

darker coloured seed. A meal prepared from a commercial seed bulk was also good in supporting growth. Inoculum from PSMA prepared from different coloured seeds did not differ in pathogenicity to cv. HY-3C.

We are routinely using PSMA in our laboratory, as it offers an efficient substitute for the V-8 juice media.

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<sup>1</sup>Kannaiyan, J., Y. L. Nene, T. N. Raju and V. K. Sheila. *Plant. Dis.* 65 : 61-62, (1981).

<sup>2</sup>Kannaiyan, J., O. K. Ribeiro, D. C. Erwin and Y. L. Nene. *Mycologia* 72 : 169-181, (1980).

<sup>3</sup>Ribeiro, O. K. *A source book of the genus, Phytophthora*. J. Cramer, Lehre, West Germany, 420 pp., (1978).

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### Accumulation of phenolics in leaves of Areca palm affected with yellow leaf disease\*

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Arecanut (*Areca catechu* L.), the betelnut is an important plantation crop of commercial value in India. Yellow leaf disease (YLD) is the most serious disease of the palm crop wide-spread in Kerala and Karnataka of South India<sup>7</sup>. Possible involvement of biological agents in causing YLD has been indicated<sup>8,9</sup>. The affected palm exhibits typical "Yellows" type of disease symptoms<sup>6</sup> wherein the foliar yellowing (chlorosis) starts from the tips of leaflets, extends to the base of the lamina and is often characteristically demarked by a green area. Browning of leaves, falling of entire crown and ultimate death of the affected palms are not uncommon in advanced stage of the disease<sup>9</sup>.

It is known that phenol metabolism is deranged in infectious plant diseases<sup>4</sup>. Pathological conditions in plants due to biotrophic parasites like viruses<sup>3,5</sup> and mycoplasma-like bodies<sup>10,11</sup> have been also known to affect the phenols. The present investigation reports the level of total phenols in leaves of arecanut affected with YLD in comparison with healthy ones.

Leaf samples were collected from affected palms in mild and severe stages of YLD, at the rate of six palms per treatment. Samples of comparable age from healthy plants served as control. The total phenols both in healthy and diseased leaves were estimated by adopting the method of Bray and Thorpe<sup>1</sup>. After extraction of phenols from leaves and colouring the solution with Folin-Denis reagent as described in the method, the aqueous solution diluted to 250 ml was read in a ECIL Spectrophotometer at 725 nm. The optical density (O.D.) was converted into units by taking 0.001 O.D. as one unit and values of diseased and healthy leaves were compared.

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It will be seen from the data (Table 1) that the level of total phenolics was higher in leaves affected with YLD than that in healthy leaves. A mean increase of total phenols was only 18.28 per cent in mild stage of leaf yellowing whereas 82.80 per cent increase was recorded under severe YLD. It indicates that the amount of increase in phenolics in diseased palm was related to the severity of YLD. It is also seen that the difference in level of phenolics among the diseased palms was wider and more with increase in severity of the disease.

TABLE 1 : Total phenolics in leaves of healthy and yellow leaf disease (YLD) affected *A. catechu*

Nature of leaf samples	Total phenolics (units)		Diseased Healthy × 100
	Range among samples	Mean	
Healthy	82 — 112	93	100.00*
Y L D — Mild	84 — 149	110	118.28
Y L D — Severe	114 — 227	170	182.80

1 unit value = 0.001 O.D.,

\*Mean of healthy = 100%.

The above results show that the metabolism of phenols is altered in leaves of arecanut palm affected with YLD and the disease contributes to the accumulation of phenolics. The cause for the deranged phenol system in YLD is not known. The etiology of the disease itself is precisely not known. Accumulation of phenols in host plants due to infection by biological agents including the viruses<sup>375</sup> and mycoplasma—like bodies<sup>10711</sup> is known. Stimulated production of phenolics following the invasion by infectious agents is reported to be a physiological syndrome in several host-pathogen interactions<sup>274712</sup>. Further studies are necessary to determine whether the accumulation of phenolics in the YLD affected areca leaves is a consequence of the involvement of any biological agent or not and its role in the manifestation of disease symptoms.

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<sup>2</sup>Diener, T. O. *Ann. Rev. Phytopathol.* 1 : 197-218, (1963).

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<sup>4</sup>Goodman, R. N., Z. Kiraly and M. Zaitlin. *The Biochemistry and Physiology of Infectious Plant Diseases*, Van Nostrand, Princeton, New Jersey, pp. 187, (1967).

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<sup>6</sup>McCoy, R. E. Mycoplasmas and Yellowing Diseases. In *The Mycoplasmas III. Plant and Insect Mycoplasmas*. Ed. R. F. Whitecomb and J. G. Tully, Academic Press, pp. 229-264, (1979).

<sup>7</sup>Nayar, N. M. *Arecanut and Species Bull.* 8 : 21 (1976).

<sup>8</sup>Nayar, R. *Ibid.* 22-26, (1976).

<sup>9</sup>Nayar, R. and C. E. Seliskar. *Eur. J. For. Pathol.* 8 : 125-128, (1978).

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