



# Flatbread feeds the world

Variety and flour treatment

# Overview: Flatbread



Flatbreads are made all over the World.

Highly heterogenous market  
→ 200 types of flatbread

In Middle Eastern, African & Asian countries, flatbreads are widespread and are becoming increasingly popular globally.

Relatively cheap

→ low final consumer price,  
→ subsidised in some markets

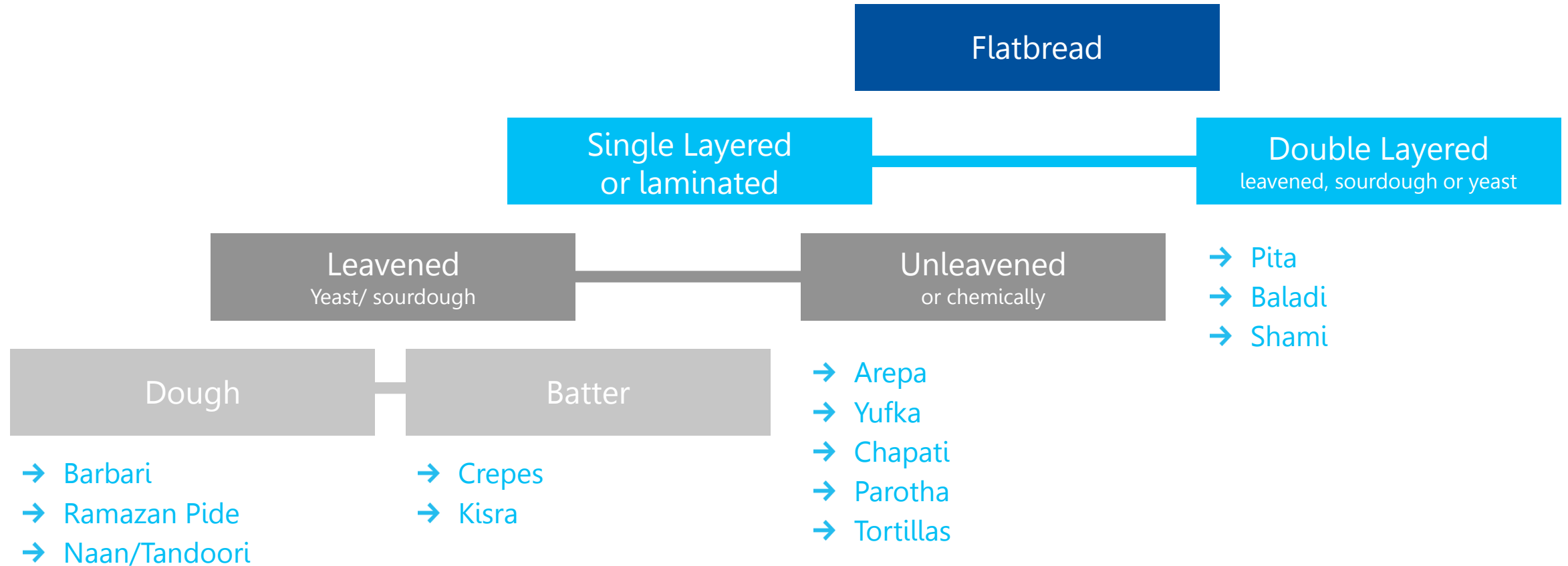
High baking temperature  
and short baking time.

Freshly baked flatbreads are soft and elastic. When kept at room temperature they stale within few hours and become hard and tough.

Low specific volumes,  
but higher crust and crumb  
ratio than pan bread.

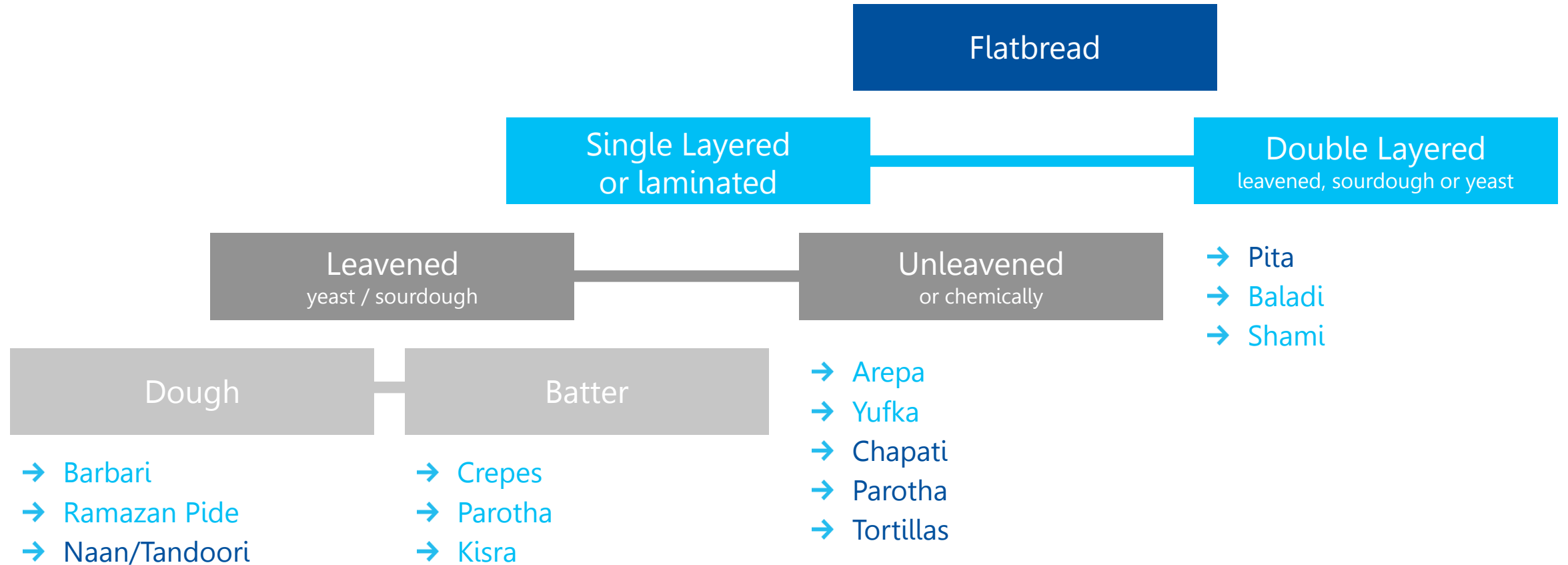


# Categorization of Flatbreads



Source: Qarooni (1996)

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# Flour Quality Range for Flatbread

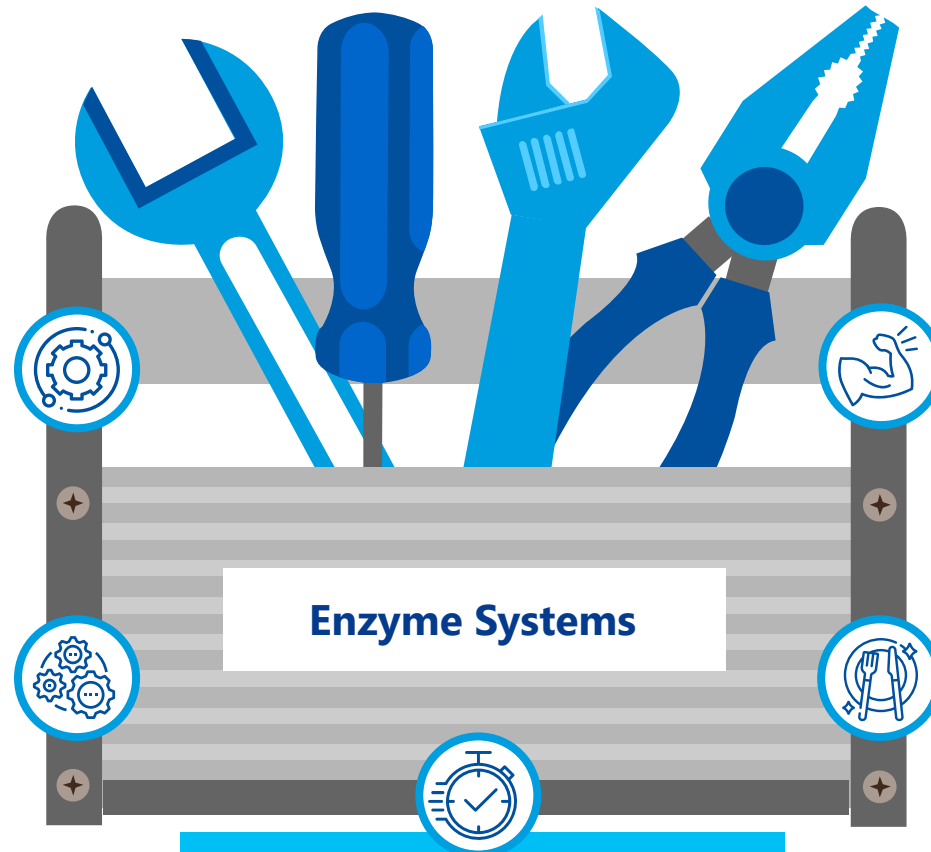
Flour quality – as diverse as flatbread						
Property	Dim.	Arabic Pita Flatbread	Chapatti/Roti	Naan (Tandoori)	Paratha	Tortilla
Ash	%	0.7 – 1.1	0.5 – 1.5	0.5 – 1.0	0.4 – 1.1	0.5 – 0.6
Protein	%	9.5 – 12.5	8 – 11 (whole wheat)	11 – 13.5	10.5 – 13	10. – 11
Wet Gluten	%	23 – 28	22-26	25 – 30	27-30	30
Falling Number	S	300 – 450	300 – 400	350 – 500	350 – 550	350
Alveograph P/L	-	0.5 – 1.0	0.4 – 1.0	0.7 – 1.5	0.4 – 1.0	0.7
Alveograph W	10 <sup>-4J</sup>	180 – 280	180 – 300	220 – 350	180 – 300	280

Regional specialties >> Depending on the region, flours with other specifications are also used

# Enzymes for Flatbread Flour Improvement

Improve the processing properties of the dough

Can be used to correct rheological flour parameters



Prolong the duration of softness and foldability

Can be used to strengthen or soften the dough

Improve the appearance and the eating properties

# Arabic Flatbread: Quality Requirements



E.g. for Arabic bread, baladi, pita, Lebanese bread, kubus, khubz, خبز

Fermentation tolerance/  
dough stability



Industrialized process,  
machinability of the dough/  
sheetability



Soft texture and regular  
brown surface



Baking at 450°C approx. 7seconds

# Enzymes for Arabic Bread

## Properties and effects

### Amylases

- Fermentation
- Flavour and colour formation
- Dough handling properties/ extensibility: release of water from starch > gluten softening
- Eating properties: crumb more "juicy"
- Duration of softness (shelf-life) > rollability

### Proteases

- Useful in case of very short gluten structures
- May limit the flexibility of the final product
- L-cysteine is an alternative for gluten softening > only weakens the interaction of the protein chains, not their strength.

### Glucose Oxidases

- Stabilization of dough pieces
- Drying of dough surfaces > reduced stickiness
- Increasing effect upon resting time
- May affect the diameter of the bread

### Lipoxygenase

- Comes as enzyme active (soy-) bean flour
- Improves whiteness of the crumb
- Enhances eating properties (shorter bite)



# Tandoor Bread: Quality Requirements



In **Middle East/ India**, it is known as Naan Bread; in **CIS** it is a yeast raised thick flatbread

Tandoor Bread is usually produced manually

ME: Dough has to be stable > 12 hr.

CIS: Process up to 4 hr



ME Tandoor: Leavened with soda/ yeast

CIS Tandoor: Yeast raised



The dough should not be too moist, as water steam could cause the bread to fall off too early.



CIS Tandoor



Middle East Tandoor



# Enzymes for Tandoor Bread

## Properties and effects

### CIS Region: Tandoor Bread

#### Hemicellulase and Amylase

- As basic treatment

#### Alpha-Amylase

- Water release improves extensibility
- Partial starch break-down retards staling

#### Hemicellulase

- Water release improves extensibility
- Partial starch break-down retards staling

### Middle East Region: Tandoor Bread

#### Glucose Oxidase and Lipase

- As dough stabilizers

#### Glucose Oxidase

- Increase water absorption
- Result in dryer dough surfaces and hence better handling properties
- Improve dough stability

#### Lipase

- Enhances dough stability
- Improves softness after baking
- Brightens the dough

# Paratha: Quality Requirements

Paroatha, parotta, porotta, parontay, palata, farata

Bread must be well layered and easy to break, without being crumbly



Manual process – therefore good extensibility is required



Butter, fat or oil separates layers



→ Paroatha: unleavened bread – mainly made from maida flour, sometimes from whole meal flour

# Enzymes for Parathas

## Properties and effects

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### Alpha-Amylase and Hemicellulase

- Due to the prolonged resting time at unfavourable conditions, these enzymes are added in low dosages only to flour for parathas, since they could cause excessive softening and stickiness when overdosed

### Proteases

- Useful for good extensibility
- In combination with L-cysteine good sheeting properties can be reached
- Added in lower dosages

### Lipase and Glucose Oxidase

- Stabilization of dough pieces for long resting times
- Risk for off-flavour formation with butter or oil is small because the fat is added only after dough resting

# Chapati: Quality Requirements



Chapatti, shabaati, safati, roti, poori, phulka

Made from high extraction rate flour, whole wheat flour (atta)



Flexible, but strong enough for folding. Softness and duration of freshness of the bread



Butter, fat or oil separates layers



Indian Roti

# Enzymes for Chapati

## Properties and effects

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### Amylases

- Mainly added for browning
- Especially glucoamylase is preferred
- Fungal amylases degrade the starch leading to improved fresh keeping

### Proteases

- Fungal proteases in lower dosages improve extensibility without causing stickiness
- Support the maillard reaction and enhance browning

### Hemicellulases

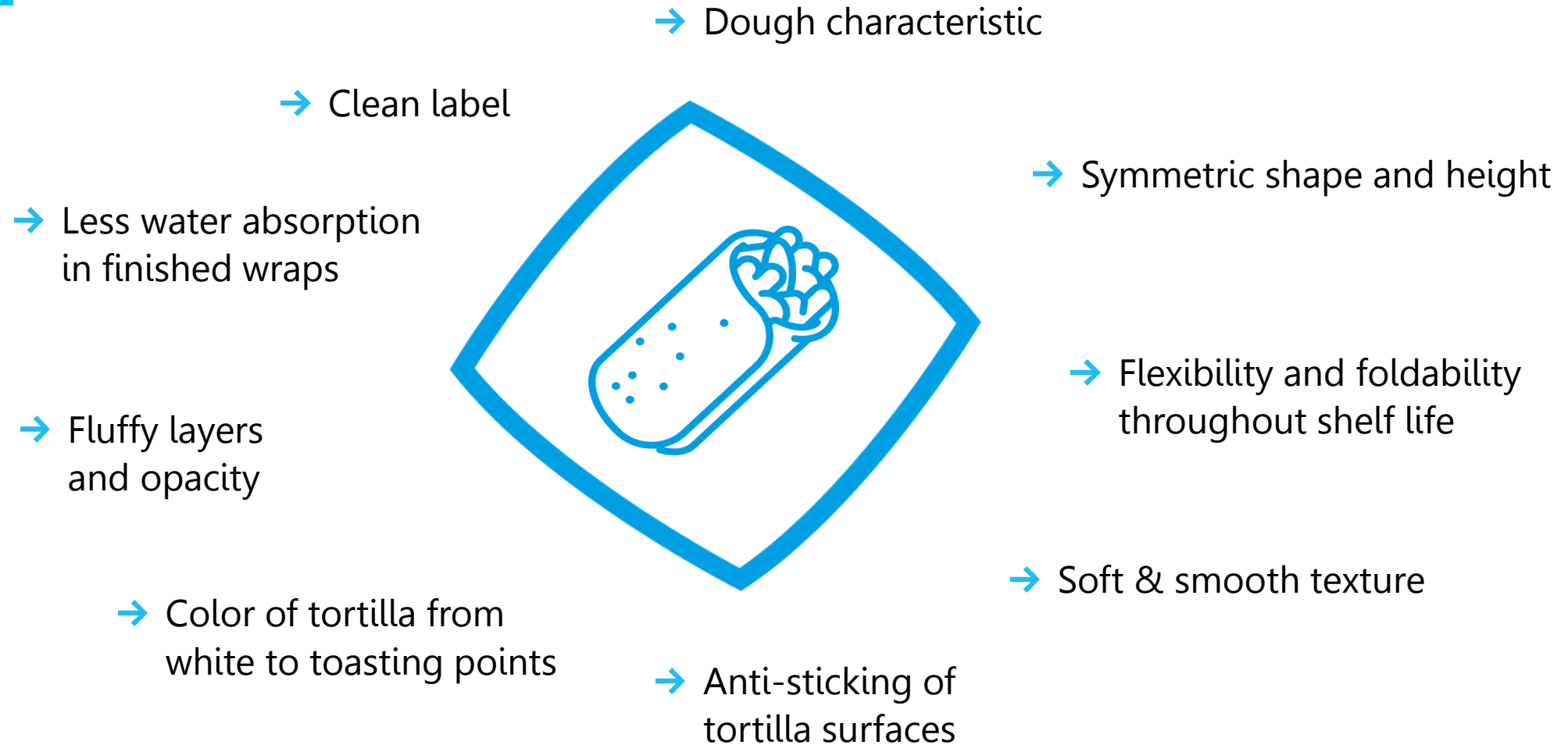
- Mainly fungal hemicellulases are used for sheeting improvement
- Hemicellulases can have an impact on fresh keeping and bite characteristics



# Tortilla

# Quality Requirements of Wheat Tortilla

## Customer's requests





# Tortilla

## Challenges and solutions

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Reduction of elasticity



Increasing extensibility



Reduction of stickiness



Improving foldability

Tortilla fresh keeping  
comparison after 4 weeks  
storage

# Enzymes for Wheat Tortillas

## Properties and effects

### Protease

- Elastic > plastic dough properties

### Lipase

- Volume yield is not required
- However, triacyl lipase supports bleaching by lipoxygenase (intrinsic or added)

### Lipoxygenase

- From enzyme active (soy-) bean flour
- Improves whiteness

### Glucose Oxidase

- Reduction of stickiness after baking

### Hemicellulase

- Releases water from pentosans > improves extensibility
- Effects gluten crosslinking with pentosans > improves duration of flexibility

### Maltogenic Alpha-Amylase

- Prolongs shelf-life more efficiently than standard alpha-amylase
- Doesn't affect processing properties, bread structure or appearance
- Responds to market requirement.

# How can we help you?

## Get in touch with us!



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