

Phenolic acids from *Imperata cylindrica* (L.) Raeusch. var. Major (Nees) c.e. Hubb.

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INTRODUCTION

Alang-alang rhizomes, *Imperata cylindrica* (L.) Raeusch. var. *major* (Nees) C.E. Hubb., is widely used traditionally as a diuretic, antipyretic, anti-inflammatory, and haemostatic agent^{1,2,3,4}.

Alang-alang is known by various local names e.g. *eurih* (West Java), *langalang*, *alang-alang*, *kambengan* (Central and East Java), *kebut*, *lalang* (Madura)^{1,2}.

Imperata cylindrica var. *major* is an annual grass with long creeping, branched, scaly rhizomes; stem of vertical, simple (flowering) shoots not elongating and remaining underground until shortly before anthesis; basal leaves vigorous, with coriaceous sheaths, blades erect, linear-lanceolate, gradually attenuate downwards, upwards gradually tapering into acute, usually hard and sharp point, inflorescence a silky panicle, fruit caryopsis^{5,6}.

For man, the *Poaceae Gramineae* is the one of the most important family in the plant kingdom because it is a source for food, building material etc., so that most of the chemical investigations are directed to compounds which are important economically e.g. carbohydrates, proteins, vitamins, volatile oils, while the secondary metabolites are still relatively unknown⁷.

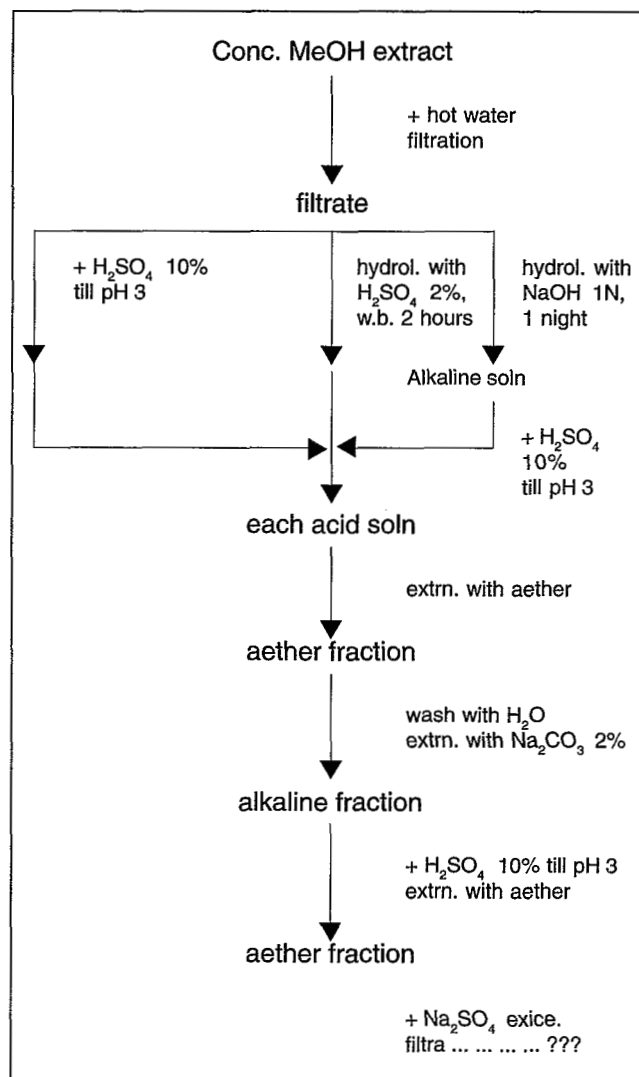
To support the governmental program in promoting the use of traditional drugs, an investigation on the chemical contents of *alang-alang* rhizomes, especially an analysis of the phenolic acids, was carried out.

MATERIALS AND METHODS

The methanol extract of *alang-alang* rhizomes was obtained by soxhletation, evaporated under pressure at a temperature below 60 °C using a rotary evaporator.

Free phenolic acids, phenolic acids as glycosides and esters were investigated. The isolation scheme of the phenolic acids can be seen in Fig. 1.

Fig. 1
Isolation scheme of phenolic acids



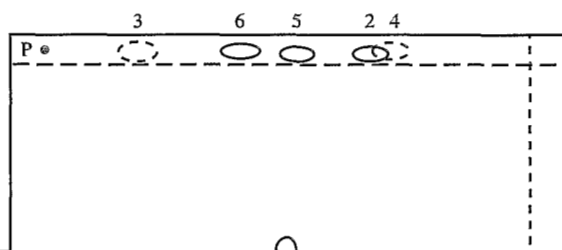
Identification of the phenolic acids is done by paper chromatography on Whatman 1 paper, with HOAc-water 2% and benzene-HOAc-water (60 : 22 : 1, 2) as eluents, together with the reference standards.

For detection of the acids, the papers are sprayed with a diazo-paranitroaniline solution, followed by a 15% sodium carbonate solution⁸ (Fig. 2).

Fig. 2

Paper chromatography of phenolic acids on Whatman 1

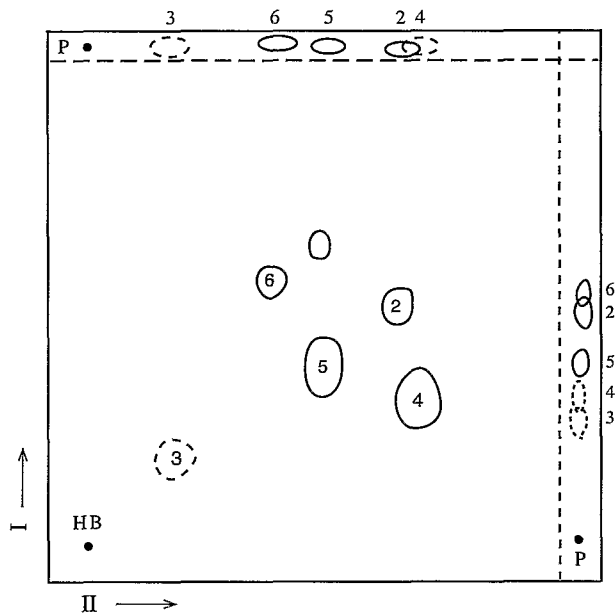
Fig. 3
Two-dimensional paper chromatography
of free phenolic acids (TH)



especially ferulic-, p-coumaric, and caffeic acids, are always obtained as mixtures of *cis*- and *trans*-isomers, while the isolated vanillic acid is probably still mixed with the *cis*-isomer of ferulic acid⁹, p-Hydroxybenzoic acid cannot be obtained in the pure form because it is always mixed with the *cis*-isomer of p-coumaric acid, and due to its very small amount no ultraviolet spectrum could be made.

Fig. 5

Two-dimensional paper chromatography of phenolic acids after alkaline-hydrolysis (HB)



I.: Eluent HOAc-water 2% – II.: Eluent benzene-HOAc-water (60:22:1,2)
Relative position and colour of spot 2 (violet), 3 (brown, blue fluor.), 4 (blue-brown, blue fluor.), 5 (blue-brown), and 6 (rose) corresponds with vanillic-, caffeic-, ferulic-, p-coumaric, and p-hydroxybenzoic acid.

CONCLUSION

From the results it can be concluded that *alang-alang* rhizomes contain vanillic-, ferulic-, p-coumaric-, and p-hydroxybenzoic acids in the free form, and caffeic acid in the ester form.

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