



General Mills
FOODSERVICE



Pizza Crust Boot Camp™

Presented by Tom Santos and Curt Wagner



Video: [The Heritage of All Trumps™ Pizza Dough and Flour](#)



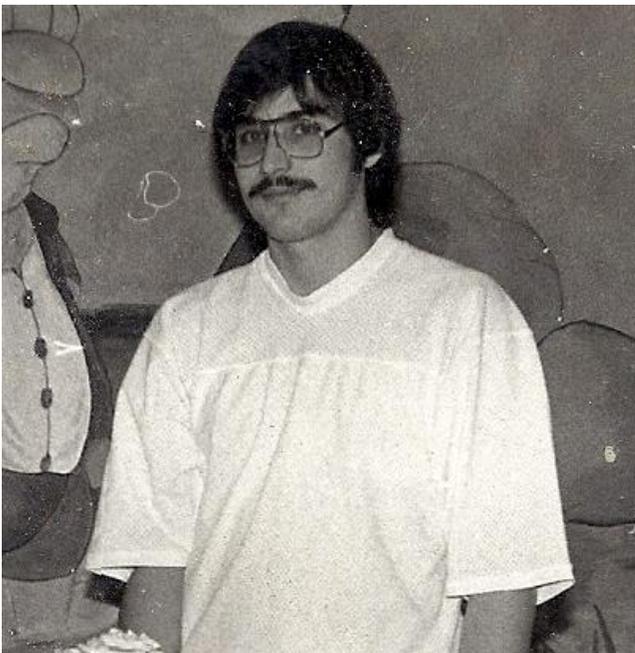
Tom Santos

National and Regional Flour Sales and
Technical Support

45 Years in Bakery, Pizza
and Flour Industry

Bakery Owner 1980-
1998

General Mills 1997-
Present





Curt Wagner

Corporate Chef; CEPC,
ITQ Corporate Chef

40 Years in the Educational
Baking, Pastry and Pizza
Industry

Developed a Sugar-Free and
No Sugar Added Dessert line
"Remember When Desserts"

General Mills 2014 - Present



General Mills Foodservice Booth #2044



Dough Making Demos

- 11:30am & 2:00pm on Tuesday and Wednesday



Pizza Crust Boot Camp™

Sessions held both Tuesday and Wednesday in W314-316

- Part 1 – Technical
 - 9:30-10:30 AM
- Part 2 – Practical
 - 3:30-4:30 PM

**Want to Improve Your Pizza
Culinary Expertise?**



presented by:  

Get More Details at Booth #2044

Ingredient Functionality

Can You Answer the
Question...

**What Does It Do In
My Dough?**

What Does It Do In My Dough?

Primary Ingredients

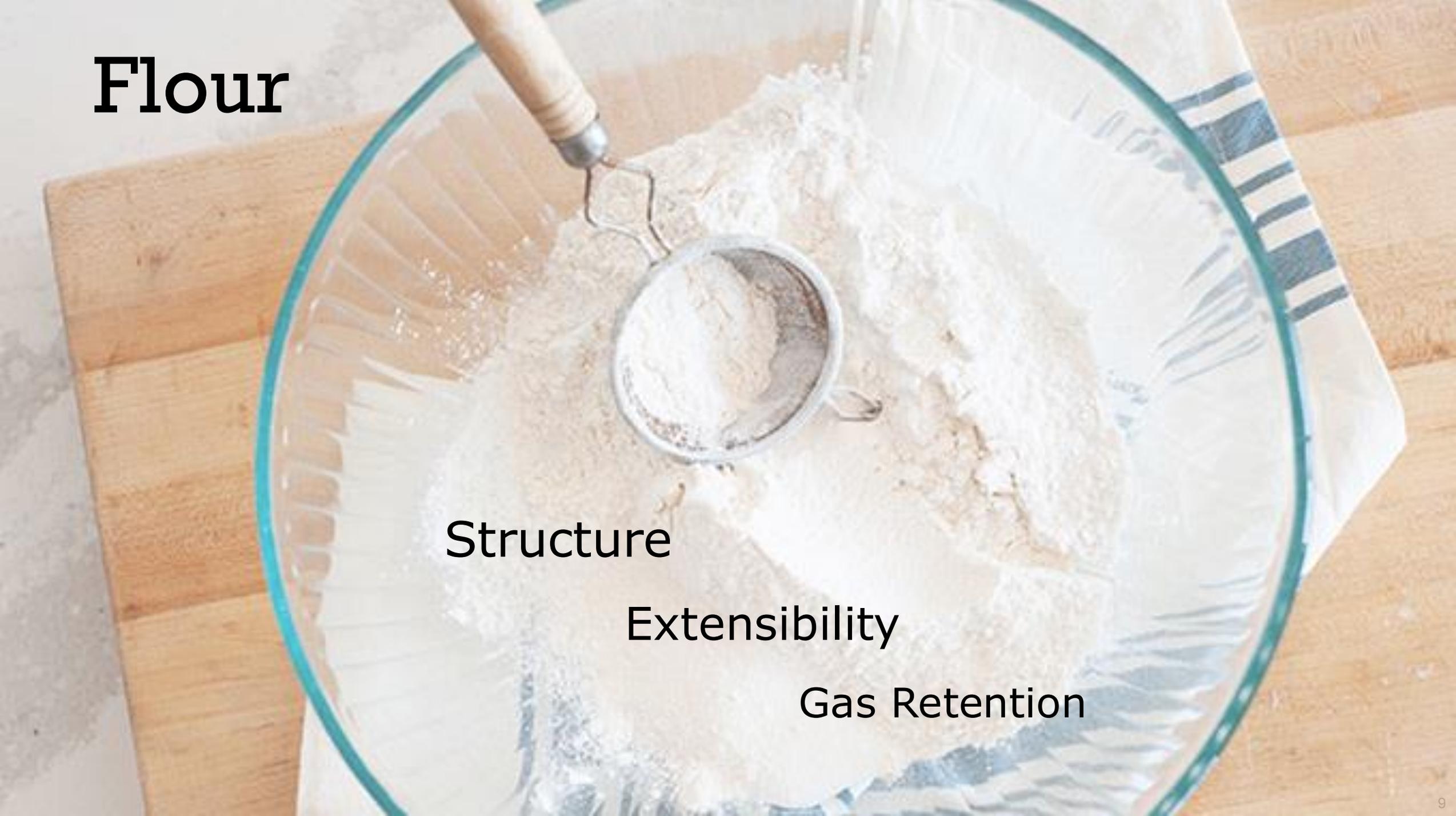
- Flour
- Water
- Salt
- Yeast



Optional Ingredients

- Sugar
- Oil

Flour

A top-down view of a clear glass bowl with a green rim, filled with white flour. A metal sifter with a wooden handle is positioned over the flour, with some flour trapped inside it. The bowl sits on a light-colored wooden surface. A white paper bag with blue stripes is partially visible on the right side of the bowl.

Structure

Extensibility

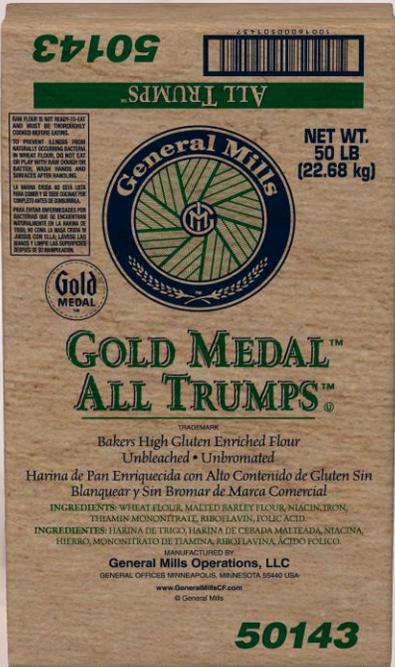
Gas Retention

Flour Treatments

Bleaching: makes flour whiter

Bromating: process of treating flour with potassium bromate to mature the flour. Also known as the “Bakers Helper”, it strengthens dough forming properties

Enrichment: replaces vitamins and minerals lost during the milling process

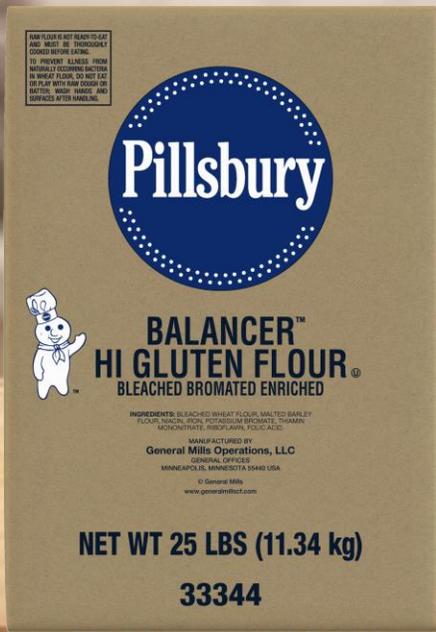


Function of High Protein Flour

Serving size

	% Daily Value*
Tolerant to mixing and fermentation	
Develops crisp crusts with a chew	
Minimizes soakage of sauce	
Spring Wheat	
Protein Level.....	13.3+%
Gluten Strength.....	High
Dough Strength.....	High
Absorption Potential.....	56-62%

* The % Daily Value (DV) tells you how much a nutrient contributes to a daily diet.



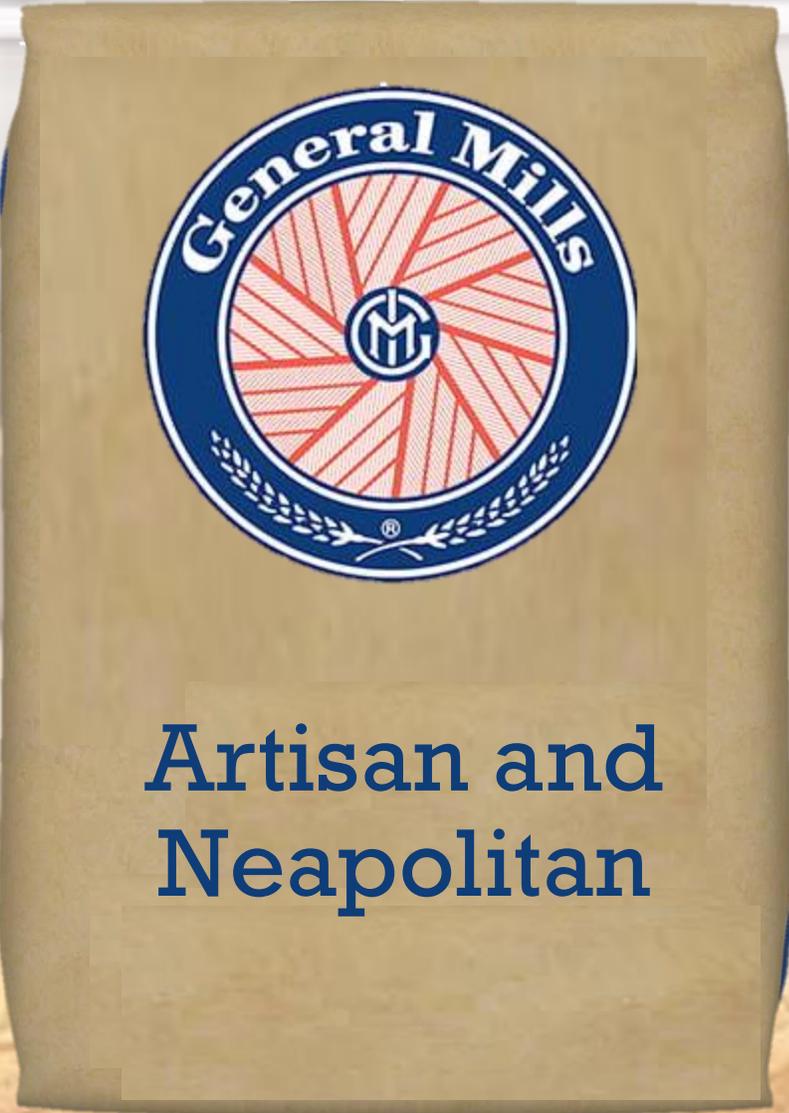


Function of Bread Flour	
Serving size	
	% Daily Value*
Excellent go-between Flour	
Spring Wheat	
Softer Mouth Feel	
Good choice for pan style	
Can be stretched for thin crust	
Protein Level.....	12.4-12.9%
Gluten Strength.....	Medium
Dough Strength.....	Medium
Absorption Potential.....	53-60%

* The % Daily Value (DV) tells you how much a nutrient contributes to a daily diet.



53722



Artisan and
Neapolitan



"00 STYLE"

DI PRIMORDINE
FARINA



Pizzeria
PREMIUM PROFESSIONAL FLOUR

NET WT. 27.55 LB (12.5 kg)

16326

DI PRIMORDINE FARINA

Function of Flour	
Serving size	
% Daily Value*	
High Heat Oven/Hearth Tolerance	
European Style Domestic Winter Wheat	
Select Blend of Hard Winter Wheat	
Protein Level.....	11.8-12.1%
Gluten Strength...Lower Medium	
Dough Stretch*.....	Soft
Absorption Potential.....	+/-62%
<p>* The % Daily Value (DV) tells you how much a nutrient contributes to a daily diet.</p>	

14314

HOTEL & RESTAURANT

RAW FLOUR IS NOT READY-TO-EAT AND MUST BE THOROUGHLY COOKED BEFORE EATING.
TO PREVENT ILLNESS FROM NATURALLY OCCURRING BACTERIA IN WHEAT FLOUR, DO NOT EAT OR PLAY WITH RAW FLOUR OR BATTER. WASH HANDS AND SURFACES AFTER HANDLING.

LA HARINA CRUDA NO ESTÁ LISTA PARA COMERSE SE DEBE COCCINAR POR COMPLETO ANTES DE CONSUMIRLA.
PARA EVITAR ENFERMEDADES POR BACTERIAS QUE SE ENCUENTRAN NATURALMENTE EN LA HARINA DE TRIGO, NO COMA LA HARINA CRUDA NI JUEGUE CON ELLA. LAVASE LAS MANOS Y LIMPIE LAS SUPERFICIES DESPUES DE SU MANEJACION.



NET WT. 50 LB (22.68 kg)

GOLD MEDAL
HOTEL & RESTAURANT
BAKERS
ALL-PURPOSE ENRICHED FLOUR
BLEACHED

**HARINA DE PAN
ENRIQUECIDA Y BLANQUEADA
PARA TODO USO**

INGREDIENTS: BLEACHED WHEAT FLOUR, MALTED BARLEY FLOUR, NIACIN, IRON, THIAMIN MONONITRATE, RIBOFLAVIN, FOLIC ACID.
INGREDIENTES: HARINA DE TRIGO BLANQUEADA, HARINA DE CEBADA MALTEADA, NIACINA, HIERRO, MONONITRATO DE TIAMINA, RIBOFLAVINA, ACIDO FOLICO.

MANUFACTURED BY:
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MINNEAPOLIS, MN 55440 USA
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All Purpose
Flour

Function of All Purpose

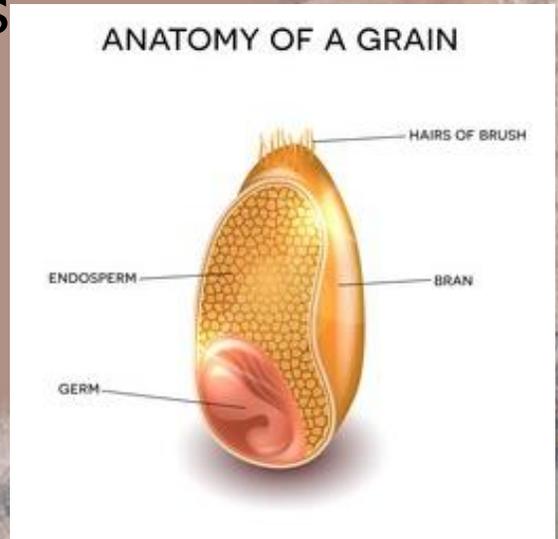
Serving size

	% Daily Value*
Minimizes Dough Shrinkage- Winter wheat	
Suitable for Deep Dish Crust	
Used with Cracker Crust	
Protein Level.....	10-12%
Gluten Strength.....	Low
Dough Strength.....	Soft
Absorption Potential.....	48-52%

* The % Daily Value (DV) tells you how much a nutrient contributes to a daily diet.

Whole Wheat Flour

- Milled from 100% of the wheat kernel
 - Usage level of 20-40% total flour
 - Great whole grain food
 - Adds flavor and texture to pizza
- Good option for serving pizza in schools





White Whole Wheat Flour



Whole Wheat Flour

Baker's Percent:

Flour = 100%
Other ingredients are a percentage
of the flour

Ingredient	Weight	Bakers %
Flour	100 lbs.	100
Water	56 lbs.	56
Salt	2 lbs.	2
Sugar	4 lbs.	4
Oil	6 lbs.	6
Yeast	1 lb.	1
Total	169 lbs.	169%

Water's Function in the Dough:

Temperature Control

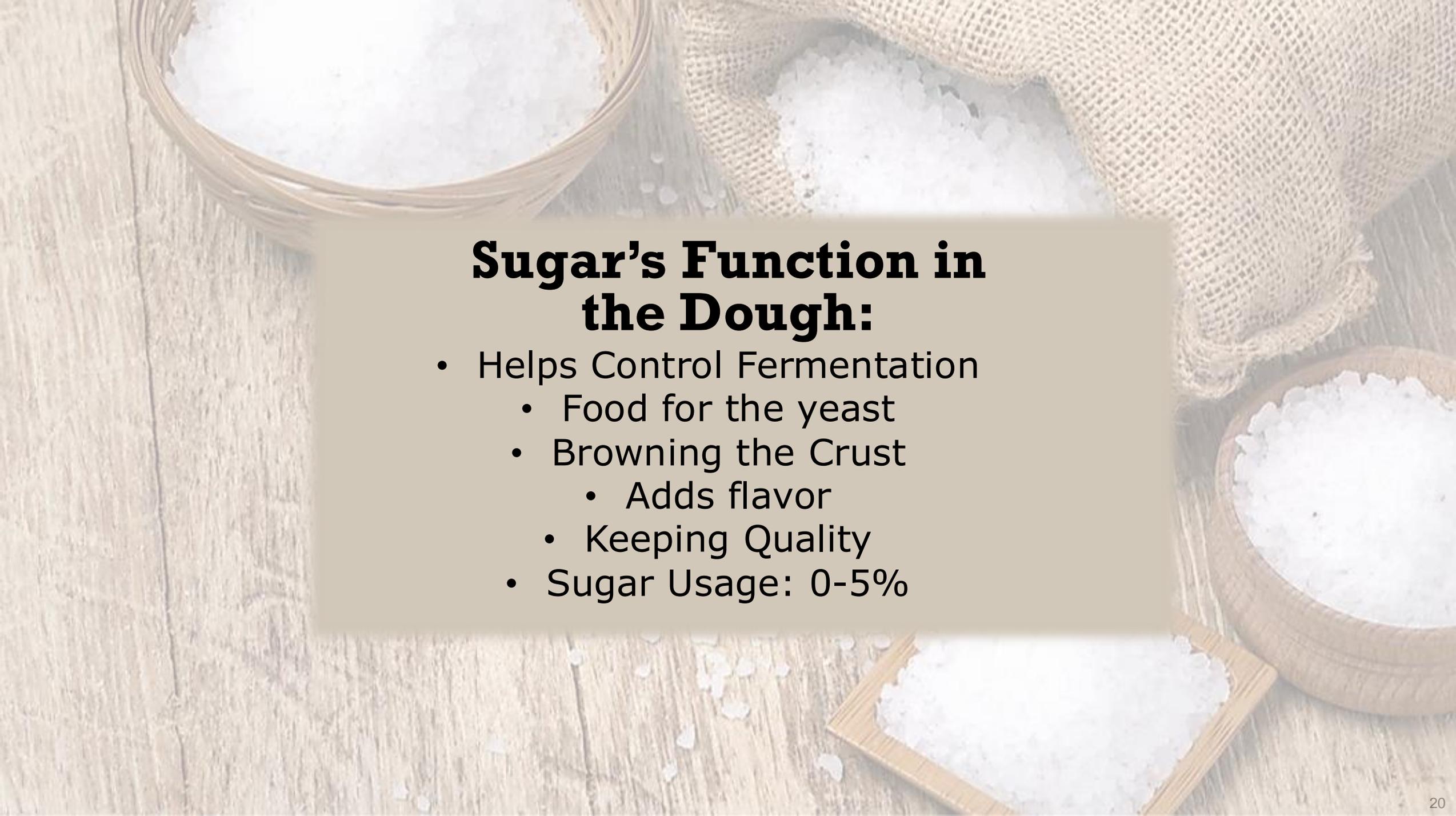
Hydration

Usage 54-75%



Salt Function in the Dough:

- Helps Control Fermentation
 - Strengthens dough
 - Adds flavor
 - Keeping Quality
- Salt Usage: 1-2.5%



Sugar's Function in the Dough:

- Helps Control Fermentation
 - Food for the yeast
 - Browning the Crust
 - Adds flavor
 - Keeping Quality
- Sugar Usage: 0-5%

Oil/Shortening's Function in the Dough:

- Lubrication
- Extensibility
 - Browning
 - Tenderness
- Quality Keeping
- Usage: 0-14%

Olive Oil



Corn Oil



Lard



Canola Oil





Yeast's Function in the Dough:

- Leavening Action
- Dough Conditioning
- Flavor and Aroma Development
 - Usage: 0.25 - 3%

Instant yeast

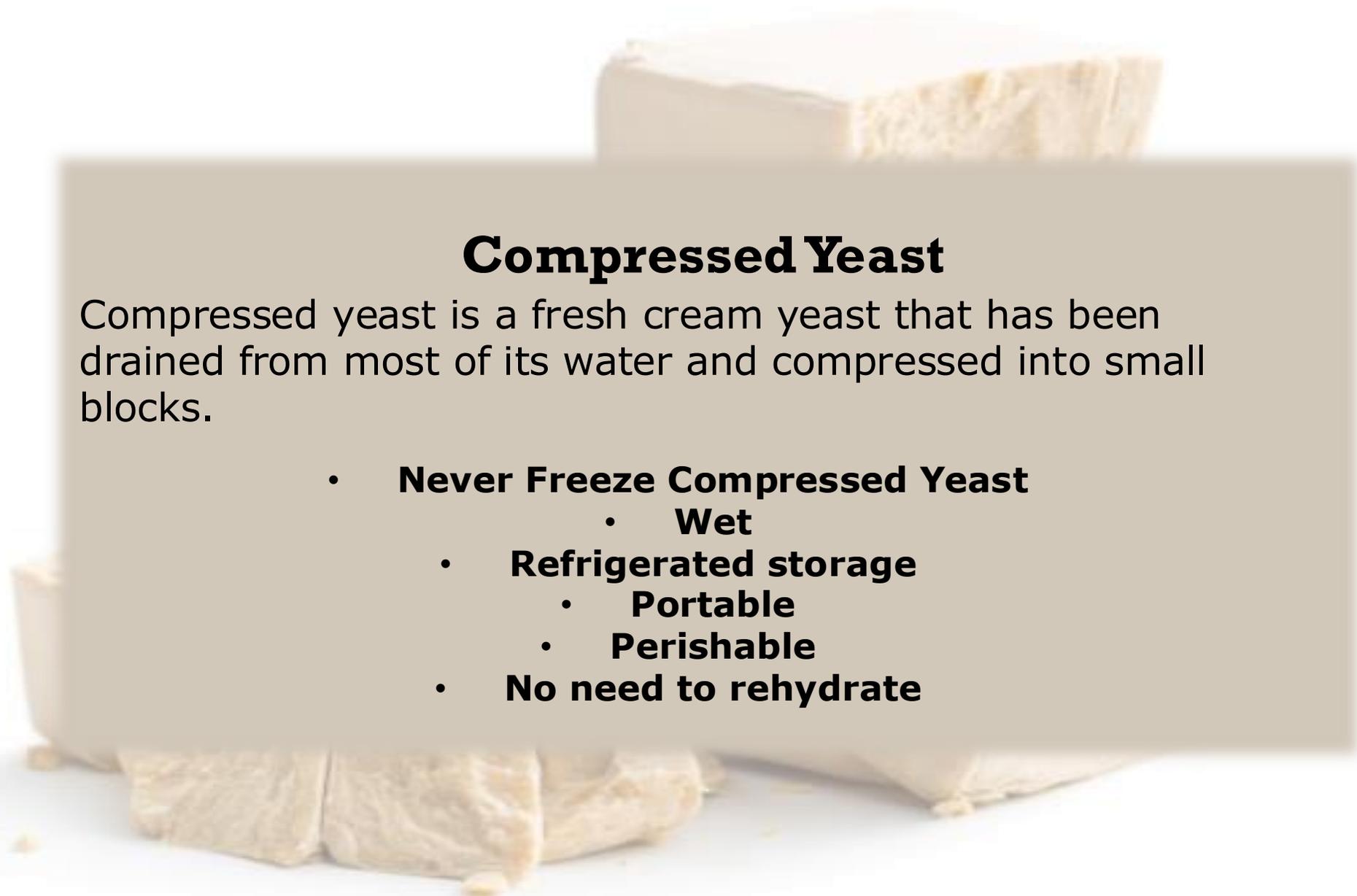
A dry yeast that comes in smaller granules than active dry yeast, absorbs liquid rapidly, and does not need to be rehydrated or proofed before being mixed into flour.

- Dry
- Dissolves quickly
- No need to rehydrate
- Constant activity

Active Dry Yeast

A form of dry yeast in which the yeasts are not killed but made dormant through dehydration.

- Dry
 - Need to rehydrate
- 5:1 minimum water to yeast
 - Stronger “Yeasty” flavor
- Live and dead cells present



Compressed Yeast

Compressed yeast is a fresh cream yeast that has been drained from most of its water and compressed into small blocks.

- **Never Freeze Compressed Yeast**
 - **Wet**
 - **Refrigerated storage**
 - **Portable**
 - **Perishable**
 - **No need to rehydrate**

See [dough formulas](#)

Basic Dough Formulas

Technical Disclaimer*

Based on our experience, dough processing will make a difference, but **here is a starting point...**

Basic Dough Formulas – Spring Wheat



Pizza Type	NY Thin	NE Hand Tossed Pizza	Detroit
Flour Type	Spring Wheat	Spring Wheat	Spring Wheat
Formula	13.6+% High Protein	12.6+% Mid Protein Patent	12.3+% Mid Protein Patent
Flour	100	100	100
Water	58	56	58
Salt	2	1.5	1.2
Sugar	1	2	1.4
Oil	4	6	0
Yeast (instant)	0.75	1	1.2
Semolina	0	0	12

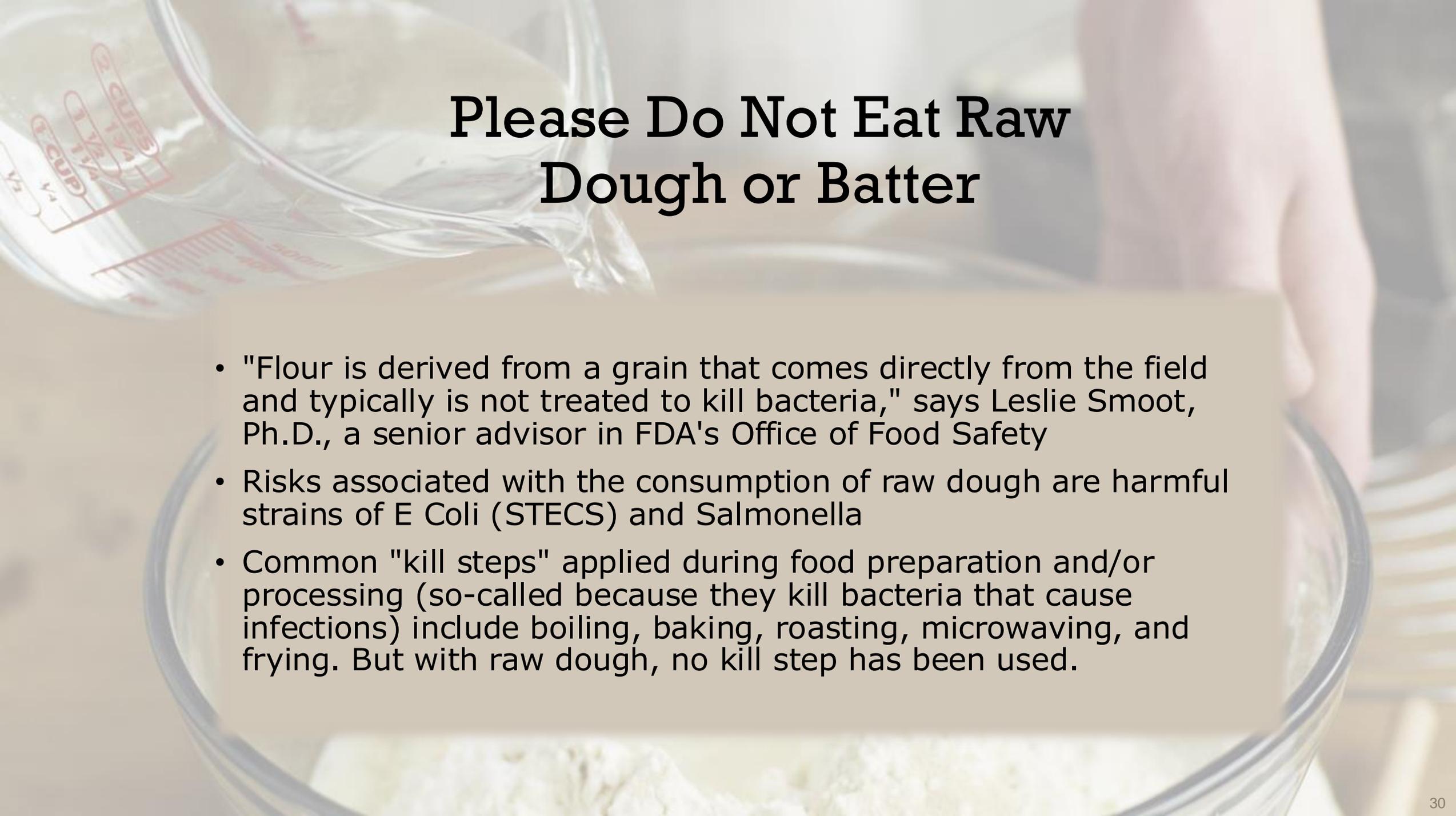
Basic Dough Formulas – Winter Wheat



Pizza Type	Deep Dish	Cracker	Neapolitan
Flour Type	All Purpose/H&R	All Purpose/H&R	Di Prim/Harvest King
Formula	10.5-11.5%	10-11%	11.7-12.0%
Flour	100	100	100
Water	56	50	63
Salt	1.5	2	2.25
Sugar	2.5	4	0
Oil	8	2	0
Yeast (instant)	0.5	1	0.25

A close-up photograph showing a hand pouring water from a clear glass measuring cup into a larger glass bowl. The bowl contains a mound of white flour. The measuring cup has red markings and labels for 1/2 cup, 1 cup, 1 1/4 cups, 1 1/2 cups, and 2 cups. The background is blurred, showing a kitchen setting with a wooden surface and a white container.

Food Safety Flour Video

A background image showing a person's hands pouring a liquid from a clear measuring cup into a glass bowl. The measuring cup has red markings and the word 'CUP' is visible. The bowl is partially filled with a light-colored liquid. The scene is brightly lit, suggesting a kitchen environment.

Please Do Not Eat Raw Dough or Batter

- "Flour is derived from a grain that comes directly from the field and typically is not treated to kill bacteria," says Leslie Smoot, Ph.D., a senior advisor in FDA's Office of Food Safety
- Risks associated with the consumption of raw dough are harmful strains of E Coli (STECs) and Salmonella
- Common "kill steps" applied during food preparation and/or processing (so-called because they kill bacteria that cause infections) include boiling, baking, roasting, microwaving, and frying. But with raw dough, no kill step has been used.



Gold Medal™ All Trumps™ Dough Balls

- A more consistent & labor-friendly option to emergency dough
 - Ambient thaw 4-6 hours
 - Available in 8oz, 16oz, 20oz, 24oz
- Made with the #1 pizzeria flour¹ Unbleached/Unbromated Gold Medal™ All Trumps™ for an **Authentic New York Style Pizza Crust**
- Tight manufacturing specs to ensure **quality and consistency**
- Exceptional oven compatibility & performance
- Pre-flattened shape allows for **fast prep & limited shrink (snap back)**
- **In-booth demonstration times:**
 - Tuesday & Wednesday at 11:30 AM and 2:00PM



¹ Circana™, High Protein Flour in Foodservice Channel, 12 months ending December 2023, in Dollars & Pounds.

Flour Detective Video Playlist



Six in-depth lessons on flour available to watch by **anyone**.

Playlist available [here!](#)



Flour Detective Lessons

General Mills Convenience & Foodservice
6 videos Last updated on Apr 4, 2022

⋮ ↗

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-  **Lesson 1 Flour and Different Yeast Types**
General Mills Convenience & Foodservice
7:24
-  **Lesson 2 Flour Water and Dough Temperature**
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General Mills Convenience & Foodservice
8:25



Questions?



Ready for a slice of success?
Scan for more dough and crust
resources & information!



**General Mills
Foodservice Pizza**



@GeneralMillsFSPizza

**Follow us for more tips & tricks,
inspiration & more!**

Presented by Tom Santos and Curt Wagner
Booth #2044





General Mills
FOODSERVICE



Pizza Crust Boot Camp™

Presented by Tom Santos and Curt Wagner



So, You Want to Make Dough?

Scaling Ingredients

Mixing

Fermentation

Make-up

Scaling Ingredients

**Consistency =
Quality**

Weight

Accuracy

Zero Out



Suggested Order

Consistency = Quality

1. Water
2. Dry – hydrate the flour
3. Oil – develop the gluten



Step 1: Water



Add water

Step 2: Dry



Mix for one minute to allow the water to hydrate the flour

Step 3: Oil



Add the oil and continue mixing

Function of Mixing

Consistency = Quality

1. Disperses and combines ingredients
2. Develops gluten protein network



Mixing Time Factors

Consistency = Quality

1. Flour Protein
2. Absorption
3. Formulation
4. Temperature
5. Mixer Type
6. Batch Size



Mix Time by Protein Level



	Protein Level	Gluten Strength	Dough Strength	Mix Time
All-Purpose	10 – 12%	Low	Soft	5 - 7
Bread Flour	12 – 13%	Med	Med	7 - 10
High Gluten	13 – 14%	High	Stiff	10 - 14

Mix times will be dependent upon processing method



4 Minutes



6 Minutes

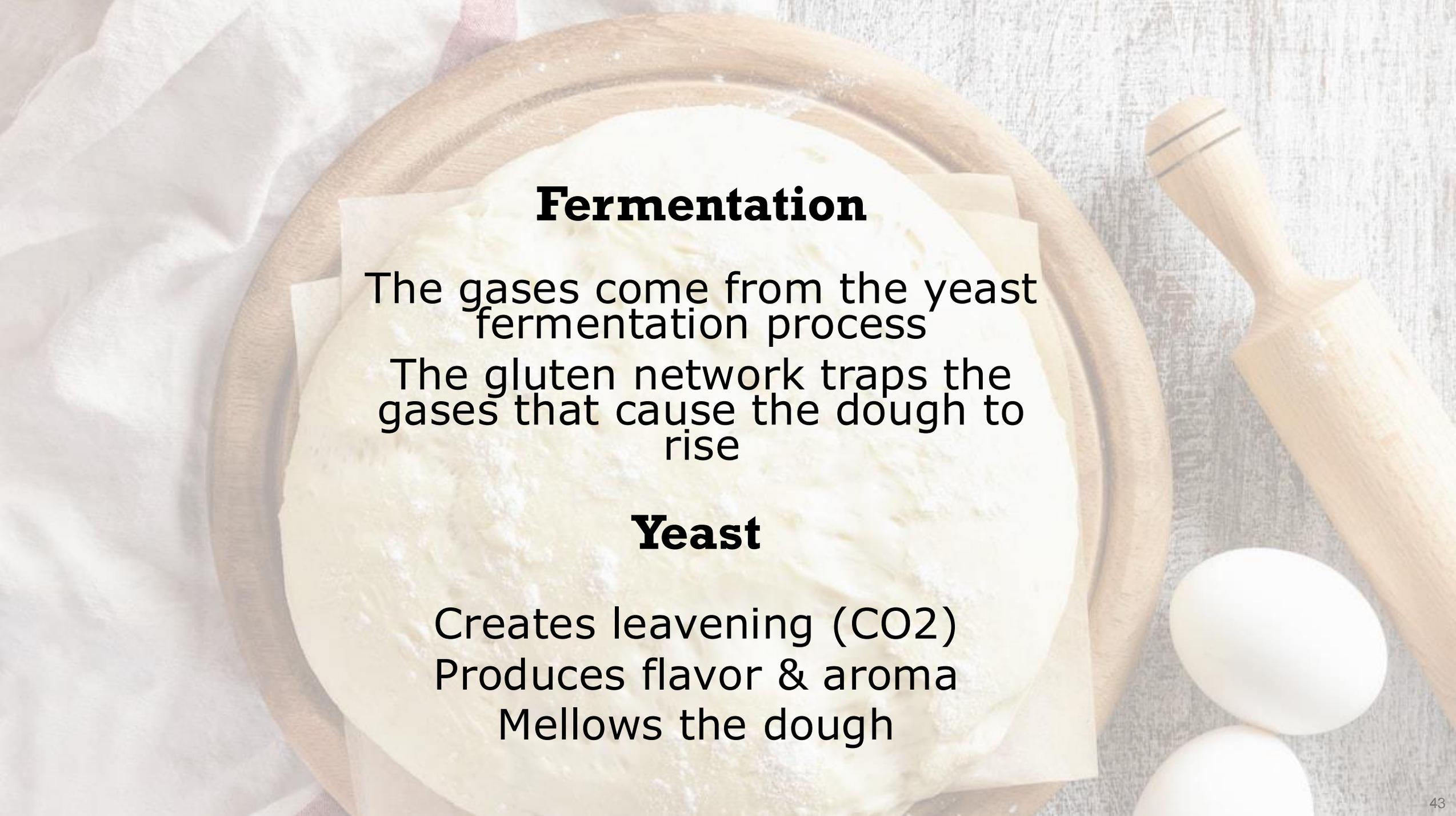


8 Minutes



10 Minutes





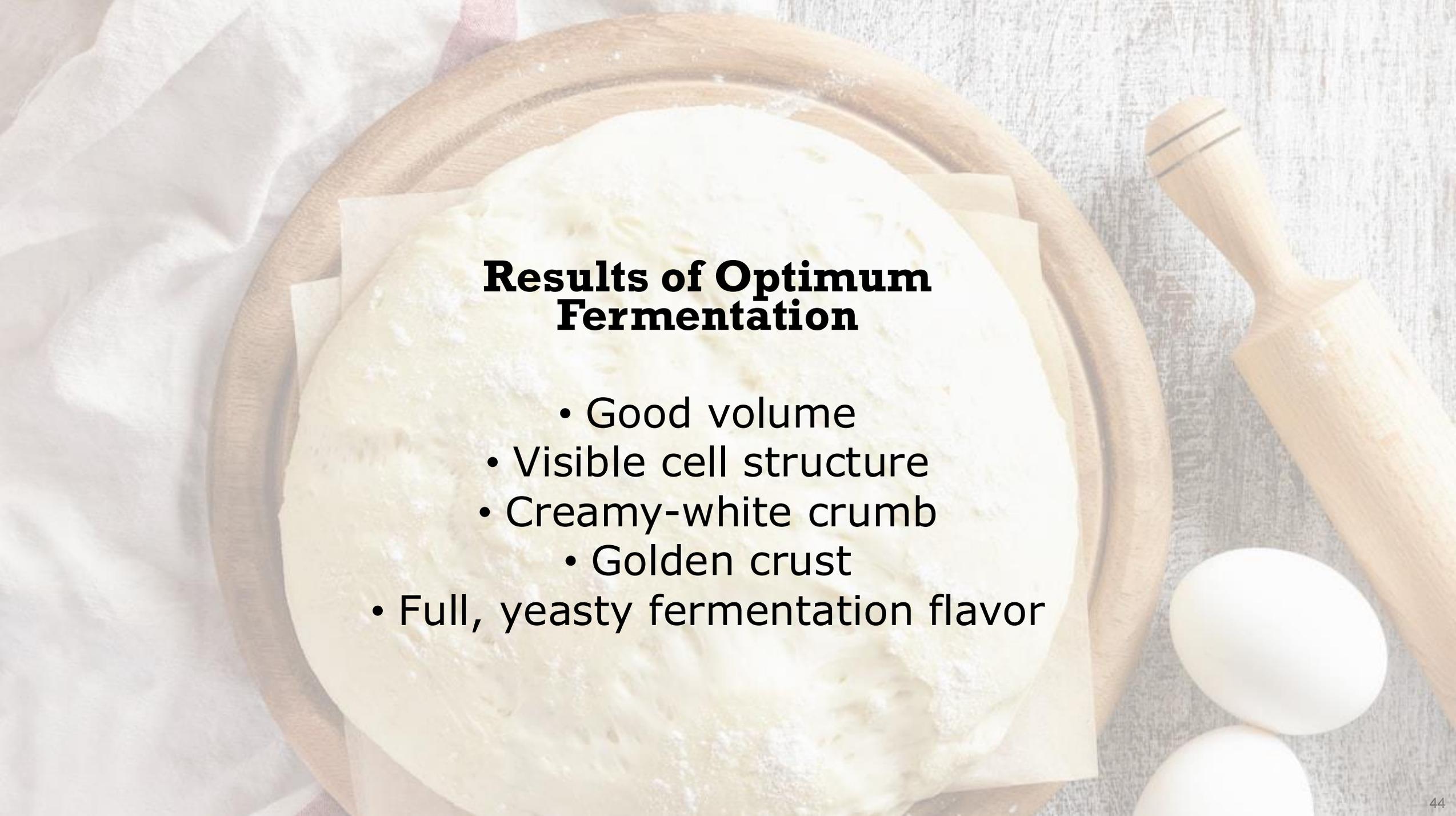
Fermentation

The gases come from the yeast fermentation process

The gluten network traps the gases that cause the dough to rise

Yeast

Creates leavening (CO₂)
Produces flavor & aroma
Mellows the dough



Results of Optimum Fermentation

- Good volume
- Visible cell structure
- Creamy-white crumb
 - Golden crust
- Full, yeasty fermentation flavor

Non-Optimum Fermentation

Over-Fermented

- Flat
- Irregular, open grain
- Bad beer odor
- Gummy-grayish crumb
- Lack of browning

Under-Fermented

- Flat
- Tight, dense grain
- Bland flavor
- Gummy-grayish crumb
- Lack of browning

Dough Temperature

A thermometer is one of the best investments you can make to control your dough performance and costs.



Affected by:

- Flour temperature
- Room temperature
- Bowl friction (heat from mixing)
- Water temperature

An 18°F increase in dough temperature could
double yeast activity.
Therefore...
*An 80°F dough will rise twice as fast as a 62°F
dough!*



96°F



88°F



76°F

Water Temperature Chart

Room Temperature

		40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90
Flour Temperature	40	110	108	106	104	102	100	98	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60
	42	108	106	104	102	100	98	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58
	44	106	104	102	100	98	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56
	46	104	102	100	98	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54
	48	102	100	98	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52
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	52	98	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48
	54	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46
	56	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44
	58	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42
	60	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40
	62	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38
	64	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36
	66	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34
	68	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32
	70	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30
	72	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28
	74	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26
	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24
	78	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24	22
80	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24	22	20	
82	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24	22	20	18	
84	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24	22	20	18	16	
86	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24	22	20	18	16	14	
88	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24	22	20	18	16	14	12	
90	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24	22	20	18	16	14	12	10	

Using the water temperature chart*

The intersection of the Room Temperature column with the Flour Temperature row reveals the needed Water Temperature for a 75°F dough temperature

Example Shown:

If room temperature is 72°F and flour temperature is 60°F a 58°F degree water temperature would needed to achieve a finished dough temperature of 75°F.

*Chart is based on targeting a 75°F ideal dough temperature with an estimated friction factor of 35°F.

Points marked in Blue will need ice to achieve the proper dough temperature.

Fermentation Time

Attribute	Fresh	Retarded
Age of dough	3 – 12 hours	12 – 72 hours
Yeast Level	Higher	Lower
Dough temp	Warm (85 – 95)	Cool (75 – 85)
Fermentation	Fast	Slow

Fresh Dough

Goal is to produce multiple, smaller batches in order to maintain a supply of fresh dough

Advantages:

- More refrigeration space
- Accurately anticipate demand

Concerns:

- Requires mixing during the day
- Short shelf-life of dough
- Potential for inconsistent product
- Flavor profile

Fresh Dough Method



Mix



Ferment/Proof



Make Up



Use/Hold

Refrigerated Dough

Concerns:

- Dough temperature is critical
- Cooler space required
- Dough management skill

Advantages:

- Minimizes need for accurate production planning
- Dough produced during off-peak time
- Good level of dough consistency

Refrigerated Dough Method



Mix



Divide/Round



Refrigerate



Warm Up



Make Up

Refrigerated Dough Method



Dough Tray – Cross Stack - Nestle



Emergency Dough

Emergency dough formula:

- Increase yeast level – double?
- Increase sugar level – double?
- Warmer dough temperatures $>95^{\circ}\text{F}$

Should only be used in an emergency, then destroyed!



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Got a Problem?

Dough ball didn't rise

Dough ball rising too much

Dough ball gets
"crusty"

Bubbles in my crust

My crust doesn't brown

Dough is too springy

Reasons Your Dough May Not Rise

- Dead or old yeast
- Yeast not properly rehydrated
- Not enough yeast
- Too cold: the dough or storage
- Not enough fermentation time
- Poor gluten network

Reasons Your Dough is Rising Too High

- Too much yeast
- Dough too warm out of the mixer
 - Storage conditions too warm
 - Too much fermentation time
 - Check your salt levels

Reasons Your Dough Doesn't Brown

Pale all over:

- Old dough - no residual sugar
- Add some sugar to your formula
- Add milk solids to your formula

Reasons Your Dough Has Bubbles in the Crust

Improperly proofed dough:

- Under proofed
- Over proofed
- Dock the dough
- Dough too cold

Wheat Market Update

- Improved drought conditions in Spring Wheat Planting region
- Still concern about dryness in Winter Wheat Growing region
- Russia/Ukraine extended safe passage deal 60 days (market was hoping for 120 days)
- Bank concerns and debt weighing on markets (US Dollar)
- Supply chain has improved since we talked last year.

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