Adios, Corn!

The image of the United States is suffering south of the border due to an increase in prices of staples like tortillas, which have nearly doubled as a result of hoarding and speculation, rising costs of fuel and electricity, and increased ethanol production. In 1998, NAFTA deregulated the corn market, resulting in it becoming controlled by large corporate entities, which now buy as much corn as they are able and resell it at a higher price than they paid. In some cases, these corporations receive subsidies for importing, exporting, and shipping corn between México and the United States. The deregulation and subsequent privatization of the corn and grain market has contributed to severe economic pressure on the people who can afford it the least.

Nearly half of México’s population relies upon corn (in the form of tortillas) as a major source of calories and protein. Any rise in the price of corn has widespread effects upon this population, with the poorest being hardest hit, spending up to one quarter of their wages on tortillas alone. In the United States, corn that would otherwise be available as foodstuffs for México (and for production of food products derived from corn, such as corn syrup, and feed for livestock) has been diverted to meet the growing demand for ethanol.

In response to this growing market change, we explored the potential for substituting alternative grains in the preparation of tortillas and identified the recipes and preparation instructions that would be required for utilizing these replacement grains. We looked at several grains including brown rice, sorghum, millet, kasha, whole wheat, barley, and traditional preparation methods. We investigated traditional preparation techniques both on a web search and by talking to acquaintances who migrated to the United States from México.

The traditional process for making tortillas from dried whole grain corn involves steeping the corn in a solution of hot water and lime. This hot water steep in strong alkaline conditions accomplishes two things. First, it softens the corn kernel for later grinding. Second, it loosens the hull of the corn kernel to facilitate removal prior to grinding. The steeped and dehulled kernels are drained and then stone ground to the consistency of a coarse paste. This paste is then further diluted with water to form a loose batter which can subsequently be worked and formed into a ball, which is then pressed into the traditional shape of a tortilla using a hand-operated press.

For our testing, we used whole grains that were ground into flour on a KitchenAid grain mill and hand sifted using appropriate USS sieves. The batter was prepared using the following ratios:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Flour</td>
<td>46.42%</td>
</tr>
<tr>
<td>Water</td>
<td>53.32%</td>
</tr>
<tr>
<td>Salt</td>
<td>0.26%</td>
</tr>
<tr>
<td>Total</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

The batter is placed on a hot griddle and manipulated by hand and with a spatula until it is slightly firm and dough-like and will retain its shape if formed into a ball.

In traditional Mexican cooking, this partial cooking technique is implemented when raw flours are used to make dough for tortillas, sopes, and other traditional dough-based foods.

For example, the preparation of sopes is a two-step process. First, the dough is cooked on a hot griddle over medium flame, and then the sope is fried in a pan with lard. It is important to note that the partially cooked dough is still malleable after the first cooking step in both sopes and tortillas, and it will withstand reshaping into a final form (the flat tortilla or the biscuit-like sope) before initiating the final cooking step.

To make the tortillas, we took approximately 0.5–1 oz of the partially cooked dough and formed it by hand into a ball. Once formed, the ball was placed on a plastic sheet (cut from a clean plastic Ziploc-type storage bag) and placed onto the tortilla press. We obtained our tin-plated and hand-operated press from a local supermarket. Once pressed and formed, the raw tortilla was transferred rapidly from the plastic sheet to the hand, and then carefully placed on the hot, ungreased griddle (medium-high flame). Each side of the tortilla needs to be seared on the griddle such that each side can be pressed firmly with a metal spatula without the tortilla sticking to it. The tortilla was further cooked until internal pockets of steam were generated, as evidenced by raised pillowing of the tortilla’s generally flat surface. At this point the tortilla was removed from the griddle for serving.

Brown rice made the most acceptable tortillas along with millet and barley. Sorghum also made acceptable tortillas, but the characterizing flavor was too strong to be used as a 1:1 replacement for corn. Brown rice, millet, and barley would make good substitutes in partial replacement of corn, but there would need to be some allowance given for the dilution of the traditional corn flavor. Kasha and whole wheat did not make acceptable tortillas, either by themselves or in combination with corn.

Nutritional comparisons can be found in Tables I and II.

Tables I and II illustrate improved nutritional scores using each of the three alternate grains (millet, barley, and brown rice) either individually or in a blend with corn. These tortillas, prepared as described previously, gave good eating characteristics but were different from the traditional corn tortillas in flavor and appearance. By using these alternative grains in a 50/50 blend...
with corn, variances in flavor and appearance were mitigated somewhat. But, traditions are hard to change. We would not expect such a change to the diet to be welcomed by the population in general. But, if there were an opportunity to reduce dependence on corn for society as a whole, and if the economics of the change were significant, there are alternatives that taste good and are nutritionally equivalent or better.

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An advertisement appeared here in the printed version of the journal.