NUTRITIONAL QUALITY EVALUATION OF GRAIN AND BIOMASS OF LIMA BEAN (*Phaseolus lunatus*)

Regis Araujo Pinheiro[1], Gilberto A Peripolli Bevilaqua[1], Irajá Ferreira Antunes[1], Violeta Bachieri Duarte[2]

[1]Embrapa Clima Temperado, BR 392, km 78, CxP 403, Pelotas, RS, Brazil; [2]Cooperativa Bionatur Sementes, Candiota, RS, Brazil. E-mail: gilberto.bevilaqua@embrapa.br

INTRODUCTION

The family farming systems require the use of plants with multiple purpose that can be used as ground cover, green manure, human and animal nutrition, and exhibit good growth capacity and adaptation to developing in low fertility soils. Furthermore, Altieri (2002) states that these cropping systems had profound changes in recent years, observing the drastic reduction of crops of commercial interest number and of the genetic diversity used for cultivation. The lima beans can replace other land cover crops and green manure, as Mucuna sp. and Crotalaria sp. with advantages such as the use of biomass and grain for feed and food, however requiring accuracy analysis to better recognize the nutritional potential of culture.

According to Vieira (1992) the lima bean is a major legume grown in tropical regions and has the potential to provide vegetable protein to the population, decreasing dependence, almost exclusively, of common beans (*P. vulgaris*).

Embrapa Clima Temperato has a germplasm bank of lima bean composed of 70 cultivars collected throughout the southern region of Brazil and some coming from the tropical region. These genotypes have been evaluated over the past few years and show a large variation between the grains, cycle and size. The aim of this study is to analyze the nutritional composition of grain and biomass of lima bean accesses from germplasm bank of Embrapa Temperate Climate.

MATERIAL AND METHODS

Genotypes 195A and 198, from the germplasm bank were analyzed, and the control used was cowpea, cultivar Amendoim from the Cooperative of Family Farmers of São José do Norte (Cooafan), RS, Brazil.

The soil for cultivation was Haplaquult, typical of floodplains, presenting poorly drained and low fertility, with the follow physic-chemical characteristics: 1,2% of organic matter, 2 mg kg^{-1} de phosphorus (P), 35 mg kg^{-1} of potash (K), 20% of clay e pH 5,8. After preliminary analysis of the soil was performed correction with limestone , and adding organic compost, rock phosphate and granodiorite powder, manually entered in dosis of one t ha^{-1}. For installation of observation units were sown in november, four lines of each variety, 6m long, spaced 0.50 m apart at a density 2 to 3 plants m^{-1}.

Analyses of grain and biomass at flowering were performed in the laboratory of Food Science and Nutrition Animal Embrapa Temperate Climate. The methodologies employed for determination of dry matter, ash, lignin, neutral detergent fiber, acid detergent fiber, ether extract, lignin and crude protein were described according to Silva & Queiroz 2002; National ...(2001).

RESULTS AND DISCUSSION

Regarding the crude protein content in the grain, the G 195A showed slightly higher than the genotype 198, however similar at check treatment (Table 1). When analyzed the levels of neutral and acid digestible fiber, the lima bean genotypes were similar, but bellow of cowpea. In relation of mineral matter the results of genotypes were very similar. In relation at ether extract the lima bean genotypes were superior cowpea checking and G 198 had higher value. These values are above those found by Azevedo et al. (2003) which analyzed seven lima beans genotypes in the Piauí State, Brazil, found values between 26.70% - 17.95% for crude protein, 4.10% -3.06% for mineral matter, and from 1.49 to 0.88 % for ether extract.

Table 1: Nutritional composition of grain and biomass in flowering stage, of lima bean (*Phaseolus lunatus*) in Pelotas, Brazil.

Genotypes	%DM	%CP	%NDF	%ADF	%MM	%EE	%LIG
			Grain				
G 195A	87.0	28.4	18.9	4.5	5.0	1.09	-
G 198	87.2	25.1	22.2	5.7	4.5	1.38	-
Cowpea (C)	86.6	28.2	32.1	8.7	4.6	0.74	-
			Biomass				
G195A	94.0	20.4	46.7	33.9	5.9	-	10.6
Cowpea (C)	90.0	17.1	54.0	35.1	11.7	-	9.1

DM: dry matter; CP: crude protein; NDF: neutral detergent fiber; ADF: acid detergent fiber; MM: mineral matter; EE: ether extract; LIG: lignin
Check: cowpea cv. Amendoim

Regarding the nutritional composition of lima bean biomass, the results were similar to those presented by cowpea, however, the first presented numerically higher, especially when analyzing the crude protein content (Table 1). With regard to the fiber content, cowpea shown numerically lower results in relation of lima bean, however similar for both types of fibers analyzed. The results can indicate the best nutritional quality of lima bean for feeding animals and humans. For the other hand, in relation to mineral matter the cowpea was superior to lima beans. For the lignin content both genotypes showed similar results however, the same can be considered quite high for use in animal feed.

CONCLUSION: Lima bean genotypes from the germplasm bank of Embrapa Clima Temperado can be regarded as an excellent protein source for agricultural families, providing a richer diet, in addition, they present high rusticity, becomes a kind of extreme importance in crop diversification in agroecological systems

REFERENCES

ALTIERI, M. A. Agroecologia: bases científicas para uma agricultura sustentável. Guaíba: Editora Agropecuária, 2002. 592 p.

AZEVEDO, J.N.; FRANCO, L.J.D.; ARAÚJO, R.O.C. Composição química de sete variedades de feijão-fava. Teresina, PI: Embrapa Meio-Norte, 2003. 4p. (Embrapa Meio-Norte. Comunicado Técnico, 152.)

NATIONAL RESEARCH COUNCIL. Washington, DC.: *National Adacemy of Sciences*, 7a. ed., 2001. 381p.

VIEIRA, C. Leguminosas de grãos: importância econômica na agricultura e na alimentação humana. Informe Agropecuário, Belo Horizonte, v. 16, n.174, p.5-11, 1992.