

# Corn Tortillas Enriched with Brown Sorghum Bran

G. Cedillo, L. W. Rooney

Cereal Quality Laboratory, Soil & Crop Sci. Dept., Texas A&M University, College Station, Tx

## ABSTRACT

The effect of the addition of brown sorghum bran (BSB) on corn tortillas was evaluated. Tortillas were prepared from nixtamalized corn flour (NCF) and 10% BSB. The effect of guar gum, carboxymethylcellulose (CMC), and maltogenic alpha-amylase, on BSB added tortillas was also assessed.

Tortillas were stored seven days at 4°C and analyzed. Subjective and objective texture tests were utilized.

Tortilla appearance was modified by the addition of BSB. Brown tortillas were produced. Tortilla flavor was also affected; a bitter aftertaste was perceived.

The addition of BSB negatively affected tortilla texture. Tortillas were crumbly. The addition of CMC improved tortilla properties as measured by subjective tests. Nevertheless, tortillas were perceived as chewy.

## INTRODUCCION

Specialty sorghum hybrids contain high levels of phenolic compounds that may provide health benefits. Decortication to remove outer layers of the kernel can concentrate these compounds 3-7 fold producing fractions that possess antioxidant properties comparable to those of berries (Awika 2000). Sorghums thus could be an important source of ingredients to be used in functional foods.

Inclusion of BSB in corn tortillas could produce a product with antioxidants and increased levels of dietary fiber.

Tortillas represents a significant vehicle for nutraceutical delivery to consumers due to its widespread and growing consumption.

## OBJECTIVE

Evaluate the effect of BSB, and BSB in combination with additives, on corn tortilla properties.

## MATERIALS AND METHODS

Brown sorghum bran

High tannin sorghum was decorticated using a PRL dehuller. Bran yield was 12%. To get a finer particle size the bran was ground using cyclotec mill (UDY Corp., Fort Collins, CO) with a 1 mm mesh.



Brown sorghum bran (BSB)

BSB composition

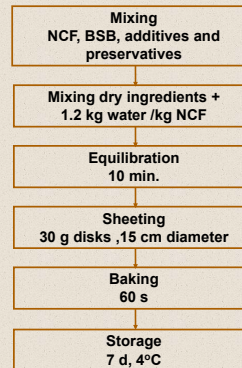
Hydrocolloids. CMC and guar gum were evaluated at two levels (0.75 and 1.5%), and in combination (0.5% each).

Enzymes. Maltogenic alpha-amylase was tested at one level (170 mg/kg), which has proven to be effective in corn tortillas (Bueso-Ucles 2003).

Treatments

Treatment	CMC (%)	Guar (%)	Maltogenic alpha-amylase mg/kg DMF
Control			
Control BSB			
Low CMC	0.75		
High CMC	1.50		
Low Guar		0.75	
High Guar		1.50	
CMC+Guar	0.50	0.50	
CMC+Guar+enz	0.50	0.50	170.00

Tortilla preparation



Texture analysis

Tortillas were analyzed after 7 d of storage. Five repetitions were conducted.

One-dimensional extensibility. The test was conducted using the texture analyzer (model TA.XT2i Texture Analyzer, Texture Technologies Corp.). Modulus of deformation (N/mm), rupture force (N) and rupture distance (mm) were recorded.

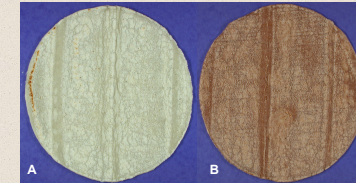
Pliability. A tortilla was squeezed inside the palm of one hand, held for 2 s and then released. A score was assigned utilizing a five-point scale defined where 1 = complete crumbling and 5 = completely pliable (no cracks).

Rollability. Half of a tortilla was rolled around a 1.0 cm dowel. A subjective rollability score on the scale of 1 to 5 (where 1 = unrollable and 5 = rolls without cracking or breaking) was assigned.

## RESULTS AND DISCUSSIONS

Calculated dietary fiber content is increased from 0.5g to 1.59g per serving (serving size 55 g). The calculated antioxidant value per serving is 6725 µmol TE.

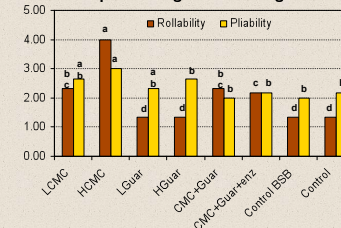
Tortilla appearance was affected by the addition of BSB. The pigments present in the bran stained the masa producing a brown tortilla.



A. Control, B. Control BSB

Tortilla flavor was also affected. A bitter after taste was perceived.

Tortillas added with brown sorghum bran (control BSB) had low rollability and pliability scores, and required a small force to rupture. The bran weakened the structure producing a crumbling tortilla.



Texture properties of tortillas stored 7 d at 4°C; treatments with the same letter are no significantly different

The addition of CMC improved tortilla texture as measured by objective tests, but tortillas were perceived as chewy.

Guar gum addition did not have a positive effect on tortilla texture.

LCMC, CMC+ guar gum, as well as the addition of both hydrocolloids plus maltogenic amylases, produced a tortilla with better rollability than the control and control BSB.

## CONCLUSIONS

The addition of BSB increases tortilla dietary fiber content, and provides antioxidants, but tortilla properties are modified.

The addition of BSB adversely affect tortilla texture. Tortillas do not hold together when rolled/folded. Guar gum was not able to overcome the lack of structure caused by the bran addition. CMC could be a feasible option when used at levels below 0.75. Otherwise, it produces chewiness.