In vitro screening of various forages for anthelmintic activity on *Haemonchus contortus* eggs

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Introduction Helminth control programmes, based on improvement of farm management and regular anthelmintic treatment, are often impracticable in developing countries due to relatively high price of modern anthelmintics for the smallholder. Medicinal plants may become good alternatives for modern synthetic anthelmintics in smallholder farms if their efficacy can be proved scientifically under controlled studies (Satrija *et al.*, 2001). The objective of the present study was to assess the *in vitro* anthelmintic potential of fifteen tropical forages usually given by farmers as goat feeds, that contain active compounds, in exerting their anthelmintic effects against *Haemonchus contortus* eggs

Materials and methods Fifteen plants used as goat feeds by local farmers in Yogyakarta, Indonesia, were screened for *in vitro* anthelmintic activity by measuring the inhibition of the hatching of *Haemonchus contortus* eggs. The plant materials were screened for the presence of water soluble total tannin. The *in vitro* anthelmintic potential of the 15 tropical forages was assessed using aqueous infusions (50%, w/v) of the plant material. Adult female parasites of *Haemonchus contortus* were collected from the abomasums of goats obtained from the abattoir (Daryatmo *et al.*, 2008). Female worms were separated from males, transferred to phosphate buffer saline (PBS) solution (pH 7.2) and incubated at room temperature for 24h. The worms were removed from PBS after 24h and ova laid by them were collected by sedimentation using slow centrifugation. Between 50 - 100 eggs were transferred into petridisks filled with 5 ml of each infusions. The experiment was replicated three times for each infusion. Unhatched eggs were then counted under a dissecting microscope with ×40 magnification. The positive and negative controls were Albendazole and phosphate buffer saline, respectively. The values obtained were analysed using one way analysis of variance and the LSD test at the 0.05% significance level.

Results Tannin contents of the 15 plants ranged from 0.34 – 2.89% of DM (Table 1). The aqueous infusions of the plants inhibited egg hatching by 53.42 - 79.15% (Table 1). The two most potent infusions using egg hatch assay were those of *Manihot esculenta* Crantz and *Artocarpus heterophyllus* leaf in a decreasing order of potency.

Table 1 Tannin contents of 15 plants and their inhibition (as aqueous infusions) of hatching of *Haemonchus contortus* eggs.

No	Treatment	Water soluble total tannin (% of DM)	Eggs not hatching (%)[1]
1	Albendazole	-	96.15^{a}
2	*Manihot esculenta* Crantz	2.89	79.15^{b}
3	*Artocarpus heterophyllus*	2.49	78.72^{b}
4	*Swietenia mahagony*	1.23	74.10^{c}
5	*Sesbania grandiflora*	1.22	71.39^{cd}
6	*Ficus benyamina*	1.85	69.93^{de}
7	*Albizia chinensis*	1.19	67.64^{e}
8	*Ceiba petandra*	1.69	67.47^{e}
9	*Carica papaya*	1.52	66.21^{e}
10	*Acacia* spp.	2.10	65.55^{e}
11	*Eugenia aquea*	1.63	65.12^{ef}
12	*Leucaena leucocephala*	1.27	61.84^{f}
13	*Gliricidea sepium*	0.60	61.62^{f}
14	*Bauhinia malabarica*	0.41	61.48^{f}
15	*Dalbergia latifolia*	0.84	57.60^{g}
16	*Musa paradisiaca*	0.34	53.42^{h}
17	Phosphate Buffer Saline (PBS)	-	17.78^{i}

[1]Means of three measurements; within a column, means with different superscripts are statistically different ($P<0.05$)

Conclusions The results indicate that the 15 plants tested showed promising anthelmintic activity. These properties, and their potential as animal feeds, supports their use by farmers in traditional animal health care. Further controlled *in vivo* experiment studies are required to identify possible negative effects on the performance of the animals before any plant can be recommended for save use.

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