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## BIOACTIVE COMPOUNDS AND ANTIOXIDANT ACTIVITY IN GRAINS OF LIMA BEAN GENOTYPES

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## BIOACTIVE COMPOUNDS AND ANTIOXIDANT ACTIVITY IN GRAINS OF LIMA BEAN GENOTYPES

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**INTRODUCTION:** Lima bean (*Phaseolus lunatus*) plays a relevant role, mainly in the Northeast region of Brazil, where it is an alternative source of income and food source for the population, which consumes it in the form of mature or green grains, decreasing dependence on common bean (*Phaseolus vulgaris*). The dry grains have nutritional value similar to common bean, containing approximately 63% of carbohydrates, 25% of protein and 6% of fibers (AZEVEDO et al, 2003). Grain consumption contributes synergistically to its medicinal properties as antioxidant, diuretic, anti-inflammatory, antitumor and antimicrobial, with a positive effect against some chronic diseases (DÍAZ et al, 2010). The cowpea (*Vigna unguiculata*) has nutraceutical properties quite pronounced and increasingly consumed in human food, the beneficial effects of its bioactive compounds remains unexplored (BECKER; SIDDHURAJU, 2007). In the literature there is little data available on Lima bean and its potential antioxidant capacity for which the grains of several varieties were analyzed.

**MATERIAL AND METHODS:** Whole grains of Lima bean genotypes were analyzed from bean germplasm bank of Embrapa Clima Temperado. As witnesses, two cultivars of cowpea, from Rio Grande do Sul State, were used. All the varieties analyzed had predominantly red color, except Baio control. The genotypes were cultivated at the Terras Baixas Experimental Station in plan soil with drainage deficiency and low fertility. Fertilization was performed with a mixture of avian bed, rock powder and natural phosphate in the same proportion using a dose of 2 t.ha<sup>-1</sup>. After being harvested, they were dried to 12% water content and transported to the Embrapa Clima Temperado Food Nucleus.

For the analyzes of the raw and whole grains, the samples were ground in a knife mill for the purpose of obtaining flour. The flour was stored in capped polyethylene bottles and kept at room temperature. Analyzes were performed using the following methodologies: total anthocyanins (Fuleki and Francis, 1968); total carotenoids (Talcott and Howard, 1999, adapted from Swain and Hillis, 1959) and antioxidant activity for DPPH method (adapted from Brand-Williams et al., 1995).

**RESULTS AND DISCUSSION:** Among the varieties analyzed, G 195 and G 349 presented the best results for anthocyanins, differing significantly from the controls used. Segundo Puertas-Mejía et al. (2013) in addition to having a relatively high protein content, this grain also presents antioxidant substances, among them anthocyanins, a type of polyphenols present naturally in food and of great importance for health. Although beans are not considered sources of carotenoids, the varieties G 195A and cv. Baio were outstanding in relation to the others, with respectively 7.38mg/100g and 7.23mg/100g of total carotenoids.

The range in concentration of total phenolic compounds was reduced, and varied from 5,445mg/100g, in G 198, at 7,545mg/100g in the cv. Baio, which obtained the highest

concentration of total phenolic compounds and the highest antioxidant activity . Silva et al. (2009) to characterize physically and chemically raw bean cultivars also found correlated results in total phenolic compounds contents and antioxidant activity.

For antioxidant activity, there was also a statistical difference between the analyzed varieties. G 195 and cv Baio (check) presented the best antioxidant capacity but without statistical difference.

**Table 1.** Anthocyanins and carotenoids concentrations in Lima bean genotypes from germplasm bank of Embrapa Clima Temperado.

Genotypes	Total anthocyanins (mg equivalent cianidina-3-glicosídeo/100mg)	Total carotenoids (mg equivalent $\beta$ -caroteno/100mg)
G 198	15.22+2.45 a*	6.42+0.25 ab
G 195A	2.99+0.33 c	7.38+0.29 a
G 349	15.92+1.15 a	1.76+0.51 c
Baio (C)	8.84+1.55 b	7.23+0.68 a
Amendoim (C)	2.60+0.22 c	6.59+0.18 ab

\* Different letters in the column show significant difference of means by the Tuckey test at the 5% probability level

**Table 2.** Concentrations of phenolic compounds and antioxidant activity in Lima bean genotypes from germoplasm bank of Embrapa Clima Temperado.

Genotypes	Total phenolic compounds (mg equivalent chlorogenic acid/100mg)	Antioxidant activity ( $\mu$ g equivalent Trolox/g)
G 198	5445.14+499.83 a*	13670.33+70.33 c
G 195A	5750.35+572.57 a	20529.64+1341.59 ab
G 349	6108.38+369.98 a	16192.68+912.93 b
Baio (C)	7545.22+644.97 a	23411.81+1200.53 a
Amendoim (C)	6137.44+140.03 a	4775.36+309.57 d

\* Different letters in the column show significant difference of means by the Tuckey test at the 5% probability level

**CONCLUSIONS:** There was variability among the cultivars regarding anthocyanins, carotenoids and antioxidant activity, but similar results for phenolic compounds. The genotypes G 198 and G 349 stood out for anthocyanins. Baio and G 349 for phenolic compounds while G195A and the Baio had the high antioxidant activity.

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