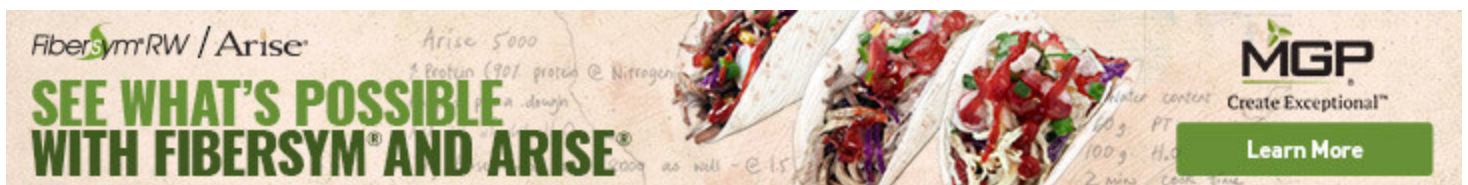


Tortillas & Dough Extensibility

Tortilla production is becoming an exciting space for the baking industry. Bakers are innovating beyond the traditional product to create fresh flavor-added tortillas containing chiles, cilantro, or lime ingredients. Several tortillas use alternative grains for nutritional value addition, such as heirloom corn. Health claims, such as high-fiber, low calorie, low carb, organic or gluten-free, are becoming the norm. These trends are expected to help boost the global tortilla market to about USD 53 billion by 2025.

Ideal tortillas are light in color, opaque, well puffed, soft in texture, flexible without cracking when folded, and have a long shelf life. Flour tortillas are manufactured from wheat dough that is either leavened by steam generated during baking or raised lightly with a small amount of chemical leavening (like baking powder) or by yeast. Corn tortillas, on the other hand, are unleavened and thin products, manufactured using nixtamalization.



Fibersym[®]RW / Arise[®]

Arise 5000
* Protein (90% protein @ Nitrogen)
in dough
as well - e is
100g PT
100g H.S
2 mins Cook time

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Nutritional Facts

Standard nutritional content for wheat flour tortillas and corn tortillas

| Nutritional Facts | Wheat Flour Tortillas (Per 100 g) | Corn Tortillas (Per 100 g) |
|-------------------|-----------------------------------|-------------------------------|
| Energy | 1250 kJ - 1350 kJ (295-325 kcal) | 837 - 1500 kJ (198 -350 kcal) |
| Fat | 5 - 6 g | 2 -3 g |
| Carbohydrates | 51 - 54 g | 38 - 75 g |
| Sugars | 1 - 2 g | 0 -1 g |
| Dietary fiber | 2 - 4 g | 3 - 4 g |
| Protein | 8 - 9 g | 5 - 8 g |
| Salt | 1 - 2 g | 0.2 - 2 g |

QUALITY PARAMETERS

Some key quality parameters for tortilla production include:

- Tortilla dough should be extensible, providing a dough that is machinable
- In case of slackening, a good dough recovery should be achievable in a controlled mixing time
- Good water holding capacity for the dough
- Good rollability scores
- Strong internal structure
- Uniform and homogenous texture



Analyzing Tortilla Overall Quality

A good tortilla should have: ¹

- A large diameter (17-18 cm)
- An opaque (90-100%) and light color (high L* values)
- Well-puffed volume (higher than 1.38 cm³/g specific volumes)
- A good shelf life (14+ days)

Texas A&M University has developed a rollability score method to analyze the quality and shelf life of tortillas.³ The tortillas are rolled and scored on a 5-point scale, with 5 being the highest quality, and 1 being the worst quality. It is a decreasing scale where 5 = no cracking, 4 = signs of cracking but no breaking, 3 = cracking and breaking beginning on the surface, 2 = cracking and breaking imminent on both sides, and 1 = unrollable or breaks easily. The shelf life of the tortilla is the number of days when the tortilla achieves a score of 3 or higher.

Tortilla quality score (TQI) is determined using:¹

$TQI = (\text{opacity} \times \text{rollability score at 12 days storage} \times \text{specific volume})$

Arise 5000, at 1-3% usage in the dough, provides a remarkable shelf life increase to 22-26 days. Additionally, the specific volume of tortilla containing this gliadin-like fortification is higher, resulting in a well-puffed tortilla.



How to improve tortilla quality and add value:

1 Dough Extensibility Improvement

Arise 5000 and Arise 6000 (gliadin-like proteins) improve dough extensibility and pliability. Furthermore, this results in an increase in the diameter of the product. In applications where there is a weak flour, glutenin-like Arise 8000 is a suitable additive to improve dough handling properties. ADA, potassium bromate and ascorbic acid can be used to increase dough strength. However, oxidizing agents reduce the rollability or extensibility of the dough.

2 Shelf-Life Extension

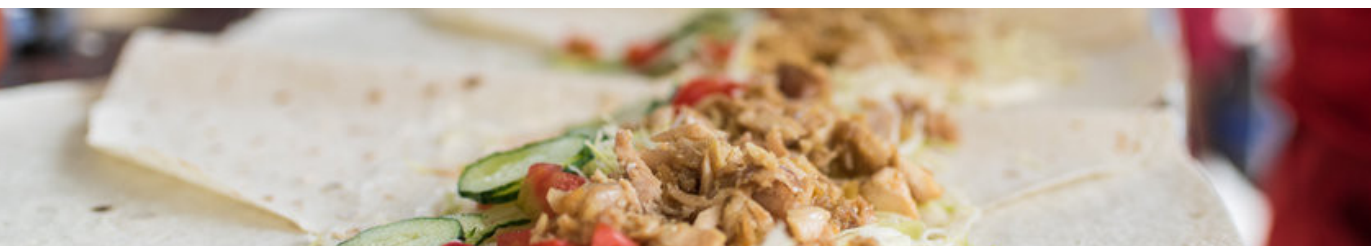
Extensible dough results in pliable tortillas that maintain improved rollability scores over time. As discussed earlier, this resonates in the 5-score rollability method as an extended shelf-life. Using potassium sorbate (10% solution as a spray), calcium propionate, vinegar, and sorbic acid (10% grain) improves the shelf life of tortillas against mold growth. The usage levels should not exceed the FDA guidelines.

3 Zero Net Carb Tortilla

Fibersym® RW resistant wheat starch can be formulated in value-added, specialized tortilla dough. This results in high-protein, low-carb (high fiber) tortilla products.

4 Clean Label with No Sulfites

Imparting dough extensibility and pliability during commercial tortilla production involving clean label ingredients is not easy to accomplish. The most commonly used chemical ingredient for these properties are sulfites. Arise 8100 and Arise 8200 are clean label solutions that do not contain sulfites to improve dough extensibility properties.





How can I improve the softness and shelf-life of my tortillas?

Using gliadin-like proteins in the formulation increases the shelf life and softness of the tortillas. A standard tortilla usually has a specific volume of 1.4 cm³/g. Some studies show that using a 3% gliadin-like protein source (such as Arise 5000) can increase its specific volume to 1.60 cm³/g, making the tortilla softer.

A good quality tortilla should have a 14-day shelf life when measured with the 5-point rollability score method as mentioned above. Addition of gliadin-like proteins (Arise wheat protein isolates) to tortilla flour increases the shelf life significantly. Arise 5000 or Arise 6000 is a wheat protein isolate that does not only increase the tortilla softness but simultaneously, it also increases the product shelf life. High vital wheat gluten addition results in a smaller tortilla diameter due to increased dough strength or increased resistance of the dough to extension.^{2,4}



Our tortillas crack when stretched, and break after 3 days. How can we improve the quality?

You should start by using flours (milled from hard red winter wheat) developed for bread with moderate protein quality and dough strength. In addition, the use of 3% gliadin-like proteins like Arise 5000 may give you a softer tortilla with an increased shelf life. Depending on the gliadin-like protein concentration used, this product may not exhibit cracking for over 20 days.



“What is the standard water activity and moisture content for flour tortillas?”

Tortillas have a moisture content of 32-33% with a pH of 5.2-5.3.^{3,4} They have a high water activity of 0.97-0.98 which indicates a highly favorable environment for mold growth. Mold inhibitors, as mentioned earlier, can be used to control mold growth.⁵

References

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Arise 5000
Protein (90% protein @ Nitrogen)
water content

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