Croissants

BAKING INDUSTRY RESEARCH TRUST

> INFORMATION SHEET

DEFINITION

Crescent-shaped roll made from yeasted dough layered to make flaky puff pastry. May be flavoured with almond paste, chocolate or cheese. Should be light and flaky in texture and melt in the mouth.

HISTORY

Croissants are thought to have originated in Austria. In 1683 when the Turks were secretly digging tunnels under Vienna to make a surprise attack on the city they were heard by bakers working early in the morning. The bakers who raised the alarm and saved Vienna from being defeated by the Turks then baked a special commemorative roll in the shape of the crescent, as seen on the Turkish flag. Marie Antoinette introduced the roll to France where it became known as the croissant, the French word for crescent.

INGREDIENTS

INGREDIENT	**FUNCTION & SPECIFICATIONS** (*Based on flour content.)
Flour	Strong with protein content of 11.5–13%. The extensibility of the protein is important during folding and rolling of pastry. Needs to have good gas retention properties to help trap carbon dioxide produced by the yeast. To slow down the yeast it is recommended that flour is chilled in a freezer or fridge for 24 hours before use.
Butter	Within the dough: 4–5%* to lubricate gluten strands during mixing and assist with lamination process. Roll in butter: To add flavour and tenderness to the finished product. Added into dough by English or French method for puff pastry to achieve hundreds of layers of dough, fat, dough, fat...to produce a flaky croissant. Ideal butter temperature is 14–15ºC.
Sugar	For crust colour, sweetness and to make the finished product tender.
Salt	For flavour, to control fermentation and strengthen the gluten strands.
Yeast	For flavour and aeration. Amounts vary depending on the amount of sugar, fats and eggs used in the dough. As more of these ingredients are added, more yeast is required. If the croissants are to be frozen then the yeast amount should be doubled.
Water	Added to hydrate the flour proteins and combine all ingredients. Water should be chilled for 24 hours before use to slow down fermentation of yeast.
Milk powder	For crust bloom, flavour, crumb texture and to produce a flaky texture.

Optional ingredients include eggs, which can add richness and strength to dough, and improvers/dough conditioners, which can assist in the final volume.

PROCESSING

Two sets of skills are needed for manufacture: bread (yeast raised) and puff pastry making. Yeast requires care hence the need for chilling the dough (pastry) between each fold/turn to prevent the yeast from working too fast and losing effectiveness during proofing and baking stages.

PROCESSING

PROCESS	**DETAILS**
Mixing	The aim is to achieve proper blending and hydration of the ingredients. Some gluten development is desirable to make dough handling easier at the early stages of laminating.
Dough temperature	Ideal temperature is 19 ± 2ºC as the dough ingredients will readily hydrate and roll-in fat will remain firm.
Laminating	The flakiness of croissants depends on the formation of many thin films of gluten protein which trap water vapour and carbon dioxide from fermentation. Laminating separates these films with fat. The process consists of a series of sheetings, where the dough is reduced to 1/3 or 1/4 of its thickness before being folded into 3 or 4 layers. Most croissants are made from three folds after the fat has been incorporated which gives 54 fat layers, although by changing one three-fold to a book-fold the number of fat layers is increased to 72. Number and type of folds is determined by whether a soft or firm roll-in fat is used.

Resting & retarding dough	Whether the dough is rested is dependent on the baker's opinion on the desired final product qualities and whether the process is automated or hands on. Most important is the use of good quality yeast.
Dough makeup	Laminated dough should be subjected to as little compression during sheeting and makeup as possible. The dough should be stretched rather than squeezed between reduction rollers. The cutting edge should be sharp. Final thickness of dough sheet before makeup is determined by size of the finished product – the smaller the roll then the thinner the sheet. Dough is cut into triangles of desired size which are then rolled starting from the base usually with three-and-a-half to four full turns, with ends of roll bent inwards to form a crescent. The final shape has slight differences in different regions of France.
Egg wash	Is recommended for bakers who proof their croissants for a long time in an open warm room.
Proofing	The most important step to produce quality croissants. This stage must be closely monitored. The proof temperature must not exceed melting point of roll in fat and ambient relative humidity must be in the range of 75–85%. It is generally agreed that croissants need to expand to two-and-a-half times their original volume and, depending on temperature, this may take 1–3 hours. Under proofing causes collapse of internal crumb structure.
Baking	Depending on type of oven and size of croissants the baking time can vary from 10–20 minutes and oven temperature from 165–205ºC.
Packaging	Croissants must be packed in grease-proof film or a poly coated box. Due to their high fat content and tendency of fat to absorb odours, they need to be kept away from all strong smells. Packaging should offer little head space to avoid drying out or freeze burn.

TROUBLE SHOOTING

PROBLEM	PROBABLE CAUSE	REMEDY
Butter breaks through dough	Butter too cold Dough too soft Harsh sheeting reduction	Condition butter to 14–16ºC before use. Reduce water in dough so same consistency as butter at 14–16ºC. Use gradual and even sheeting reduction
Butter oozes out from dough	Butter too warm Dough too warm Dough too tight	Condition butter to 14–16ºC before use. Chill dough. Increase water in dough.
Butter melts during proof	Proofer too warm Insufficiently laminated	Reduce power temperature to 30–32ºC. Laminate with minimum of three book folds.
Baked pastries are misshapen	Irregular laminating Butter too hard Oven too hot Rolled out too thinly or quickly	Use butter sheets. Condition butter to 14–16ºC before use. Bake croissants at 230ºC. Use gradual and even sheeting reduction.
Baked pastries show fatty patches inside	Insufficiently laminated Excess roll-in butter	Laminate with minimum of three book folds. Reduce roll-in butter (max 75% flour weight).
Pastry sticks to sheeting rollers	Insufficient dusting Room too warm	Use more flour for dusting during sheeting. Work in cooler room or at cooler time of day
Pastry topples during baking	Too few folds Dough pieces too thick	Increase number of folds. Roll slightly thinner.

Tough end product	Too little layering butter Too little dough butter Baking temperature too low	Increase butter (max 75% flour weight). Increase dough butter. Bake croissants at 230ºC.

REFERENCES

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