



The Basics of Frozen Bakery Products 冷冻烘焙产品基础知识
RAW MATERIALS 原料篇 5.6.2024

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1. Four major ingredients & sub ingredients 四种主料和辅料

2. Oxidizing & Reducing agents 氧化剂和还原剂

3. Emulsifiers 乳化剂

4. Enzymes and Others 酶和其他

5. Q & A 问答

FOUR ESSENTIAL

Bread Ingredients 1 面包的四种主要原料1

1. FLOUR 面粉

2. WATER 水

3. YEAST 酵母

4. SALT 盐

Bread Ingredients 2 面包原料2

5. Sugar 糖

(Granulated, corn syrup, etc. 砂糖, 玉米糖浆, 等等)

6. Fats & Oil 油脂

(Butter, Shortening, liquid oil/powder, etc. 黄油, 起酥油, 液态/固态, 等等)

Milk 牛奶

(NFDM, Whole Milk, liquid/powder form, etc. 全脂, 液态奶/奶粉, 等等)

Eggs 鸡蛋

(Whole eggs, Egg yolks / Egg whites, powder/liquid form 全蛋, 蛋黄/蛋白, 蛋粉/液态蛋, 等等)

Bread Ingredients 3 -1 面包原料3-1

- Yeast nutrients 酵母
- Oxidizing agents 氧化剂
- Reducing agents 还原剂
- Emulsifiers 乳化剂

Bread Ingredients 3-2 面包原料3-2

- Others 其他
 - _ Enzymes 酶
 - _ Preservatives 防腐剂
 - _ Gums 胶
 - _ Vital wheat glutens 谷朊粉

FLOUR 面粉

1. Main function - Structure (protein & starch) 主要作用 – 结构支撑 (蛋白和淀粉)
2. Gliadin + Glutenin w/water = Gluten 麦谷蛋白+麦醇溶蛋白 + 水 = 形成面筋
3. Gluten play a crucial part of gas retention 面筋对持气起最关键作用
4. Starch + water w/ heat = starch gelatinization 淀粉+水 + 热 = 淀粉糊化
5. Good quality and amount of protein is essential in frozen dough 对冷冻面团来说，蛋白的质量和数量非常重要

WATER 1 水1

1. Main function - Hydration 主要作用 – 水合
2. Combines with gliadin & glutenin and forms gluten 与麦谷蛋白、麦醇溶蛋白结合形成面筋
3. Solvent for other ingredients 其他成分的溶剂
4. Control dough temperature 控制面团温度

WATER 2 水2

5. Good quality and amount of protein is essential in frozen dough 蛋白的质量和数量非常重要

- Hard water & Soft water 硬水和软水
 - 100 to 150 ppm of minerals (medium hard water) is great for mixing bread dough 含100-150ppm 矿物质的水 (中等硬度的水) 对面包粉面团搅拌非常有利
- Hydration is generally reduced to maintain shape of frozen dough 加水量通常会减少, 以更好保持冷冻面团形状 (generally 2-3%+) 一般来说2-3%

YEAST 1 酵母1

1. Main function - Leavening 主要作用 – 起发
2. Influence dough (bread) aroma. 影响面团(面包)风味

YEAST 2 酵母2

Three kind of Yeast. 三种酵母

- 1) Fresh compressed yeast 新鲜压缩酵母
- 2) FFFY (Free-Flowing Frozen) Yeast FFFY(自由流动冷冻)酵母
- 3) Dry yeast (instant and active dry) 干酵母(即发活性干酵母)

For frozen dough, 对冷冻面团来说

- 1) Fresh compressed yeast 新鲜压缩酵母
- 2) FFF Yeast FFFY酵母

YEAST 3 酵母3

Yeast type 酵母类型

- 1) For lean dough (low sugar formula dough) 用于低糖面团
- 2) For rich dough (high sugar formula dough) 用于高糖面团

SALT 盐

1. Main function : Taste 主要作用：调味
 - Enhance flavor and taste of bread 给面包增香、添加风味
2. Helps control fermentation by retarding the fermentation (activity of yeast) 通过延迟发酵(控制酵母活性)来控制醒发时间
3. Toughens and strengthens gluten 增强面筋

SUGAR 1 糖1

1. Function 1 : Nutrient for the yeast 作用1 : 给酵母养分
2. Function 2 : Taste of the bread 作用2 : 增加面包风味
3. Function 3 : Color of the baked dough (breads) 作用3 : 焙烤上色 (面包)
4. Function 4 : Softness of the bread 作用4 : 令面包柔软

SUGAR 2 糖2

1. Sugar usage in frozen dough can be reduced 冷冻面团中，糖的量可以减少

- little fermentation in frozen dough to consume sugar as substrate 冷冻面团不需发酵因此不需糖原
- if not reduced, there will be an excess of residual sugar thus causing excessive coloring during baking 倘若不减量，糖量过剩，焙烤时会过度上色

FATS & OIL 油脂

1. Function 1 : Lubrication (machine tolerance) 作用1 : 润滑(耐机械操作)
2. Function 2 : Contribute to bread volume increase 作用2 : 增加面包体积
3. Function 3 : Contribute to crust 作用3 : 改善面包表皮
(thinner & tender, and color) 令其更薄而柔软, 颜色更好
4. Function 4 : Contribute to crumb structure 作用4 : 改善面包瓤
(finer, increase whiteness) 令其更细腻, 更白
5. Increase caloric value of the products 增加卡路里

OXDIZING Agents – Dough Conditioners 氧化剂 – 面团调节剂

1. Strengthen dough structure 强化面筋结构
2. Improves dough handling 改善面团操作性
3. Improves product volume 增加产品体积
4. Increases water absorption 增加吸水

-Must be used oxidizing agents for frozen dough
due to lack of natural oxidation through fermentation.
冷冻面团产品中必须使用，因醒发过程中缺少了自然氧化过程

OXIDIZING Agents 氧化剂

Oxidizing agents 氧化剂	Usage level 用量 (ppm)	Reaction Rate 反应速度
Potassium bromate 溴酸钾	10-75	Slow acting
Calcium bromate 溴酸钙	10-75	Slow acting
Potassium iodate 碘酸钾	10-25	Fast acting
Calcium iodate 碘酸钙	10-25	Fast acting
Calcium peroxide 过氧化钙	10-25	Fast acting
Azodicarbonamide (ADA) 偶氮二甲酰胺	10-25	Fast acting
Ascorbic acid 抗坏血酸	30-200	Fast acting

REDUCING Agents – Dough Conditioners 还原剂 – 面团调节剂

1. Weaken dough structure 弱化面筋结构
2. Reduce dough mixing time and resistance to extensibility 减少面团搅拌时间，弱化抗延展性
Contribute to shaping and make up 更好成型
3. Used for frozen dough to reduce resting time between mixing and freezing 用于冷冻面团，以缩短搅拌和冷冻之间的成型时间
4. Less damaging to the yeast than allowing a longer rest period
缩短成型时间也会减少酵母损伤
5. Longer rest period promotes the start of fermentation and the by-products of fermentation are detrimental to the survival of the yeast during freezing. 成型时间长会令产品开始发酵，而发酵的产物会在速冻过程中对酵母造成损伤

REDUCING Agents – Dough Conditioners

还原剂 – 面团调节剂

Reducing agents 还原剂	Usage level (ppm) 用量
L-cysteine 半胱氨酸	15 – 90
Sorbic acid 山梨酸	20 - 40
Deactivated yeast 失活酵母	Depends on the formula 视配方定

Emulsifiers – Crumb Softeners & Dough Strengtheners 乳化剂 – 令面包瓤柔软同时强化面筋

1. Crumb softeners 令面包瓤柔软

- Improves moisture retention 提高持水性
- Contribute as lubrication like fats & oil on commercial baking on dough 在商业生产中，类似油脂一样对面团起润滑作用

2. Dough strengtheners 强筋作用

- Improves gas retention properties 改善持气性能

Emulsifiers – Crumb Softeners & Dough Strengtheners 乳化剂 – 令面包瓤柔软同时强化面筋

SSL: Sodium stearyl-2-lactylate 硬脂酰乳酸钙

CSL: Calcium stearyl-2-lactylate 硬脂酰乳酸钠

DATEM:

Diacetyl Tartaric Acid Esters of Mono & di-glyceride 双乙酰酒石酸单双甘油酯

Ethoxylated Mono & di-glyceride (EMG or EDG) 乙氧基化单双甘油酯

Polysorbate 60 聚山梨酯

Succinylated Monoglycerides (SMG) 琥珀酰化单甘油酯

Distilled Monoglycerides (DMG) 蒸馏单甘油酯

ENZYMES 酶

Each enzymes has specific application in bread production 在面包生产中每种酶有特定用途

- Inhibited the migration of water in the frozen dough 抑制冷冻面团中的水分迁移
- Improves dough handling 改善面团操作性
- Converts damaged starches into sugars (Amylases) 将破损淀粉转化成糖(淀粉酶)
- Keep bread fresher 保持面包新鲜
- Make bread looks more appetizing 令面包看起来令人更有食欲

VITAL WHEAT GLUTEN 谷朊粉

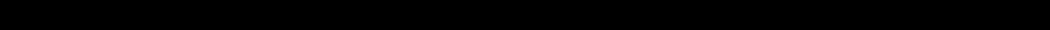
- Improves dough strength 增强面筋
- Improves water absorption 增加吸水
- Improves fermentation tolerance 提高发酵耐受
- Improves loaf volume 增加面包体积
- Essential ingredient for pre-proof frozen dough 对预醒发类型的冷冻面团产品是必不可少原料
- May be used for frozen dough products if protein level or strength is lacking. 或可用于冷冻面团产品当需要弥补蛋白/筋力不足
Ex. Rice bread, etc 如大米面包

GUMS 胶

- Sometimes used for frozen dough to aid in strength and stability 有时用于冷冻面团以增强筋力和稳定性
- Greatly aids in gas retention 对持气有极大帮助

Xanthan gum

2. Raw materials



THANK YOU 谢谢！