

Choux Pastry: Preparation and Baking

CHOUX PASTRY is a simple dough mixed quickly on the stove, piped into adorable round puffs, then baked in the oven. The most common application for choux pastry is for profiteroles, or cream puffs, which feature choux pastry filled with whipped cream then topped off with chocolate ganache. When profiteroles are stacked into a grand triangle, or evergreen tree shape, they are known as a Croquembouche. This tower is often served at weddings, Christmas parties, and swanky celebrations. Choux pastry has a reputation for being difficult, but it is a wonderful recipe to master because it opens the door to dozens of other pastries!



Objective:



Summarize basic choux pastry ingredients and equipment, preparation and baking methods.

Key Terms:



beat
choux
choux pastry
dorure

emulsion
gelatinize
pâte
pâte à choux

score
sifting

Choux Pastry

Choux pastry or **pâte à choux** is a classic French pastry preparation that uses two stages of preparation: cooking the paste and baking the paste.

PÂTE Á CHOUX

The word “**pâte**” is French for “dough”, “paste”, or “batter” and is used as a descriptor for a category of products, which are the building blocks of many traditional and contemporary creations. The consistency of the paste is thicker than a batter, but not quite as stiff as a dough. The word derivation of “**choux**” is French for “cabbage” and historically refers to the irregular shape it takes on as it bakes. Once

baked, the pastry crusts on the outside, creating a puffed shape and a hollow interior. The crisp shells are filled with a variety of creams and finished with a glaze.



FIGURE 1. Pâte á choux bakes up into golden brown, crisp pastries. Inside these light pastries are mostly air pockets with a bit of moist dough. They can be filled with sweet cream, custard, fruit or even savory mixtures. The dough is most often piped into rounds for cream puffs and fingers for eclairs.

HISTORY

Pâte á choux has roots back to the 16th century and originally was made by adding eggs to a paste made from potatoes. The dish is still made today and is known as pommes dauphine. The Pâte á choux recipe was perfected by Antoine Carême in the 19th century and his recipe is still used today.

INGREDIENTS

Pâte á choux is a combination of milk and/or water, butter, margarine or shortening, sugar, salt, pastry flour, and whole egg. This lesson covers the basic ingredients used in preparing choux paste, but for a full description of ingredients and their functions, refer to the Baking Basics reference document found in the MYCommunity section of MYCAERT.

Liquid

The use of milk gives the choux more color during baking and creates a more tender pastry, whereas water allows for baking at a higher temperature. Generally, a combination of both water and milk will be used.

Fat

Unsalted butter is typically used for the fat; however, margarine and shortening can be used as well.



FIGURE 2. Pâte à choux is a combination of milk and/or water, butter, sugar, salt, flour and whole egg. The milk gives the choux more color, whereas the water allows for baking at a higher temperature. Generally, a combination of both is used.

Flour

Pastry flour is used for its weaker protein content, preventing the dough from distorting too much during the baking process. If bread flour is used, the paste will require more hydration and the paste may be tough and will not expand well in the oven.

Sweetener

A small amount of sugar is usually added, lending a slightly sweet flavor as well as aiding in coloration.

Salt

Salt rounds off the flavors, helping to bind the water to the paste and ultimately making a smoother dough.

Eggs

Eggs should be at room temperature to ensure easy incorporation into the paste. [Tip: Using fresh eggs will ensure the optimal flavor]

HAND TOOLS AND EQUIPMENT

Basic hand tools and equipment are necessary for creating a light and airy pastry. For a full description of hand tools and equipment, refer to the baking basics reference document located in the MYCommunity section of MYCAERT. The following list is the basic tools and equipment needed to prepare choux paste:

- ◆ Liquid measuring cup
- ◆ Scale to weigh out ingredients or dry measuring cups and spoons
- ◆ Sifter
- ◆ Pot (large enough to hold the liquid, fat, and flour, with enough room to stir vigorously with no spillage)
- ◆ Rubber spatula or cooking spoon
- ◆ Stove
- ◆ Whisk, electric hand mixer or stand mixer with paddle attachment
- ◆ Mixing bowl
- ◆ Pastry bag with piping tip or zipped top bag for piping
- ◆ Parchment paper
- ◆ Pastry brush
- ◆ Baking sheet
- ◆ Oven

PREPARING CHOUX PASTRY

Preparation of choux pastry requires many steps, ingredient preparations, tools and equipment pieces and should all be discussed thoroughly when preparing this delicate pastry.

Mis en place

Before mixing, the baker must follow the rules of *mise en place*. **Mis en place** is a French cooking term that means “to set up” or “to arrange.” The baker should:

- ◆ Read the entire recipe.
- ◆ Collect all of the ingredients and allow them to come to room temperature (with the exception of milk, which should usually remain refrigerated until use.)
- ◆ Measure all ingredients accurately, preferably by weighing.
- ◆ Follow processes requested by the recipe, ensuring ingredients are at room temperature and the flour has been sifted.
- ◆ Prepare the workstation by cleaning the area, gathering tools (spatula, liquid measuring cup, sifter, etc.), and arranging equipment (such as a stand mixer) as required.

- ◆ Preheat the oven.
- ◆ Prep baking sheet with parchment paper and prep piping bag with piping tip.

Preparation

- ◆ **STEP ONE:** Mise en place should be done. Bring ingredients to room temperature (68°F to 70°F) prior to mixing. Weigh all ingredients separately. Sift flour [**sifting** is the process of passing a dry ingredient, such as flour, through a bottom sieve. This process combines air with the ingredient being sifted, making it lighter and more uniform in texture, which improves the baking or food preparation process.] Preheat the oven. Prepare piping bag fitted with decorating tip. Place an ungreased parchment liner on a full sheet baking sheet.
- ◆ **STEP TWO:** To begin a pâte à choux, the liquid, fat, salt, and sugar are combined in a stainless-steel pot and are brought to a boil.
- ◆ **STEP THREE:** It is crucial to heat this mixture slowly at first to ensure the fat melts evenly as the mixture warms. If there is too much water evaporation [via steam], the emulsion [an **emulsion** is a combination of two or more liquids (that are naturally repellent) into a smooth mixture.] could break after the flour is added.
- ◆ **STEP FOUR:** One mixture has boiled, it is then removed from the heat and the flour is added entirely. Stir the mixture until a thick paste forms.
- ◆ **STEP FIVE:** Return the mixture to the stove, on low heat, and stir the mixture just until the flour pulls away from the sides of the pot. During this step, the starch in the flour is hydrated and binds with the liquid mixture (butter, milk, and water). This will help stabilize the emulsion. It is very important not to overcook the paste.
- ◆ **STEP SIX:** The paste is then transferred to a mixer fitted with a paddle attachment and is beaten [to **beat** is cooking term that means to rapidly stir a batter with a mixer or whisk, to thoroughly incorporate the ingredients along with air] for a few minutes.
- ◆ **STEP SEVEN:** Add three-fourths of the egg and after it is fully incorporated, the rest is added to achieve the proper texture of the batter. If all egg has been added and the batter is stiff, add warm milk to adjust the paste to the proper consistency. [NOTE: Whether or not milk is added, as well as how much milk is added, depends on the age, quality and moisture content of the flour.] It is important not to overmix pâte à choux (which happens easily when using a when using a machine for mixing). If the paste is too dry, there will not be sufficient steam generation during the baking process, to leaven the paste, and if the paste is too wet, it will not be able to hold the shape that the steam creates. Properly made pâte à choux should have a shiny, smooth appearance, and it should not be too soft.

Shaping/Piping

Transfer the paste to a piping bag, fitted with a decorative tip to aide in the shape of the end result. [NOTE: If a piping bag and/or piping tip is not available, you can also use a zipped-top bag and cut off the corner for easy piping.] Piping the paste on parchment paper is the best nonstick surface for this choux pastry dough. [HINT: Before piping the dough, moisten the parchment paper with water. WHY? Eggs need a moist and humid environment in the oven to

properly rise and avoid drying out and burning. Water moistened parchment paper = perfectly puffed up pastries with a deliciously light center and crisp exterior. Pastry perfection!]

- ◆ Your chosen choux pastry recipe will determine how your paste should be piped onto the parchment paper. For specific directions for each choux pastry, refer to the lesson CA C8–14 Choux Pastry: Desserts. However, choux pastry can be piped in round mounds for profiteroles/cream puffs or elongated for eclairs.
- ◆ After a *pâte à choux* is piped, it can be brushed with a **dorure**, an egg wash of beaten egg or egg yolk, thinned with milk or water.



FIGURE 3. Traditional pastries are piped in round or elongated shapes, however choux pastry can be piped into various shapes for the various pastries made with *pâte à choux*.

The process of brushing an egg wash on dough before baking, just like with pies, gives choux pastries a rich, golden color and a bit of a glossy shine. When applying the **dorure**, aim for a thin, even layer for more even coloring. You can use a pastry brush to apply as well as to press down any small peaks that may have formed from the piping process. Allow the choux to rest for 20 minutes in the open air to develop a skin; this helps maintain the shape during the baking process.

- ◆ Once egg washed, the *pâte à choux* can be scored and is ready for baking. The cooking term **score** refers to the shallow cuts made in the surface of meat, fish, bread or cakes. Scoring has several purposes, such as decorating the food and tenderizing. Cakes are scored to indicate where the cake should be cut without actually cutting it. The purpose of scoring the *pâte à choux* is to help encourage an even expansion of the paste in the oven. An easy way to score the paste is to indent the surface slightly with a fork in a criss-cross pattern.



BROADENING AWARENESS...

AMAZING ASPECTS: Life of Choux Pastry

Unbaked as well as baked *pâte à choux* can be stored in the freezer with good results. To store *pâte à choux* unbaked, it is best to use a blast chiller and to freeze it for up to 2 weeks. When ready to use, thoroughly defrost and the pastry can be used and baked as normal. To freeze, the individual pieces should be frozen on baking sheet pans. Once baked, all *pâte à choux* products have a relatively short shelf life of 24 hours because the pastry will soften greatly.

BAKING CHOUX PASTRY

Heat is a major player in getting a good puff from your pâte á choux, so you want to ensure your oven has reached the correct temperature and is thoroughly heated before baking off the choux paste.

Baking Process

Baking pâte á choux is a multi-step process:

- ◆ Starting with a medium-high temperature (350°F convection); this initial temperature heats the pastry quickly, creating the steam required for leavening. If the pastry becomes too hot, too much steam can be created and a misshaped or cracked pastry will result. The proteins from the egg and flour are stretched when they are warmed and held until they are set by oven heat.
- ◆ Once the full volume is achieved and the crust begins to form, the temperature should be decreased to 325°F and the oven vent should be opened.
- ◆ Some might wonder how these pastries rise without any leavening agent, it's all about the steam! The heat from the hot oven causes the liquid in the paste to quickly evaporate and turn to steam. The steam rapidly expands the paste, leaving behind hollow pockets of air with a crisp outer shell.

Testing for Doneness

Pâte á choux should be baked until it is golden brown and “dry” in the center. This could be tested by breaking open a piece out of the oven and feeling the moisture level on the inside of the pastry. Ironically, it should feel slightly moist. If pâte á choux is prematurely removed from the oven, the pastry is at risk of collapsing due to the excessive moisture from within the pastry evaporating through the crust and making it weak.



FIGURE 4. Choux pastries are sometimes filled with cream after baking like with cream puffs or éclairs.

Science Behind Choux Pastry

The double cooking of the choux paste helps produce the light, airy interior texture.

- ◆ Heating the flour, the first time causes the starch to **gelatinize**, in which the starch granules swell when combined with the liquid (in this recipe milk and/or water). By

gelatinizing, the starch will help support the structure of gluten when the steam inflates the pastry. This structure will also help hold the steam. The first cooking will also help alter the gluten molecules, so the dough is less elastic. [NOTE: Think of a rubber band, new rubber bands stretch and snap back, the dough would be like an old rubber band that stretches but does not snap back all of the way.] The steam will push out the dough to form bubbles and instead of snapping back right away, the bubbles stay stretched out. The starch structure will help support and prevent the steam from escaping.

- ◆ When baking the choux paste, it is first baked at a high temperature and finished at a lower temperature. The initial high temperature is what will create the steam to cause it to rise.

Summary:



Choux pastry is a simple dough mixed quickly on the stove, piped into round puffs, then baked in the oven. The most common application for choux pastry is for profiteroles, or cream puffs. Choux pastry or pâte á choux is a classic French pastry preparation that uses two stages of preparation: cooking the paste and baking the paste. Pâte á choux is a combination of milk and/or water, butter, margarine or shortening, sugar, salt, pastry flour, and whole egg. Pâte á choux should be baked until it is golden brown and “dry” in the center.

Checking Your Knowledge:



1. What is a choux pastry?
2. Describe how choux pastries get their shapes.
3. Do you have to bake choux pastries right away? How long do they last when baked?
4. What causes the pâte á choux to rise during baking?
5. How can you determine when the choux paste is done?

Expanding Your Knowledge:



Choux pastry is usually baked but for beignets it is fried. In Spain and Latin America, churros are made of fried choux pastry, sugared and dipped in a thick hot chocolate for breakfast. In Italian cuisine, choux pastry is the base for zeppole di San Giuseppe which are cream-filled pastries eaten in March for the feast of Saint Joseph. In Austrian cuisine, one variation of Marillenknodel, a sweet apricot dumpling cooked in simmering water, uses choux pastry. Ask your teacher if you may invite a pastry chef or chef instructor from a local pastry school to demonstrate various versions of choux pastry.

Web Links:



Troubleshooting Cream Puffs

<https://www.youtube.com/watch?v=Qn1wqaTwpfE>

Filling Cream Puffs

<https://www.youtube.com/watch?v=uowexKpS46M>

How to Make a Croquembouche (Cream puff tower)

<https://www.youtube.com/watch?v=d5nCbSNS9mA>