# *Flour Tortilla Processing Parameters Effects on Finished Tortilla Properties*

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# Flour Tortilla Process- Mixing – “ALCHEMY”

Mixing establishes the quality of the finished product.

Mixing time is established by:

- optimum development of the dough
- temperature at which the dough exits the mixer
- quantity of water
- quality of the flour

TEAM -Management, QC, Production need to agree on:

- dough development, dough temperature
- mix time
- absorption

Based on flour changes, adjustments are necessary but should be agreed to by the team

# Flour Tortilla Process- Mixing

Mixing establishes the quality of the dough

The quality of the dough affects every part of the tortilla process

Poor quality or inconsistent doughs will:

- Negatively impact the quality and consistency of the finished product
- Increase waste at the vision system incurring increased costs

# Flour Tortilla Process- Mixing

In order to go forward - we must go backward and review two key elements affecting mixing:

1. Formulation

2. Ingredients

# Flour Tortilla Process- FORMULATION

A successful tortilla formula is established between the formulator, the manufacturing facility and the end user or customer.

- The facility must be able to make the product consistently to satisfy the customer
- A successful facility has minimal or similar formulations using common ingredients

Proliferation of formulas and ingredients increases complexity and costs increasing the potential for errors

# Flour Tortilla Process- INGREDIENTS

A successful tortilla facility uses high quality, consistent ingredients

- Great care should be taken when switching ingredients
  - Flour will vary from suppliers in different regions of the country
  - Baking powder is a general term for leavening systems comprising hundreds of different reaction rates, most are similar but not all….Europe is moving away from traditional chemical leavening systems.
  - Enzymes – typically compounded and no two are identical.
  - Emulsifiers have a significant impact on processing and finished quality
  - Preservatives and acidulants – concentrations and solubility

# Incorrect Mold Inhibitors

# Tortilla Process

Mix
Divide
Round
Proof / Equilibrate
Press
Bake
Cool
Pack

# Effect of Dough Quality

- Poorly formulated doughs
- Cheap ingredients
- Improper mixing – time, temperature, hydration

- ALL THE ABOVE WILL CAUSE THE DOUGH TO BE INCONSISTENT

# Dough that is too dry / cold

- ELASTIC, TOUGH, SPRINGY, DRY – leads to:
- Translucent tortillas
- Small tortillas
- Under / over weight tortillas
- Out of round tortillas
- Rough edges on tortillas
- Pillowing of tortillas in the oven
- Leathery tortillas
- Tortillas that may crack or break

# Dough that is too dry –WHY?

➢Dry stiff dough is not malleable and will not flow. Dough flow is critical:

1. At the divider rounder
    1. Divider - Dough needs to flow to fill the void when the divider piston creates a vacuum, causes underweights because the void is not full of dough
    2. Rounder – Doughball should be soft enough to accept the rounding of the drum / sleeve so that it is a perfect sphere

2. At the press
    1. Dough too stiff will require extra temperature, pre ime to get the correct size
    2. Impact is that the dough is cooked in the press losing softness and shelf life
    3. Rough edges are formed
    4. Tortillas will be small and misshapen if the press is not adjusted

# Dry Dough and Rough Edges

# Dough that is too wet or sticky?

➢Wet or sticky dough is too malleable and will flow too much causing sticking. Dough flow is critical:

1. At the divider rounder
    1. Divider - Dough could stick to the pistons, small pieces of dough can ooze past a damaged piston eventually damaging Teflon belts.
    2. Rounder – Doughball can stick to the sleeve causing doubles
    3. Proofer – dough can stick in proofer cups causing doubles
2. At the press
    1. Doughballs will flow too much causing large sizes and flat edges
    2. Poor transfers, stick to star roller
    3. Tortillas will be large and misshapen if the press is not adjusted

# Proof

A process whereby the dough balls rest and becomes less elastic and more pliable allowing for more consistent press characteristics.

- Typically 5 to 10 min.'s
- Heat and humidity added (60%RH ~80F) by equipment manufacturers

Dry Proof or long proofing

- crust formation

Wet Proof

- sticking in cups and press

# Oven - baking

➢Review oven as a separate function

- Regardless of the quality or character of the dough, oven parameters are adjusted separately to give a desired finished quality

# Oven

Tortilla ovens are designed to impart a great amount of heat in a very short period of time.

Heat is transferred through conduction or direct contact

- metal belt is directly heated by direct gas flame
- bakes and toasts the tortilla by direct contact of the tortilla on the superheated belt surface.

# Bake

Belt type affects quality of the tortilla

Slatted belt

- less drying of the tortilla
- more conductive heating

Mesh band or CB5 band

- open weave allows heat to dissipate faster, drying the tortilla surface.
- characteristic “chicken scratch” toast marks

# Bake - Pillowing

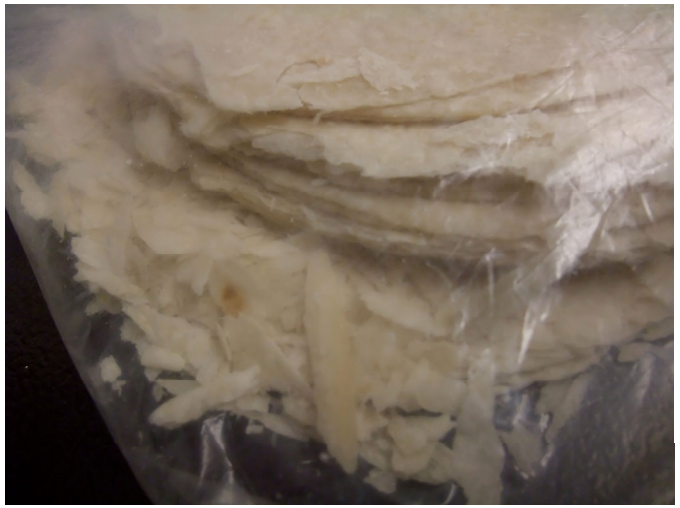
Overbaking will cause tortillas to puff or pillow due to water converting to steam at 212F or 100C

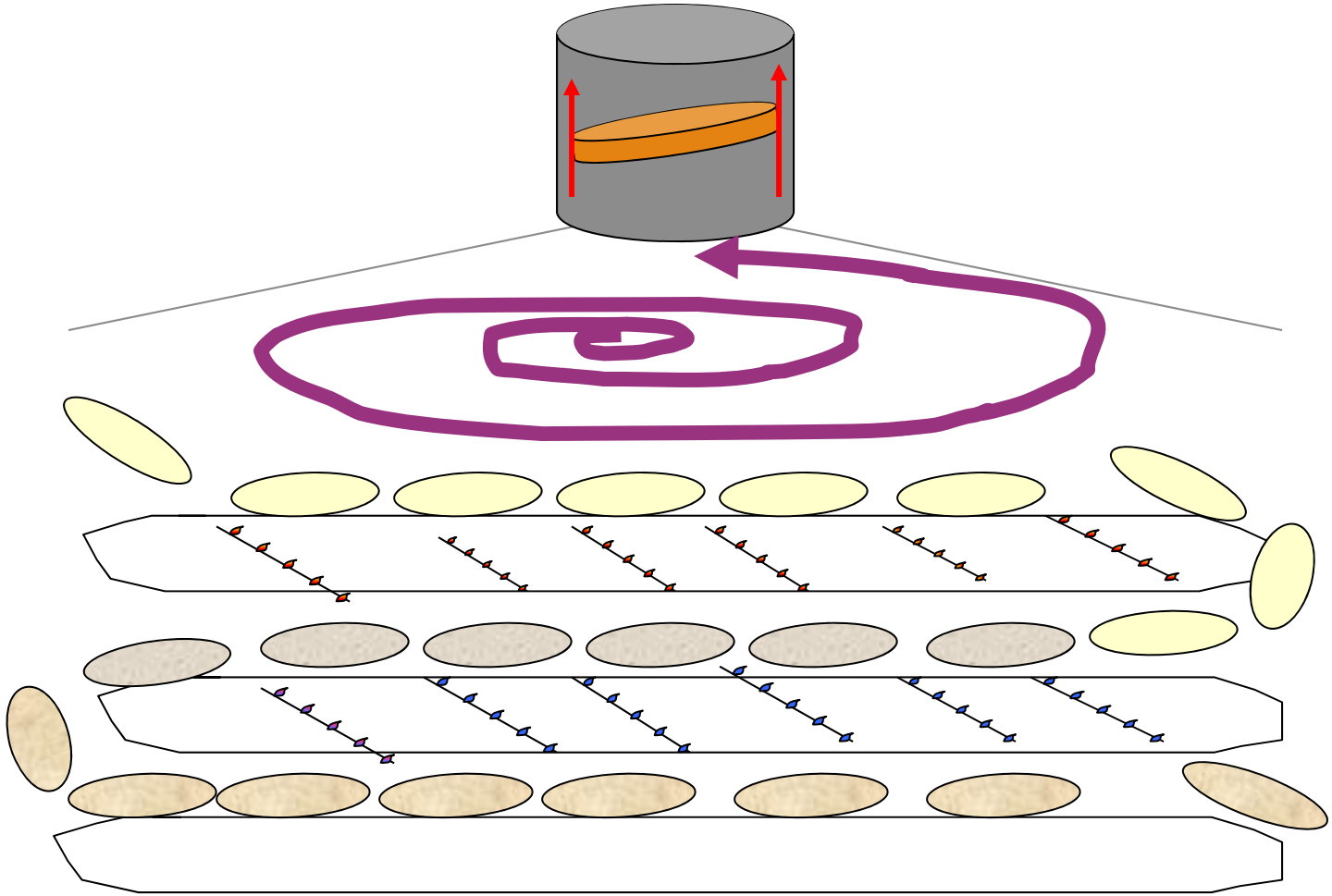
Pillowing causes weak tortillas regardless of the formulation or quality of ingredients used.

Pillowed tortillas will become fragile, crack or break.

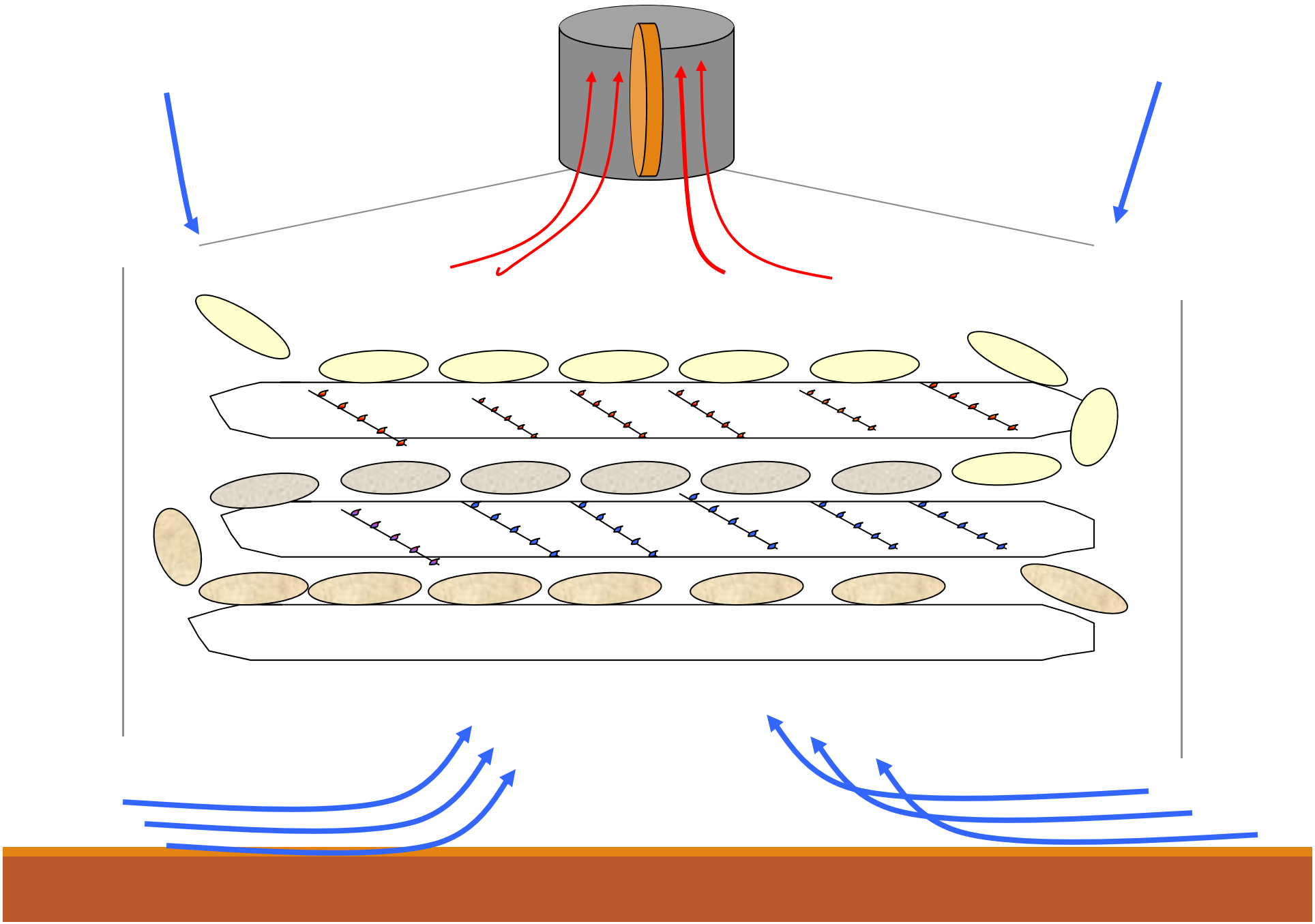
They will be tough and leathery.

# Pillowing –Quality Issues





Negative air pressure increases humidity in the baking chamber as well as increases the latent heat (convective and radiant). Causes pillowing and increases surface moisture



# Cooling Cycle – Cooling Room

- Purpose of cool down is to fully prepare the tortilla for packaging
  - Firms the starch adding strength.
  - Allows moisture to homogenize in the tortilla
- Typical cool room conditions
  - cool and HUMID, 40°F @80%+RH

**Creates sticking due to high moisture on the surface of the tortilla.**

Cooler conditions adjusted to obtain:

- tortilla pack temperature +/- 10°F package room, warehouse temperature (<100°F)
- Humidity < 60%RH – critical

# Packaging

Minimize temperature shifts

- Temperature changes promotes moisture migration
- even under frozen conditions, ice crystals will increase and become larger.

Avoid excessive compression

- over-packing
- excessive weight

Hot packages of tortillas will compress easier because the starch is still malleable –gelatinized.

# Thank You For Your Attention