# NUTRITIONAL COMPONENTS VARIATION IN COOKED COMMON BEANS (*PHASEOLUS VULGARIS* L.)

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## INTRODUCTION

The common beans is widely consumed by Brazilians, specially the poor people. It is necessarily consumed after cooking in order to develop the aroma and the acceptable consistency demanded by consumers. However, many physical and chemical changes take place in cooked grain. This work aimed to determine the proximal composition of three cultivars of common beans from 'black' and 'carioca' commercial groups (raw and cooked material), the apparent amylose content in raw and cooked grains and in its broth after cooking, in order to observe some variations as a result of cooking process.

## MATERIALS AND METHODS

The common beans cultivars from 'black' (BRS-Esplendor) and 'carioca' (BRS-Horizonte, IPR-Juriti) groups were cultivated between May and June/2008 at Capivara farm, Embrapa Rice and Beans, in Santo Antônio de Goiás city, Goiás State, Brazil and were harvested in October/2008.

The harvested grains were milled, sieved (*65 mesh*) and submitted to the following analyses: apparent amylose content estimation (AA) according to JULIANO (1979), proximal composition (moisture, crude protein (microKjeldahl), ash, lipids and dietary soluble and insoluble fiber) based on AOAC INTERNACIONAL (1997), with modifications. The total dietary fiber (TDF) content was obtained from the sum of its soluble (SDF) and insoluble (IDF) fractions values, while the carbohydrates were calculated by the difference between the value 100 and the other components contents (moisture, protein, lipids and ash). The grains were embedded in distilled water for 18 hours at room temperature before cooking in beaker with glass lid on the heating plate at the proportion water:beans (v/v) of 2:1. The cooking time was previously defined by the Mattson cooker (PROCTOR & WATTS, 1987; adapted by Embrapa Rice and Beans). The soluble solids contents were determined in the broth (PLHAK *et al.*, 1989), which was separated from the cooked grains and individually dried in the oven (60°C, 42 hours), then, milled and sieved (*65 mesh*), and finally submitted to the AA analysis. For the proximal composition analysis of cooked samples, the dried separated fractions (grains and broth) of each cultivar were joined and homogenized again and considered as a single sample.

## RESULTS AND DISCUSSION

The BRS-Esplendor cultivar had the highest cooking time of 27min, when compared to the other ones, BRS-Horizonte (26min) and IPR-Juriti (24min), showing a normal cooking resistance.

The BRS-Esplendor broth was more consistent with soluble solids content of 10,34% while the BRS-Horizonte and IPR-Juriti had 8,94% and 8,77% of soluble solids respectively.

Negative values for AA were found for each broth (BRS-Horizonte: -5,67%; IPR-Juriti: 4,87%; BRS-Esplendor: -3,54%) what means very low contents of amylose, not detected by the limit of the applied method. The cooked grains showed the following values: BRS-Horizonte: 7,84%; IPR-Juriti: 10,47% and BRS-Esplendor: 8,81%. In raw materials the highest amylose content was obtained for IPR-Juriti, 8,47%, followed by BRS-Esplendor, 7,48% and BRS-Horizonte, 6,21%. A similar profile was obtained for cooked samples (broth + cooked grains): IPR-Juriti (10,50%); BRS-Horizonte (7,51%); BRS-Esplendor (9,51%). It could be noticed an increase of AA content after cooking in all cultivars.

According to Table 1, for the three cultivars, it was observed a decrease in carbohydrate, ash and moisture contents after cooking, while the lipids and protein contents increased. This behavior was also mentioned by RAMIREZ-CÁRDENAS (2006). The TDF values were higher in cooked grains of BRS-Esplendor and BRS-Horizonte, while the cooked IPR-Juriti had a decrease resulted from the both fractions (SDF and IDF) contents reduction. The variation observed for BRS-Esplendor is a result of the significant increase in IDF content, while for BRS-Horizonte it was due to SDF more significant increase.

**Table 1:** Proximal composition of common beans cultivars (g.100g$^{-1}$, dried basis)

| Common Bean Cultivar | Carbohydrate | Ash | IDF[1] | SDF[2] | TDF[3] | Lipid | Protein | Moisture |
|---|---|---|---|---|---|---|---|---|
| BRS-Esplendor (raw) | 65,46 | 4,21 | 16,70 | 6,00 | 22,70 | 1,60 | 22,2 | 10,74 |
| BRS-Horizonte (raw) | 60,89 | 4,10 | 19,25 | 4,45 | 23,70 | 1,58 | 26,9 | 10,63 |
| IPR-Juriti (raw) | 67,94 | 3,88 | 19,67 | 6,29 | 25,96 | 1,38 | 20,5 | 10,18 |
| BRS-Esplendor(cooked) | 61,53 | 3,00 | 19,32 | 5,62 | 24,94 | 1,61 | 24,4 | 9,46 |
| BRS-Horizonte(cooked) | 58,61 | 3,36 | 19,49 | 5,75 | 25,24 | 1,93 | 28,3 | 7,80 |
| IPR-Juriti (cooked) | 64,76 | 2,50 | 17,30 | 5,43 | 22,73 | 1,68 | 21,8 | 9,26 |

[1]IDF: Insoluble dietary fiber, [2]SDF: Soluble dietary fiber, [3]TDF: Total dietary fiber.

## CONCLUSION

After common beans cooking it could be noticed a variation in nutritional components and apparent amylose contents, although these changes did not take place as a linear tendency. The BRS-Esplendor and BRS-Horizonte grains showed good results for both nutritional and cooking quality aspects.

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