temperature on the extracellular α-amlase production by *R. capitata* in stationary culture.

The amylase activity when defined in terms of saccharolytic units was that amount of enzyme liberating 0.1 mg of maltose in 3 min, while in terms of dextrinizing units, it was that amount of enzyme hydrolyzing 0.3 mg of starch in 3 min. The former method was used in the presentation of data.

α-amlase activity was observed during the entire growth phase of the organism. The excretion rate increased with the age of the culture and reached a maximum limit on the 20th day (figure 1). The optimum pH for elaboration of *R. capitata* amylase was 5.6 in citrate-phosphate buffer (figure 2). Enzyme activity was maximum at 35°C and declined at higher temperatures (figure 3). Linearity of enzyme action was up to 15 min of reaction time (figure 4).

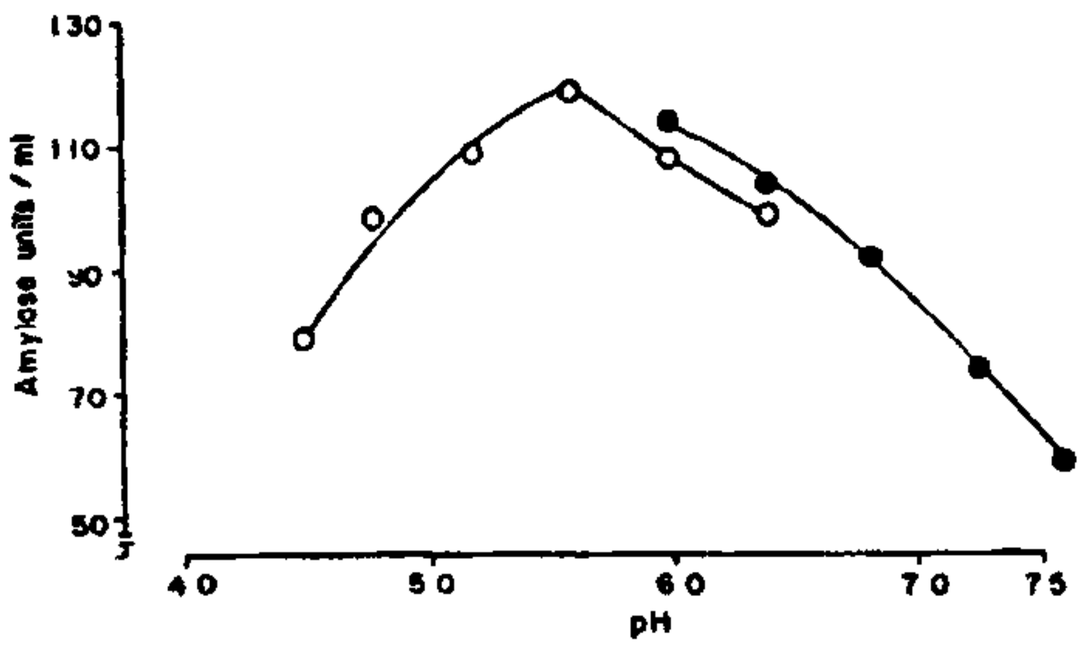

Figure 2. Effect of pH on the extracellular α-amylase production by *R. capitata* in stationary culture [○, citrate-phosphate buffer; ●, phosphate-phosphate buffer].

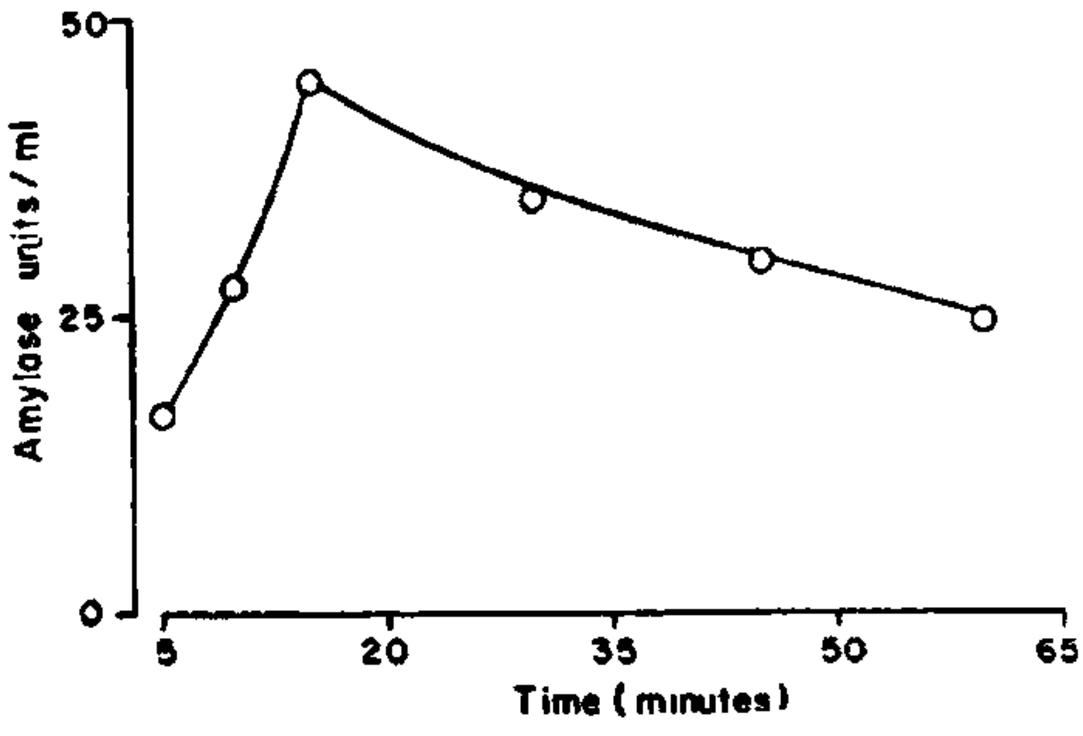

Figure 4. Effect of assay time on extracellular α-amylase production by *R. capitata* in stationary culture.

The optimum pH for the maximum α-amylase production was found to be 5.6 as with other fungi[7-9]. However, Yuanchi *et al*[7] had reported 55°C as optimum for α-amylase of *Monascus anka* v-2

It has been observed that enzyme production increases with the increase of the age of the fungal culture. Similar observations were made by Adams[10] in *Mucor pusillus* and *Humicola lanuginosa*.

Dermatophytes such as *Microsporum*, *Trichophyton* and *Epidermophyton* possess intracellular-α-amylase activity[11,12]. However, these organisms failed to produce extracellular amylase[13,14]. This difference in the production of enzyme might have contributed to the saprophytic nature of *R. capitata*.

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TOXICITY OF *PSEUDOMONAS FLUORESCENS* TOWARDS BACTERIAL PLANT PATHOGENS OF BANANA (*PSEUDOMONAS SOLANACEARUM*) AND RICE (*XANTHOMONAS CAMPESTRIS* PV. *ORYZAE*)

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AMONG the bacterial plant pathogens, *Pseudomonas solanacearum* which affects several of the economic crops and *Xanthomonas campestries* pv. *oryzae* which causes the bacterial leaf blight (BLB) of rice are the most important. The bacterial wilt pathogen, *P. solanacearum* causes heavy crop losses all over the world and has limited the production of diverse food crops like tomatoes and export of major agricultural products such as potatoes and bananas[1]. Gnanamanickam *et al*[2] reported the occurrence of bacterial wilt of banana from Southern India. The BLB pathogen of rice, *X. c.* pv. *oryzae* is a dreaded and destructive pathogen in India and the rest of Asia and causes heavy losses in grain yield. In India, annual losses due to BLB vary[3] between 6 and 60% and in Punjab, the losses are even higher[4]. In view of the absence of truly effective control measures for these pathogens, we have been interested in developing biological control with antagonistic rhizobacteria[5-10]. In this report, we describe the susceptibility of these pathogens to native strains of *Pseudomonas fluorescens*.

An Indian isolate of *P. solanacearum* (NCPPB 3214), the banana wilt pathogen and 3 isolates of *X. c.*pv. *oryzae* isolated from naturally infected rice plants (cv. IR 20 and ADT 36) were used in this study. Several strains of *P. fluorescens* isolated from rhizospheres of crops were available in our collection. A citrus strain (Pfc) and 2 rice strains (Pfr) were used in this study. These strains were characterized as biotype III of *P. fluorescens* following the biochemical criteria outlined in Bergey's manual[11].

Methods for testing *in vitro* antagonism have been described earlier[5-7]. Bacterial plugs or plugs containing cell-free siderophore (fluorescent pigment) (6 mm dia) were removed from King's medium B (KB)[12] and were transferred to the centre of KB agar plates seeded previously with cells (10^5 cfu/ml) of either *P. solanacearum* or *X. c.* pv. *oryzae*. After incubation at room temperature for 48 hr, these