



COMBATING TORTILLA STICKINESS

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ANDREW HABIGER, SCIENTIST,
BAKERY APPLICATIONS

Top 3 challenges for flour tortillas



Staling

- Firm/Dry
- Loss of flexibility and rollability



Stickiness

- Tearing and peeling



Mold growth

Tortilla Suave

Anti-staling – flour tortillas

Similar mechanism to bread – starch retrogradation

Formula and process vary widely compared to bread/buns

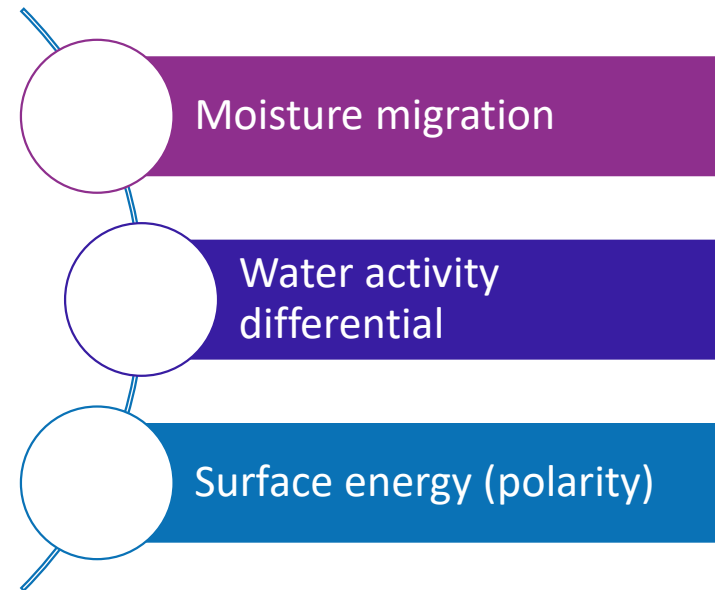
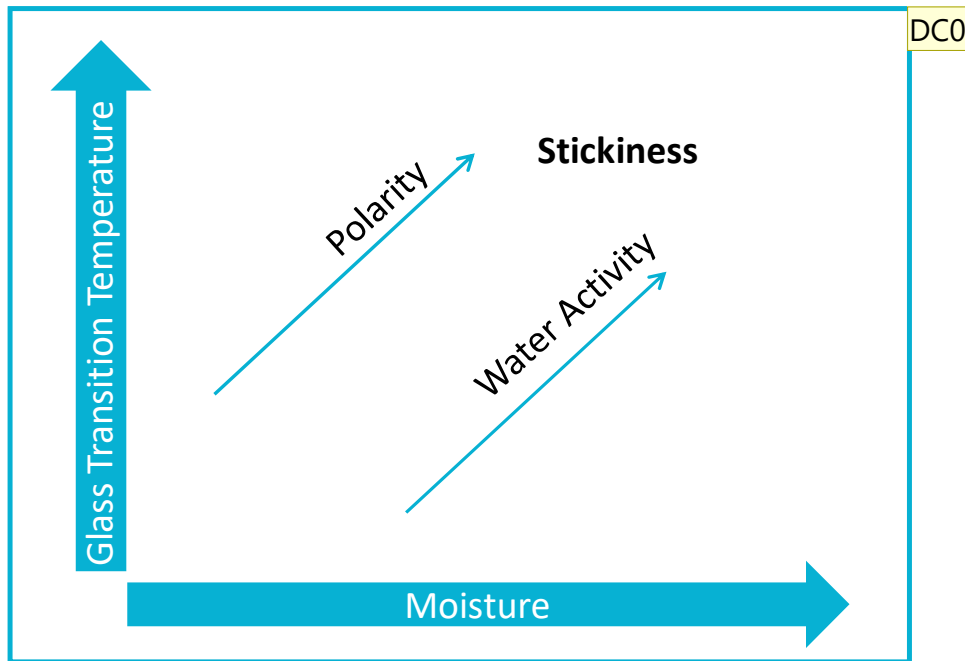
Short baking time = short window for enzymes to function

Anti-stick and staling are correlated issues

****Corbion offers solutions to all problems***

Understanding tortilla stickiness

Theory: moisture migration leads to water bridges across tortillas creating a bond between tortillas



Slide 4

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Did you hear back on if we have to share a PPT version? If so, using Jesse's suggestion of making graphs into images would reduce chances of editing

Dickie, Carrie, 2024-09-19T21:32:33.717

Basics of formulation and how they impact sticking



Type of Fat

- **Hard fats** set up after post bake and can act more rigid while creating a better surface crust, fighting against sticking
- **Liquid fats** produce a more flexible translucent tortilla and have shown to increase sticking due to increased surface adhesion



Quality Flour

Weak flour provides little resistance to tearing and increases chances for overmixing



Leavening

Higher leavening can tenderize a tortilla and contribute to pillowing/blistering



Mix Reducers

Mix reducers are often necessary for processing but can increase sticking due to weakening the dough



Sugar

Sugar is hygroscopic and acts as a tenderizer, both factors working to increase stickiness

Basic formula solutions



- **Lower moisture content** - The less water present in the tortilla's the less water that is available to create bonds.

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- Cut water in formula
- Change oven

- **Optimize the formula** – formulated for the desired type of tortilla, while also considering the effect formula changes can have on sticking

- Higher levels of fat – dilute protein
- Increased gluten – strength
- Gums

Slide 6

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Does there need to be a ","?

Dickie, Carrie, 2024-09-19T21:33:17.413

Processing solutions



- **Avoid pillowing** – Baking the top and bottom of the tortillas together
 - More present on toast points
 - Slow the oven and reduce the heat
- **Product cooling** – condensation
 - Ensure adequate cooling time and relative humidity control
- **Rapid temperature shifts** – cooling line, to packaging, to truck
 - Rule of +/- 10

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Do you mean "fusing"?

Dickie, Carrie, 2024-09-19T21:34:05.166

Anti-stick technology

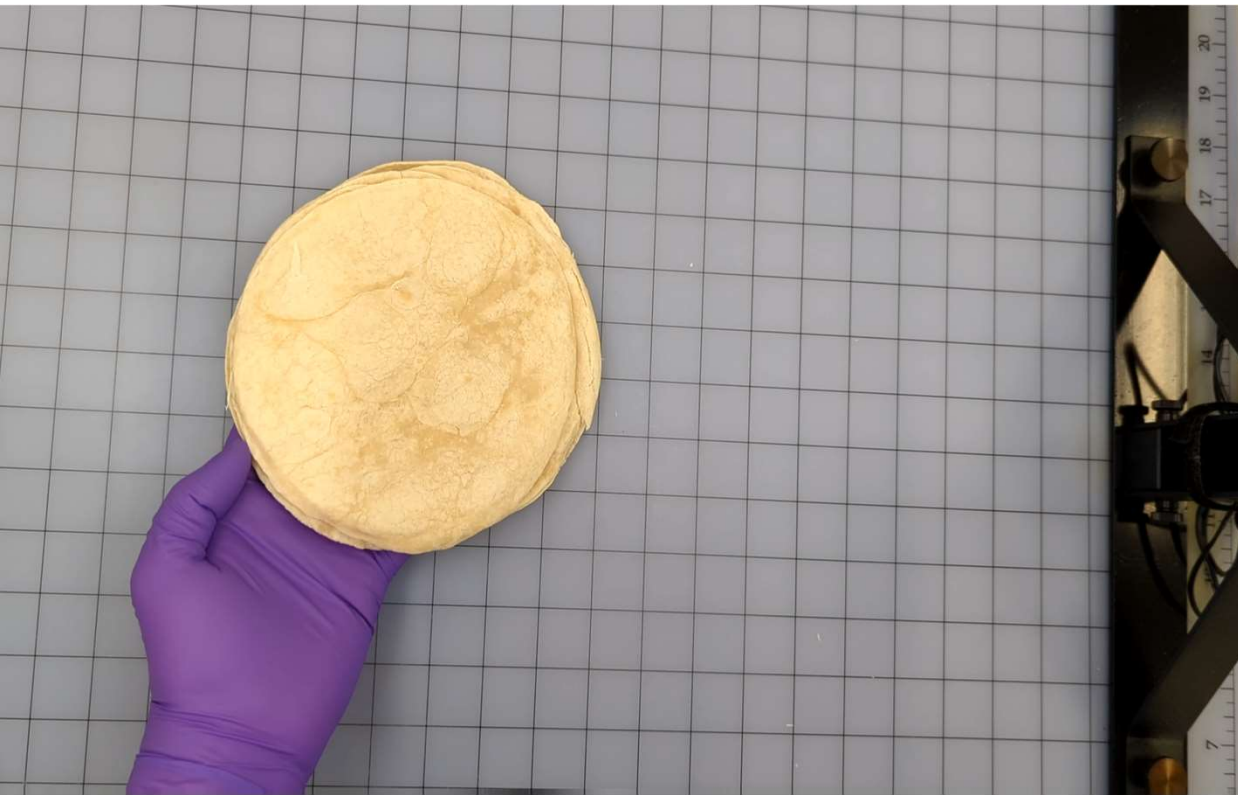
Emulsifiers

- Helps to create a “barrier” between tortillas that stops water bonding
 - Reduces number of interaction sites that happen across the tortilla face
 - Slow water permeation across the molecules
- Not all emulsifiers are created equal
 - Specially created emulsifier solutions help to create the effective barrier for anti-stick properties

Clean label solutions



Measuring the effectiveness



Adhesion test:

- Taking tortillas and pulling them apart with a consistent single motion

Standard shelf life vs accelerated:

- Tortillas have a long shelf life
- Standard shelf life testing with standard pressure
- Accelerated testing with higher pressure

Measuring the effectiveness continued



Stress Test:

- Introducing more factors into testing environment for further accelerated results

Analytical testing:

- Texture analysis
- Angle of diffraction measurement

Corbion's tortilla solutions

**Tortilla
Suave**

Anti-staling
solution

Anti-stick
solution

**Tortilla
Suave CL**

Anti-staling
solution

Clean Label
anti-stick
solution

**Tortilla Stick
No Mas**

Gums

Anti-Stick
solution ++



Corbion

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