

Advances in the characterization of non-conventional resources with potential use in animal nutrition

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Introduction

The tropical zones hold the biggest genetic diversity in the whole world, diversity which is expressed in the large number of vascular plants per unit of surface. Non-conventional forage plants are an important example of this huge natural potential. However, several of these plants have developed defence mechanisms to protect themselves against predators; these mechanisms are mainly: phenols, alkaloids, saponins and steroids. Because of this the characterization of these natural resources must be a research priority. Most of these plants are unknown to researchers, but not to peasants who have

collected a lot of knowledge (communicated from generation to generation) about the use of most of these resources.

Methods

The aim of this characterization is to identify a group of forages which could be used in different tropical regions. Most of the observations about use have been obtained from peasants and farmers; the rest are quite well known forage plants. Table 1 presents the updated list of the plants characterized by CIPAV.

Table 1 Updated list of the plants characterized by CIPAV

Scientific name	Common name	Family	Kind of plant	Part of plant	Potential use (animal species)
<i>Gliricidia sepium</i>	Matarratón	Leguminosae/ Papilionacea	Tree	Leaves	Ruminants
<i>Leucaena leucocephala</i>	Leucaena	Leguminosae/ Mimosacea	Tree	Leaves	Ruminants
<i>Trichantera gigantea</i>	Nacedero	Acantacea	Tree	Leaves	Monogastrics, ruminants
<i>Inga spectabilis</i>	Guamo	Leguminosae/ Mimosacea	Tree	Leaves	Toxic plant
<i>Canavalia ensiformis</i>	Canavalia	Leguminosae/ Papilionacea	Shrub	Fruits	Poultry (maximum 30% in diet). Toxic for pigs
<i>Cajanus cajan</i>	Guandul	Leguminosae/ Papilionacea	Shrub	Leaves	Ruminants
<i>Hibiscus rosasinencis</i>	San joaquin	Malvacea	Shrub	Leaves	Pigs, ruminants
<i>Urera caracasama</i>	Pringamoza	Urticacea	Shrub	Leaves	Monogastrics, ruminants
<i>Enterolobium ciclocarpum</i>	Orejero	Leguminosae/ Mimosacea	Tree	Leaves	Ruminants, reduce population of rumen protozoa
<i>Simphytum peregrinum</i>	Comfrey		Herbaceous	Leaves	Monogastrics, rabbits, guinea pigs
<i>Azolla pinnata</i>	Azolla	Azollacea	Aquatic	Leaves	Ruminants, monogastrics
<i>Erythrina poeppigiana</i>	Cachimbo	Leguminosae/ Papilionacea	Tree	Leaves	Ruminants

Results

The results of chemical analysis of these foods are summarized in Table 2.

All but one of the forages presented in Table 2 are being used as food resources in different animal species, and their anti-nutritional factors are a matter of research. The *Inga spectabilis* has been shown to be highly toxic (cardiac depressive effect).

Other potential resources, which have been used by peasants and farmers, are being evaluated at the moment, and are shown in Table 3.

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Table 2 Chemical analysis of forages

Scientific name	Dry matter (DM) (g/kg)	Nitrogen (g/kg DM)	Protein (g/kg DM)	Calcium (g/kg)	Phosphorus (g/kg)	Potassium (g/kg)	Magnesium (g/kg)	Degradability (proportion per 24 h)	mg total phenols per g of plant (DM)
<i>Gliricidia sepium</i>	208.7	40.5	253.1	13.2	3.0	21.4	5.0	0.72	10.923
<i>Leucaena leucocephala</i>	250.0	39.1	244.3	19.8	16.0	11.0	4.2	0.61	42.328
<i>Trichantera gigantea</i>	224.6	27.1	169.3	24.0	3.8	24.2	9.0	0.60	50.288
<i>Inga spectabilis</i>	550.0	26.7	166.9	1.5	0.7	4.9	1.4	0.30	18.947
<i>Canavalia ensiformis</i>	278.9	41.7	260.7	15.6	0.4	28.0	4.3	0.77	14.720
<i>Cajanus cajan</i>	260.5	42.7	266.8	10.5	3.9	21.7	3.1	0.56	12.944
<i>Hibiscus rosasinensis</i>	210.0	33.3	208.1	10.5	4.6	28.4	5.5	0.83	12.903
<i>Urena caracasana</i>	179.0	25.9	161.8	19.1	6.3	39.0	6.8	0.72	9.580
<i>Enterolobium ciclocarpum</i>	300.0	23.0	143.7	14.1	1.1	8.8	10.7	0.35	13.787
<i>Simphytum peregrinum</i>	118.9	32.1	200.6	15.0	7.8	66.4	4.7	0.75	9.985
<i>Azolla pinnata</i>	700.0	35.9	224.3	11.7	3.3	21.2	5.9	0.47	8.790
<i>Erythrina poeppigiana</i>	232.3	38.3	239.3	16.8	3.4	16.8	4.3	0.54	11.931

Table 3 Other potential foods

Scientific name	Common name	Family	Kind of plant	Part of plant	Potential use (animal species)
<i>Eichornia crassipes</i>	Buchón	Pontederiaceae	Aquatic	Whole plant	Ruminants
<i>Helodea</i> spp.	Elodea	Hidrocaritaceae	Aquatic	Stem	Ruminants
<i>Spirogira</i> spp.	Spirogira		Aquatic	Whole plant	Ruminants
<i>Amaranthus dubius</i>	Bledo	Amaranthaceae	Herbaceous	Whole plant	Monogastrics
<i>Morus alba</i>	Morera	Moraceae	Herbaceous	Whole plant	Monogastrics
<i>Bidens pilosa</i>	Papunga	Compositae	Herbaceous	Leaves	Monogastrics, rabbits
<i>Renealmia occidentalis</i>	Sanjuanito	Zingiberaceae	Herbaceous	Whole plant	Ruminants
<i>Thitonia diversifolia</i>	Botón de oro	Compositaceae	Shrub	Whole plant	Monogastrics
<i>Phyllanthus acuminatus</i>	Chirrinchao	Euphorbiaceae	Shrub	Leaves	Monogastrics
<i>Ricinus communis</i>	Higuerilla	Euphorbiaceae	Shrub	Leaves	Ruminants
<i>Erythrina edulis</i>	Chachafruto	Leguminosae/ Papilionaceae	Tree	Leaves	Ruminants (leaves), monogastrics (fruits)
<i>Erythrina glauca</i>	Pizamo	Leguminosae/ Papilionaceae	Tree	Leaves	Ruminants
<i>Mangifera indica</i>	Mango	Anacardinaceae	Tree	Leaves	Ruminants (leaves), monogastrics (fruits)
<i>Guazuma ulmifolia</i>	Guásimo	Ulmaceae	Tree	Leaves	Ruminants