Evaluation of condensed tannin content of some native tropical tanniniferous plants from semi-arid regions in Brazil

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Introduction During periods of feed shortage in the semi-arid regions, cattle and small ruminants consume leaves of trees and shrubs that have fallen to the ground. However these leaves, as with most tropical legumes, have significant levels of total tannins which can influence their nutritive value. Moreover, these plants may have a potentially high nutritional value and are well adapted to semi-arid conditions so they may be of use for feeding livestock. The objective of this study was to evaluate the condensed tannin content of some native tropical tanniniferous plants from semi-arid areas of Brazil.

Material and methods Samples of the plants were collected from the semi-arid regions of Pernambuco, located in northeast Brazil. Six browse species with potential use as forage were randomly selected in 450 ha natural grazing area: *Astronium urundiuva Engl*, *Sida cf. Cordifolia L*., *Caesalpinia pyramidalis Tul*, *Ipomoea sp*., *Desmanthus virgatus L*. and *Leucaena leucocephala*. The collections were carried out in the dry season (March) with five replicates for each plant. The plants were losing their leaves and starting the dormancy stage and this is the time the animals look for these plants to eat. The collected material was shade-dry. Total phenol (TP), total tannins (TT), and condensed tannins (CT) were analysed as described by Makkar (2003). Results were analysed using analysis of variance in a factorial design (six species and five repetitions). Data were compared by $P<0.05$ level using the SAS system (SAS, 2008).

Results Mean values of total phenols (TP), total tannins (TT) and condensed tannins (CT), are shown in Table 1. The results showed that there were significant differences between the experimental species in phenolic compounds concentrations. *Astronium urundiuva Engl* had the highest TP and TT concentrations (307.8 and 266.45 eq-g tannic acid/kg DM, respectively) followed with *Caesalpinia pyramidalis* Tul. (132.6 and 126.0 eq-g tannic acid/kg DM for TP and TT). Also the CT concentrations showed significant differences between the experimental plants. *Sida cf. cordifolia* L. had the highest content of CT (109.9 g-leucocyanidina g/kg DM) followed with *Desmanthus virgatus* L. and *Leucaena leucocephala* (82.85 and 53.35g-leucocyanidin /kg DM) respectively. On the other hand, *Astronium urundiuva Engl*, *Caesalpinia pyramidalis* Tul. and *Ipomoea* sp. had the lowest concentrations of CT (29.22, 5.63 and 4.61g-leucocyanidina /kg DM, respectively). These results indicated that CT concentrations of *Caesalpinia pyramidalis* Tul, *Ipomoea* sp. and *Astronium urundiuva Engl* were within the safe level (30 to 40 eq-g-leucocianidina /kg DM) for ruminant nutrition as recommended by Barry, (2003).

Table 1 Means of total phenol (TP), total tannins (TT) (eq-g TA /kg DM) and condensed tannins (CT) (eg-g leucocyanidin /kg DM) tropical tanniniferous plants from semi-arid region of Pernambuco, Brazil.

Plants	TP		TT		CT	
	Mean	SD	Mean	SD	Mean	SD
Astronium urundiuva Engl	307.80^{a}	39.01	266.45^{a}	38.60	29.22^{d}	20.52
Sida cf. cordifolia L.	88.83^{cd}	14.92	64.93^{cd}	10.36	109.90^{a}	24.05
Caesalpinia pyramidalis Tul.	132.60^{b}	17.17	126.00^{b}	16.38	5.63^{e}	4.30
Ipomoea sp.	133.90^{d}	16,99	112.20^{d}	19.15	4.61^{e}	2.77
Desmanthus virgatus L.	109.20^{bc}	16.78	59.75^{d}	13.81	82.85^{b}	15.14
Leucaena leucocephala	93.34^{cd}	17.69	76.36^{d}	13.25	53.35^{c}	16.59

^{a,b,c,d,e} Means within the same column having different letters are significantly different ($p\leq0.05$)

Conclusion The content of condensed tannins of some tropical tanniniferous plants from semi-arid region in Brazil (*Ipomoea* sp., *Caesalpinia pyramidalis* Tul. and *Astronium urundiuva Engl*) are within the range of safe levels, and probably do not cause problems for ruminant nutrition. Further research is needed to study the effects of these plants on rumen fermentation and degradability in livestock.

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