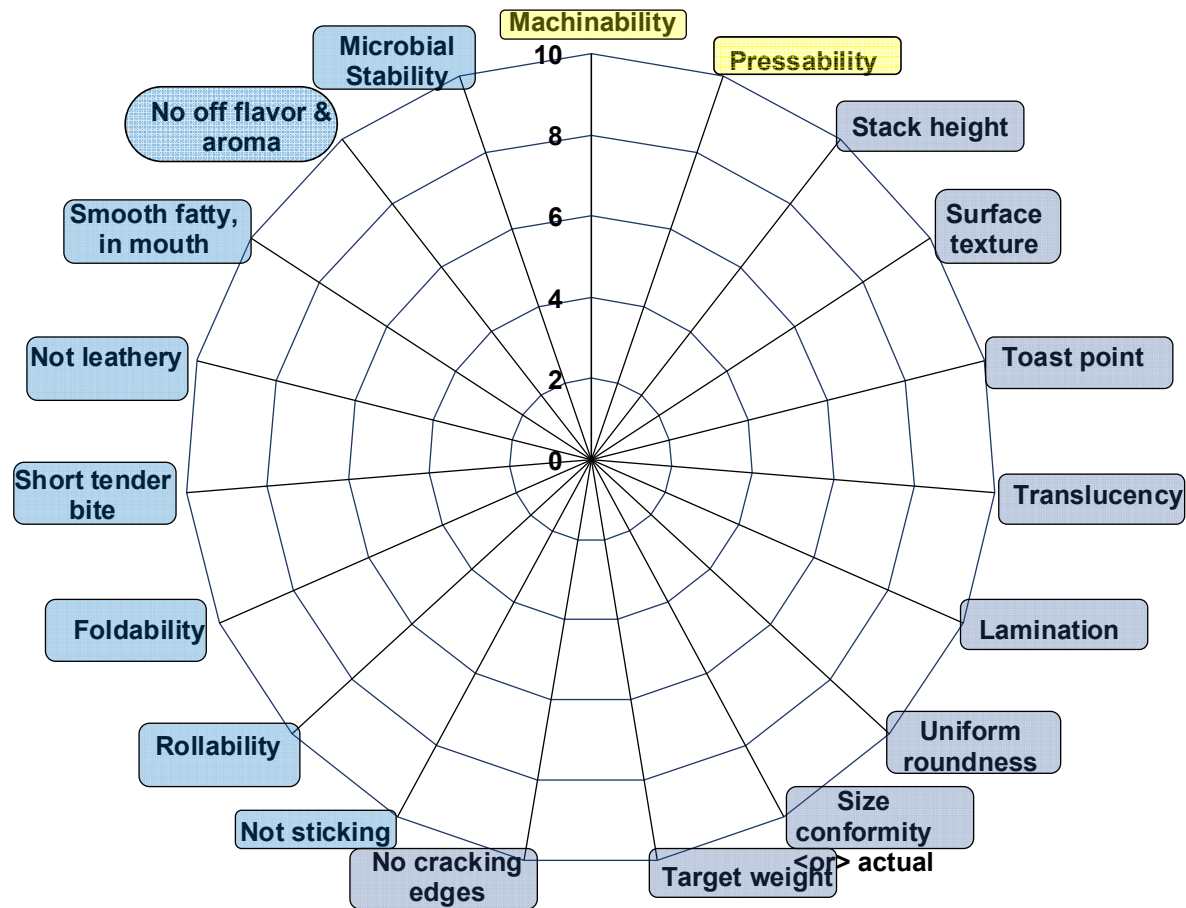


# Identifying and Fixing Tortilla Problems

Steve Bright VP R&D, Quality  
Mesa Foods



# Identifying Areas for Improvement



# Troubleshooting Tortillas

Sticking

Toast Points

Edges

Shapes

Staling

Rollability / Foldability

Mouthfeel



# Sticking – Package

Sticking Defined:

Two or more tortillas that will not separate from each other without tearing or ripping after being packaged for any period of time.

Sticking can be caused by several factors

Process

Ingredients

Formulation.

# Sticking - Press Setup

Dry, stiff doughs require increased pressure, dwell time and temperature to obtain correct sizes

- ✗ gelatinizes (cooks) starch, sets structure
- ✗ activates all leavening
  - creates top and bottom **crust** which holds in steam increasing the likelihood of pillowing (puffing)

Ideal press settings

- ✓ dwell time =  $\sim 1.3$  seconds  $\pm 0.2$
- ✓ pressure =  $\sim 1000$  psi  $\pm 200$
- ✓ temperature =  $\sim 375 / 400 \pm 25^{\circ}\text{F}$

# Sticking - Baking Profile

Under baking  
Excess residual moisture  
Insufficient surface drying



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- Over baking - creates pillowing or puffing
  - top -thin crust separates from thick -bottom crust
  - thin crust and blisters are weak
    - ✗ tear and flake

# Over baking



# Over baking + Zippering





# Sticking

## Cooling room



Purpose of the cool down is to fully prepare the tortilla for packaging, transportation and storage

Typical cooler conditions

cool and **HUMID**, 35 - 40°F @**80%+RH**

*Room is cool and wet causing mist / dew / fog to condense back on the tortilla*

Cooler conditions must be adjusted to obtain:

Tortilla pack temperature +/- 10°F package room

Humidity < 60%RH – **critical**



# Sticking - Packaging

Minimize temperature shifts after packaging

promotes moisture migration

*80°F packing into case*

*50 -100°F warehouse temperature*

*20 - 140°F truck shipping temperature winter / summer*

*70°F grocery store temperature*

*40°F consumer refrigeration*

Avoid excessive compression

over-packing

excessive weight

# Sticking -Ingredient causes

## Flour - weak flour

- poor gluten quality, although quantity may be available
- translates to:
  - poor dough process tolerance
  - weak baked film formation
  - poor resistance to compression

## Strong Flour

- enhances pillowing
- gas retention*

# Sticking - Reducing Agents

L-Cysteine and sodium metabisulfite

- greater extensibility in the dough
  - higher levels (>60ppm) lead to weak protein and crust resilience.
  - Increases the occurrence of sticking
- 
- Obtain dough consistency through
    - full mix development
    - Optimizing flour to water ratio

# Sticking -Fat, Sugar

Tenderizers:

FAT

- As fat % increases, protein is diluted.
- Use higher melt point fats
  - *higher solids at room temperature*
- Liquid oils remain liquid at room temperature
  - *enhances surface adhesion*

SUGAR

- As sugar increases, hygroscopicity increases
  - *increases stickiness and tenderness.*
  - *Dextrose, glucose, fructose and lactose are hygroscopic*

# Sticking -Water

## Case Study

Tortilla plant ran water trials from 55% - 43%

*Still had sticking at 43%*

Its not the quantity of water that's the problem

Water is both a strengthener and a tenderizer

Hydrates protein

Temperature is critical to rate of hydration

*Cooler = cold, dry, tight dough*

*Warmer = Sticky, extensible doughs*

Water hardness+ 200ppm = tough doughs (mix,  
reducing agents)

*< 50ppm = slack, sticky doughs*



# Toast Points

Tortilla Troubleshooting



# Toast Points

- ✓ Balance of:
  - ✓ *Bake Time*
  - ✓ *Zone Temperature*
  - ✓ *Flame height*
  - ✓ *Balance high fire / low fire gas pressure*
  - ✓ *Dough ball size to weight ratio*
  - ✓ *Fat level*



# Toast Points

## Bake Time

1. 25 – 35 seconds
2. Typically try to run hotter faster
3. Lower dough weight to tortilla size ratio = bake faster
  - 28g 8" Tortilla bake at 25 seconds @ 425°F
  - 38g 8" tortilla bake at 30 seconds @ 425°F

# Toast Points

## Zone Temperature

1. Top belt usually 20 - 40 °F less than the middle
  - Middle is the face and most visible in package or wrap
2. Bottom belt is set to lowest setting or turned off
  - Too much heat on bottom belt leads to pillowing

# Toast Points

## Fat Level

1. High fat levels = bake faster
  - Better heat transfer
2. Lower fat levels = bake slower
  - Less efficient heat transfer



# Size and shape

Tortilla Troubleshooting



# Tortilla Size and shapes

Tortillas too small

Strong flour = elastic

Under mixed = elastic

Under hydrated = dry, elastic

Cold dough = elastic

Under scaling = insufficient mass / pressure

Excessive floor time after mixing / dough frequency

*3 doughs per hour is the minimum rate*

*fresh dough every 20 minutes*

= / > than 30 minutes per dough will cause the last part of the dough to become dry

Poor press set up

Oven shrinkage

*Protein elasticity, insufficient press energy imparted to dough*

# Sizes

## Large

Overly extensible dough

Flour quality

Protein quantity / quality

Over mixing

Hot dough\*

High levels reducing agents

Press – too severe

*Excessive dwell time, pressure*

High fat levels >12%

Over hydration

Over scaling



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# Edges

Brittle, flaky

Curling of the dough out of the press  
into the oven

*Cupping caused by large temperature  
differential between top and bottom plates  
>25°F*

*Typically top plate hotter than bottom*

Facilitates release

Facilitates transfer

Curled edges expose more surface  
area to heat

*Creating toasted edges leading to dry,  
brittle flaky edges*



# Edges

## Lacing

Caused by excessive cooking, structure of the dough is set prior to obtaining the desired size

Dough is cooked in the press, protein and starch are denatured preventing further mobility, before it gets to the final size

*Elastic dough*

*Under hydrated*

*Under mixed*

*Low reducing agents*







# Consumer – organoleptic

Troubleshooting



# Rollability / Foldability

Staling

Starch retrogradation

Over baking

Damaging starch protein

Lean Formula

Lower fat, sugar, gums and emulsifiers



# Mouthfeel, bite

## ✓ Short tender bite

Established by formula and process

### *Lamination*

From leavening

Not over pressed – pressure, dwell time, temperature



## X Leathery, tough bite

### *High translucency*

Insufficient leavening

Hot press

Extended press dwell times

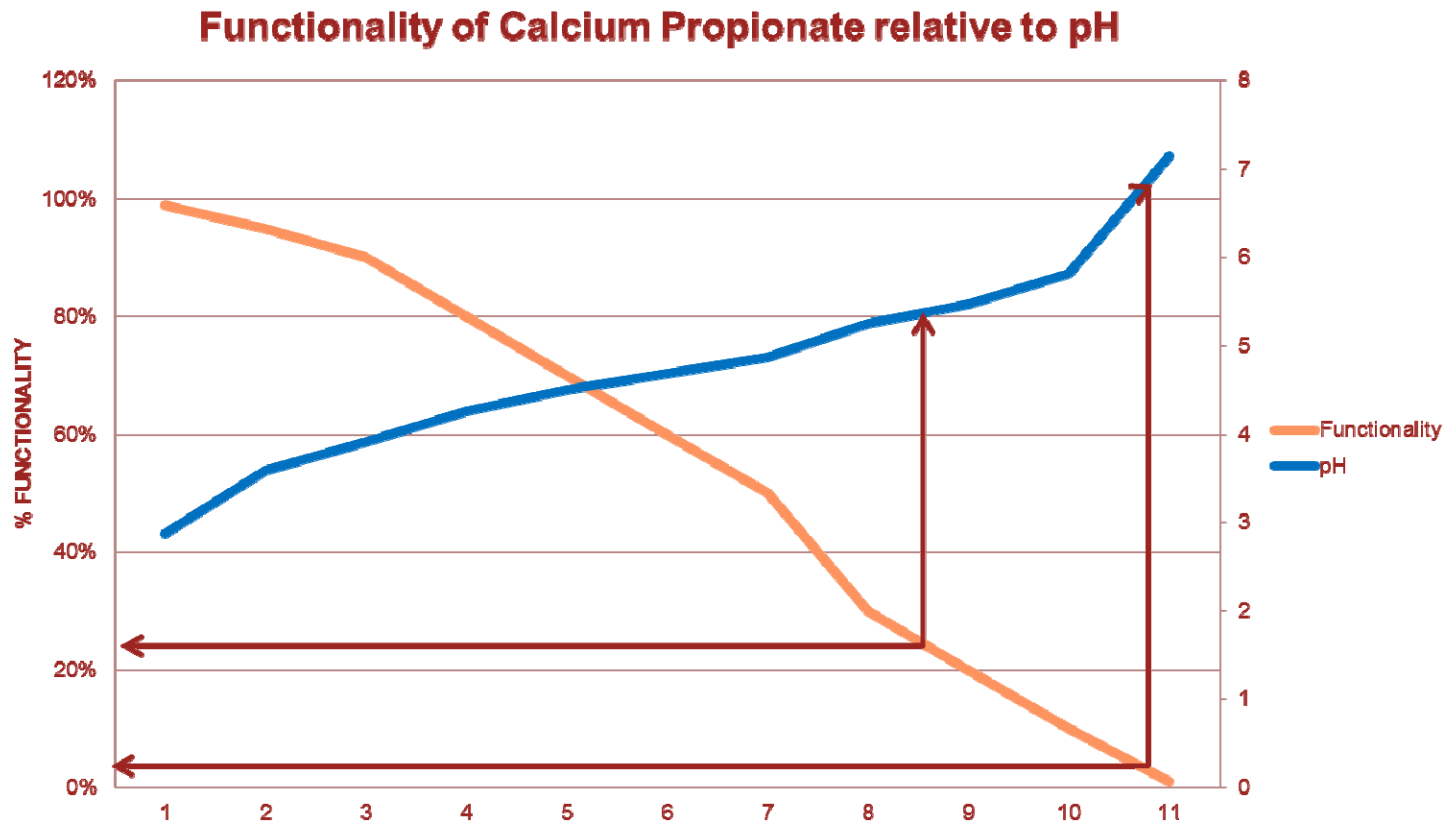


# Microbial Stability

Balance between:  
Shelf life expectations  
pH  
Preservatives  
Homogenized ingredients



# Microbial stability





Thank You.

Questions?

