EFFECT OF SOAKING AND COOKING ON THE FEATURES FUNCTIONAL AND NOT NUTRITIONAL OF THE BLACK BEAN (PHASEOLUS VULGARIS) VARIETY QUERETARO IN THE PRODUCTION OF FLOUR.

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Introduction. Due to its high content of proteins, vitamins, minerals and fiber, the bean is a legume of large consumption in Mexico; however, it contains no nutritional compounds that may interfere during the process of digestion (1).
The study aims to test different conditions of soaking and cooking to obtain flour and assess the effect on the reduction of non-nutritional compounds and antioxidant activity.

Methods. Black bean (variety Queretaro) seeds were used. Four conditions for soaking (12, 16, 18 and 20 h) and four periods of cooking at 93 ° C (15, 30, 45 and 60 min) were used (2). They dehydrated at 70 ° C in a fluid bed dryer and ground until flour is obtained. No nutritional compounds (phytic acid and trypsin inhibitors, saponins, total phenolics, tannins) and antioxidant activity were determined according to the methods reported in the literature for each used condition. He was the characterization proximal chemical of the flour according to the AOAC methods (3).

Results. According to Table 1, the content of non-nutritional compounds in bean removed, however cooking reduced them to 73%; under these conditions for soaking and cooking, the antioxidant activity of flour dropped 50%.

Table 1. Effect of soaking and cooking not nutritional characteristics of black beans.

No nutritional compounds in samples of black bean								
Soaking time (h)		Time optimal cooking (min)	Phytic acid	Saponins	Total phenolics	Tannins	Trypsin inhibitors	Antioxidant activity
			mg eq phytic acid / 100g	mg eq diosgenin / 100g	mg eq gallic acid / 100g	mg eq + catechin / 100g	mg TPI / g	%
Raw beans	0	0	1769.86 ± 1.03	526.05 ± 0.15	682.40 ± 0.04	554.30 ± 0.04	14.12 ± 0.43	30.82 ± 0.001
Bean sprout	12	0	1764.06 ± 1.48	482.85 ± 0.80	595.87 ± 0.02	298.93 ± 0.01	14.10 ± 0.31	28.05 ± 0.029
	16	0	1416.23 ± 1.20	396.19 ± 78	568.34 ± 0.02	288.74 ± 0.00	13.66 ± 0.25	25.42 ± 0.002
	18	0	1300.29 ± 0.98	327.92 ± 0.53	562.44 ± 0.00	251.15 ± 0.11	13.24 ± 1.04	21.11 ± 0.002
	20	0	961.16 ± 1.45	279.65 ± 35	483.78 ± 0.01	96.15 ± 0.04	13.01 ± 0.79	20.14 ± 0.001
% Reduction			45.6	46.8	29.1	82.6	7.8	40.9
Bean sprout and cooked	18	20	288.25 ± 0.59	172.29 ± 0.86	421.24 ± 0.80	80.28 ± 0.29	1.54 ± 0.20	19.13 ± 0.001
% Reduction			83.71	67.25	38.27	85.52	89.09	50.10

** TPI= Pure Trypsin Inhibited*
The results represent the average of 3 independent determinations ± S.D.

Table 2 shows the proximal chemical analysis of flour, with a high content of protein and fiber, (approximately 15% and 26%, respectively).

Table 2. Bean flour proximal chemical analysis.

Proximal chemical analysis								
Soaking time (h)		Time optimal cooking (min)	Protein %	Ash %	Moisture %	Total dietary fiber %	Lipids %	Carbohydrates %
Beans flour soaked and cooked	18	20	14.89 ± 0.67	2.53 ± 0.22	6.75 ± 0.05	25.64 ± 1.72	1.25 ± 0.20	48.94 ± 0.642
The results represent the average of 3 independent determinations ± S.D.								

Conclusions. The optimal conditions for soaking and cooking black beans (18 h at room temperature and 20 min at 93 ° C) were determined. Soaking and cooking allowed to obtain meals of beans with less content of no nutritional compounds, preserving up to 50% of the antioxidant activity, which translates into a higher biological value. Because of the content of protein and fiber of bean flour, it can be used in the development of food with added value (4).

References.

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