
Yoko's Pizzeria

The chemistry, manufacture, and debugging of pizza dough—with some recipes.

Copyright © 1995 – 1996 Yoko Nonaka & Giordano Beretta. All rights reserved.
URL http://www.hpl.hp.com/personal/Giordano_Beretta/ Acrobat/pizza.pdf



DOUGH CHEMISTRY

Flour. The choice of flour is very important. Select a strong or bread flour, which has a high protein content. When water is added, the protein is transformed in gluten, which makes a smooth and elastic dough when kneaded. Strong or rich in protein flours suck up the moisture rapidly and through kneading make a nice smooth dough with a fine structure.

Regular flour can be kept for 4–6 months, whole grain flour for 2 months.

Yeast. The yeast is necessary to ferment the dough, *i.e.*, to make it raise. The dough becomes loose because carbon dioxide is produced: small bubbles form, which are trapped in the dough and make it raise.

Dry yeast can be stored for a year. To test if dry yeast still works, take a couple of grains and dissolve them in water; if after 10 minutes there are small bubbles, the yeast is still good. Fresh yeast lasts for 1–2 weeks.

Prepare *dry yeast* by first dissolving a spoon of sugar or honey in warm liquid. Then pour in the yeast and let it sit on a warm place for 10 minutes, until there are bubbles. Finally, add the prepared yeast to the other ingredients.

Prepare *fresh yeast* by mixing it with some liquid and then adding the flour and other ingredients. The liquid can be cold, but if it is warm (38°–43°C) the dough raises faster.

CAUTION:

Yeast loses the boost power above 60°C, so it should not get too warm when mixed or the dough is rising. When the dough is put in the oven the yeast loses the boost power and the dough stops raising.

Salt. It improves the taste and prevents the yeast from fermenting too fast. Too much salt kills the yeast. Without salt the dough becomes sticky instead of smooth and the baked pizza remains small and firm.

Sugar. Makes the gluten soft and the crust brown. Too much sugar kills the yeast.

Fat. Makes the dough soft, gives color, and improves the storage ability.

Liquids. Always add all the fluids at once. If the dough is too soft, it is always easy to add some flour, but it is hard to add liquids to a formed dough.

Vitamin C. It makes rise the dough much faster. However, it does not make it more nutrient, because vitamin C is destroyed during the baking process.

BAKING, STEP BY STEP

Mixing. The dough can be prepared with a machine, using the kneading hooks. First put all liquids in the container, then add the other ingredients. Use the lowest speed and let it run for 1–2 minutes, until the dough comes off from the border of the container.

Kneading. This step is important to make the dough smooth and the pizza crunchy. Using a machine and the second slowest speed it takes only 2–3 minutes until the dough is smooth.

First raising. Before baking, the dough must have risen at least once for the yeast to have an effect. At oven temperature the yeast dies, so the dough has to have risen completely before it is baked. When it raises, the dough volume must at least double. *If the dough rises too long, it collapses; in that case it must be kneaded and let raise again.* During the raising time in the bowl, the dough must be completely covered with a plastic foil to prevent the formation of a crust. The raising can also take place in a plastic bag smeared with oil.

Typical raising times: in a warm place (38°C) 45–60 minutes. At room temperature (18°–21°C) 1.5–2 hours. In a cool place 8 hours. In the refrigerator 12–18 hours.

If the dough is let to raise over night, let it sit in a cool place or in the refrigerator. The next day it is kneaded and flattened again and must go through the second raising.

After the first raising, the dough can be frozen in a plastic bag smeared with oil.

Forming. The risen dough must be beaten, *i.e.*, squeezed flat with the knuckles and kneaded for 1–2 minutes. The beating knocks out the air bubbles, so the dough can rise twice uniformly. Be careful that there is not too much flour on the working surface because it affects the crust color.

The dough is then formed on a wooden pizza peel.

Second raising. It is easiest to do the second raising by sticking the peel with the dough in a food plastic bag smeared with oil. The bag has to be suffi-

ciently large to hold the risen dough. The volume has to double. The second raising time is shorter than the first raising time.

Baking. Pre-heat the oven and use the lowest rack. If you use a baking stone, it will dry out better the dough and, if adequately pre-heated, make the crust crunchier. *The pizza is ready when the dough is gold-brown.*

It s difficult to make predictions on the time. The actual time depends on the oven (gas, wood, electric; size; etc.), the toppings (water contents, weights, etc.), and variations in the dough (air, pulse, ingredients, etc.). Some of the recipes contain proven times.

As a rule of thumb, pre-heating an oven with a baking stone to 500°F takes about 15– 20 minutes and baking the pizza at 450°F – 475°F takes 20 – 25 minutes.

EXPRESS DOUGH

This method consists in using vitamin C to shorten the first rising time.

When fresh yeast is used, the first raising time is only 5 minutes. With dry yeast the first rising time is 1 hour. The second raising lasts 45–50 minutes at room temperature (21°C) or 40 minutes in a warm place (32°C).

Use a little more yeast as in the regular recipe and make sure there is always a little sugar.

TIPS & TRICKS

1. Use the correct kind of flour
2. Mix in correctly the yeast
3. Add all liquids at once
4. Knead the dough thoroughly, 2–3 minutes with the machine using the kneading hooks
5. Let the dough rise covered, to prevent crust formation
6. Make sure the oven is pre-heated at the correct temperature

DEBUGGING

Bug	Diagnostics	Fix
The dough is too firm	The flour is too fine	Use stronger flour
	Too much salt	Accurately weigh the salt
	Raising time too short	Make sure the dough volume has doubled during the raising step
	Oven not warm enough	Always pre-heat the oven to the correct temperature

Bug	Diagnostics	Fix
The dough is lumpy	Too much yeast	Carefully weigh the yeast
	You did not knead and flatten enough	Sufficiently knead the dough
	The dough has risen for too long	If you have let the dough raise for too long, knead it and then repeat the <i>forming</i> and <i>second raising</i> steps
Strong yeast taste	Too much yeast	Weigh the yeast carefully
	The dry yeast was not solved correctly	Make sure the dry yeast is fully dissolved before using it
	Fresh yeast was mixed with sugar	Use only little sugar with fresh yeast
Broken crust	Flour too fine	Use stronger flour
	The dough did not rise sufficiently	Let the dough rise for a longer time
Pizza is too wet	There was too much tomato juice and it could not dry out	There are dozens of different tomato kinds. For pizza, like for <i>sugo</i> , firm tomatoes with little juice and lots of fiber works best. Best choice: <i>pelati</i> , also known in California as Roma tomatoes

FREEZING

Dough can be frozen for two (2) months. After that time the glue action of the flour dissolves and the starch crystallizes, changing the taste. The dough has to be packaged air-tight and frozen immediately when it is ready. If fresh yeast is used, the yeast quantity has to be doubled because it loses its potency when frozen.

UNFREEZING

Thaw dough in refrigerator, roll when still cold. If it is thawed in a microwave oven, it has to be unfrozen in a microwave plastic wrap to prevent the dough from drying out.

ITALIAN PIZZA DOUGH

This recipe is for one pizza for 6 people or for 6 small pizzas.

This dough becomes a soft, light pizza shell. Put on it what you like: fish, meat, or vegetables. Experiment a little bit until you find your preferred topping. It is easiest to begin with a layer of peeled tomatoes and garlic, a layer of ingredients you like, oregano and basil, grate some cheese on top, and bake.

15 g fresh yeast or 1½ tea spoons of dry yeast
½ tea spoon sugar
5 spoons luke warm water
50 g butter or margarine
225 g flour (type 550)
½ tea spoon salt
1 egg

Dissolve yeast with sugar in luke warm water, let sit in warm place until it is bubbly. Knead the butter or margarine in the flour until it makes crumbs. Mix in the salt. Mix the yeast and the shaked egg and the flour to a tough dough. Knead on a surface with flour, put in a bowl covered with a plastic foil smeared with oil, and let it sit until the volume doubles.

Throw the dough on a surface covered with flour. Roll out to a circle (diameter 30 cm) or a rectangle (23×30 cm). It can also be rolled out to make 6 small pizzas. (Make sure the big pizza fits in the oven!)

PIZZA NEAPOLITAN

**9 peeled, smashed tomatoes
salt & pepper
12 anchovy fillets
175g thinly sliced mozzarella
1 tea spoon oregano, basil, thyme
2 spoons olive oil**

Mix the tomatoes with salt & pepper and smear uniformly on top of the dough. Halve the anchovy fillets and arrange on the pizza. Cover with the cheese and sprinkle with the herbs, sprinkle with the oil. Bake for 15–20 minutes. Bake the small pizzas for 10 minutes.

PIZZA ALLA FRANCESCA

**225 g sliced mushrooms
25 g butter or margarine
212 g sliced mozzarella
225 g canned peeled tomatoes
1 pressed garlic clove
300 g tomato concentrate
50 g black olives
1 tea spoon oregano and basil
2 spoons olive oil
Parmesan to sprinkle on top**

Sauté the sliced mushrooms in the butter or margarine at a high temperature for 2–3 minutes. Cover the dough with the mozzarella slices. Discard the juice from the canned tomatoes, smash them in a bowl, add the garlic and the tomato concentrate. Smear this mix on top of the cheese. Sprinkle with the mushrooms, decorate with the olives, sprinkle with the herbs, sprinkle with the oil, and grate some parmesan on top. Bake for 15–20 minutes. Bake the small pizzas for 10 minutes.

**PIZZA CON PEPPERONI
(BELL PEPPER PIZZA)**

**For 4 persons:
1 pizza dough
1 jar pickled roasted peppers
4 pealed tomatoes (pelati)
2 small onions
1 table spoon olive oil**

Preheat the oven to 280°C and prepare the dough. Place the knuckled dough on the peel and distribute evenly the squashed tomatoes. Drain well the roasted pepper from the liquid and cut them in stripes; distribute them on the pizza with the onions cut into rings. Let a fathom of oil flow and put in the oven for 15 minutes.

**PIZZA AI FUNGHI
(MUSHROOM PIZZA)**

**For 4 persons:
1 pizza dough
3 fresh porcini mushrooms
salt
olive oil**

Flatten the pizza dough and smear it with oil. Cut the porcini in very thin slices using a truffle cutter or a ceramic knife and distribute them on the dough. Place a tomato filet here and there, salt, and sprinkle with oil. Bake for 15 minutes in the oven at 250°C.

**PIZZA QUATTRO STAGIONI
(4 SEASON PIZZA)**

**For 4 persons:
1 pizza dough
1 small can vongole
1 box frozen clams
1 small jar artichokes in oil
70g black olives (Gaeta type)
olive oil**

Flatten the pizza dough and mark a cross with the knife. Wash the sea fruits under running water and place them in two quadrants. Halve the artichokes and put them in one quadrant. Put the stoneless olives in the last quadrant. Let a few drops of olive oil fall on the sea fruits and put immediately in the oven at 250°C.

This is the Neapolitan recipe. Further north the four toppings are: prosciutto (winter), artichokes (spring), bell pepper (summer), and boleti mushrooms boleti (fall). Capers are sprinkled over the whole pizza. Before the ingredients are added, some mozzarella and tomato is put on the dough.

**PIZZA ALL'ORIGANO
(OREGANO PIZZA)**

**For 4 persons:
1 pizza dough
5 garlic cloves
salt
pepper
plenty of oregano
oil**

Flatten the dough and stick into it the garlic pieces cut along their long side. Dust the pizza with salt and pepper. Put a lot of oregano on the pizza and sprinkle it with oil before putting it in the 250°C oven.