

ASTRAGALINE LEVELS IN CREOLE AND BREEDING LINES OF COMMON BEAN FROM RIO GRANDE DO SUL STATE, BRAZIL

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INTRODUCTION

The common bean is one of the main foods in the diet of Brazilians, being able to supply an important part of many important substances in maintaining health such as the antioxidants.

Besides being a source of essential nutrients, the beans have chemical constituents that are considered with action functional components such as flavonoids, including flavonols, glycosylated or not, anthocyanidins, proanthocyanidins and isoflavones and phenolic acids. Present in large amounts of vegetables, phenolic compounds are associated as chemical mediators between plants and microorganisms. Among these compounds, flavonoids are the most interesting because they are related to various functions such as protection, resistance to various types of stress, nitrogen fixation, among others (GONZALEZ de MEJIA et al., 2005).

The common bean has some undesirable attributes, such as phytates, factors flatulent, phenolic compounds, enzyme inhibitors, hemagglutinin (lectin) and allergens which must be eliminated for its effective use as food (GUPTA, 1987). The highest concentration of polyphenols is found in colored seed coats, and the peel of white seeds and other anatomical parts of the seed have lower concentrations (BRESSANI et al., 1991).

The objective of this study was to investigate the behavior of landraces and improved cultivars of common beans from Rio Grande do Sul for the levels of astragalina in whole grains.

MATERIAL AND METHODS

The field experiment was conducted at the Cascata Experimental Station of Embrapa Temperate Climate, in Pelotas, Rio Grande do Sul State in the year 2009/2010, using 300 kg ha⁻¹ NPK fertilizer. The seeds were sown in October 2009 and harvested in February 2010. The seeds were dried and placed in cotton bags during the storage period. Levels of antioxidant astragalina in landraces and improved cultivars of beans with different colors of the grain were analyzed, according to Correia et al. (2006).

The cultivars were divided into two groups: the first group formed by the landraces; the second by cultivars and breeding lines from different breeding programs. Data was analyzed using the standard deviation; are considered superior those genotypes who obtained a value exceeding the mean plus one standard deviation.

RESULTS AND DISCUSSION

The distribution of phenolic compounds was quite variable, where the cultivars with red and yellow seed coats presented higher levels when compared to those with black seed coats, with the exception of FTNobre and TB02-11. The cultivar FTNobre is recognized as of a good nutrition quality, and TB02-11 is a breeding line. In this study the genotypes TB02-24 (10.632 mg/100 g), TB02-26 (11.550 mg/100 g), TB 02-20 (5.000 mg/100 g) and Amarelinho Iolanda (3.791 mg/100 g), presented the highest astragaline content.

Study with four different colors of beans, using the technique of HPLC/MS showed that the highest level of astragalina was observed in seeds of non-staining black (Hu et al., 2006). The landraces had mean values slightly higher than cultivars from breeding programs.

The method for quantification of Astragalina was validated according to current regulations, and was justified in its purposes.

Table 1 – Astragaline levels in creole and breeding lines of common bean from Rio Grande do Sul State, Brazil, 2010.

Creole cultivar	Seed color	Astragaline (mg%)	Breeding line	Seed color	Astragaline (mg%)
Mouro Tavares 187	Purple	0,216	03 FPJ CF 29-1	Black	0,134
Mato Grosso	Black	0,799	FT Nobre	Black	11,050
Roxo Redondo	Purple	0,209	BRS Expedito	Black	0,142
Amarelo Iolanda	Yellow	3,791	BRS Valente	Black	0,094
AM 5	Black	0,015	Minuano	Black	0,100
Guabiju Brilhante	Black	0,079	Guapo Brilhante	Black	0,216
Rosinha Precoce	Black	2,581	Macanudo	Black	0,897
Preto Ibérico	Black	0,061	Macotaço	Black	0,076
Biriva 264	Black	0,221	BRS Pampeano	Black	0,027
TB 0220	Black	5,000	BRS Guerreiro	Black	0,165
TB 0221	Black	0,032	TB 0201	Black	0,025
TB 0222	Black	3,791	TB 0203	Black	0,665
TB 0223	Black	0,070	TB 0207	Black	0,059
TB 0224	Red	10,632	TB 0210	Black	0,045
TB 0225	Black	0,015	TB 0211	Black	10,502
TB 0226	Red	11,550	TB 0212	Black	0,294
TB 0301	Black	0,015	TB 0213	Bege	2,423
TB 0302	Black	0,048	TB 0219	Black	0,128
TB 0303	Black	0,067	Iraí	Cream	0,024
TB 0304	Cream	0,015	Carioca	Cream	0,058
TB 0305	Black	2,581			
TB 0306	Black	0,015			
TB 0307	Red	0,043			
TB 0308	Black	0,058			
TB 0309	Brown	0,392			
TB 0310	Red	0,068			
Media		1,571	Media		1,380
Standart deviation		3,087	Standart deviation		3,360

CONCLUSION: Among landraces, TB 02-26, TB 02-24, TB 02-20 and Amarelo Iolanda, and from cultivars and breeding lines, FT Nobre and TB 02-11 were those with higher levels of astragaline. The highest concentrations of astragaline were found in seeds with no black seed coats, although some black bean cultivars showed high levels.

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