Session 36
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Use of textile industry by-products of ramie (*boehmeria nivea (L.) Gaud.)* as livestock feed

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OBJECTIVES

The hypothesis of using ramie plant and textile industry by-products as livestock forage might allow a higher interest in this cultivar diffusion in Mediterranean area, mainly considering the high quantity of fresh green mass derived from this plant (as much as 300 tons of fresh material/ha). The aim of this study was to carry out a chemical and nutritional evaluation on different parts of ramie plant to verify a possible use of the textile industry by-product as feedstuff for ruminants.

METHODS

The standard chemical composition was determined on the whole plant and on its parts. The study was particularly focused on leaves and tops, not used in fibre production and available to feed livestock. Organic matter enzymatic digestibility was determined by a double step method: the first based on cellulosolitic enzymes (cellulase and hemicellulase) and the second on proteolytic enzyme (pepsin). Palatability tests were carried out on sheep, offering dried leaves or the whole fresh plant, minced and fed alone or mixed to alfalfa hay.

RESULTS AND DISCUSSION

Chemical analysis (Tab.1) showed a good crude proteins content on leaves and tops: 17.00±1.52%, 15.25±0.77% on dry matter (DM) basis respectively and similar to other forages commonly used in ruminant diets (Fig.1). A normal fibre fraction ADF and NDF amount was also observed whereas the lignin content (ADL) resulted high and not constant among different plant parts. Ash content was high in all plant parts; ash analysis (Fig.2) showed high calcium concentration, especially in leaves, with values exceeding 4% of DM. The other minerals were in a normal range. Organic matter enzymatic digestibility (OMD) and energetic value (MilkFU/kg DM), were low in all the samples if compared with other common forages (Tab.1).

As far as palatability tests are concerned (Fig.3), the sheep refused the dried leaves, whereas ingested without problems the fresh plant, fed alone or mixed with alfalfa hay.

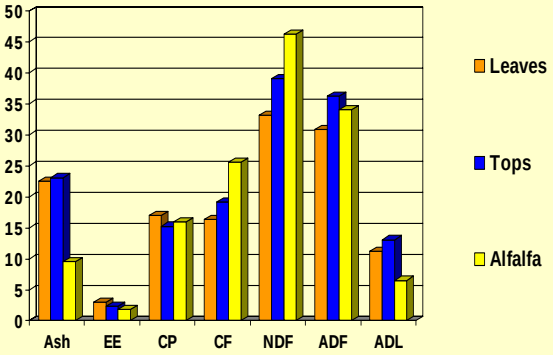

Figure 1. Chemical composition of leaves and top of ramie vs alfalfa

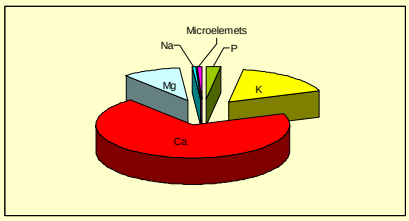

Figure 2. Composition of the ash

	DM%	Ash%	EE%	CP%	NDF%	ADF%	ADL%	OM%	OMD%	Milk FU/Kg DM
Leaves	91.87±1.63	22.50±2.19	2.95±0.55	17.00±1.52	33.19±4.27	30.82±6.48	11.27±4.58	69.53±1.12	34.23±7.24	0.33
Tops	92.66±1.85	23.08±2.62	2.33±0.39	15.25±0.77	39.07±5.62	36.18±3.98	13.07±0.58	69.57±4.05	29.96±6.76	0.28
wholePlant	93.05±1.85	17.46±3.21	1.93±0.12	11.79±3.32	48.17±9.55	43.59±9.50	11.45±2.20	75.59±3.53	25.09±8.66	0.21

Table 1. Chemical composition and enzymatic digestibility of the whole plant, leaves and tops

CONCLUSIONS

Though the ramie chemical composition is rather close to medium quality hay, its nutritional value seems scarce.

Reported low digestibility values and low energy levels of ramie might not be due to the high minerals and lignin content only, even if their role is important, but also to some antinutritional factors, like the polyphenols, largely present in this plant and able to interact with the digestion enzymes reducing their activity.

So the utilization of ramie plant and by-products as animal feed requests further studies concerning their nutritional quality.

Figure 3. Palatability tests