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PREFACE. -12°C GELATO

Gelato is a frozen treat with roots from all over the world, but most famously Italy. The word gelato comes from the Italian word 'Congelare' which means 'frozen'. But what is it exactly? And why not call it ice cream? What does -12°C mean?

Sure, ice cream and gelato are both frozen delights. Made from raw materials, such as milk, cream and sugars, they are subsequently whipped while adding cold to create a cold treat with a soft and smooth consistency. However, there are some differences. Since both of the writers of this book have a predilection for crafts, quality and artisanal activities, it was important to stick with a product that has all those properties.

Gelato differs from ice cream in many ways. Gelato is made in an artisanal way on a small scale, using only the finest and freshest raw ingredients. Gelato means offering daily fresh products of high quality in a changing and evolving menu over the seasons and days, whereas ice cream is produced with giant machinery in a big facility, not always using the finest ingredients. Ice cream is mostly produced on a big scale and meant for long storage. Apart from the almost melancholic reasons, ice cream and gelato differ in terms of the final product. Gelato contains less sugar and fat than ice cream does and it carries less air. For example, the air incorporation of gelato is anywhere between 20 and 35%, whereas industrial produced ice cream can contain over 100% of air. Gelato has made a huge step in popularity and fame over the last few years. With the overall global increased interest in homemade and 'real' products, combined with a rising sense of healthier nutrition, gelato has gained popularity over ice cream with artisan gelato parlours popping up globally.

The title for this book is -12°C. This is the perfect serving temperature for artisan gelato. With this book, our aim is to offer a true reference book for starters as well as the more advanced Gelatiere in the gelato industry. With its in-depth theory, recipe calculation methods, beautiful and tasty gelato creations and recipes, we believe this is a great enchiridion for everyone who shares the same love for this beautiful, fluffy and frozen product: gelato.

GELATO INGREDIENTS

WATER (H2O)

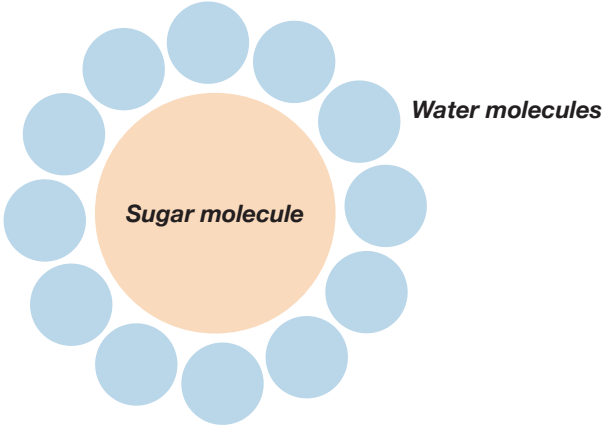
A big part of gelato is water. The water content ranges anywhere between 58-68% for Milk gelato and even more (68-74%) for fruit sorbets. It is a part of milk, cream, fruit and some types of sugar.

THE FORMATION OF ICE CRYSTALS

Water is the only element of gelato that actually freezes, so it changes from a liquid state to a solid state under the influence of cold. It gives consistency to gelato. Not all the water in the gelato, however, freezes at the same temperature due to the different types of solutions.

Pure water freezes at 0°, but because of the added sugars and solids, the freezing point of the water drops. On average, the freezing point of a gelato mix lies between -2.6°C and -3.2°C.

Water turns to ice when frozen and normally freezes into a tight crystal grid: a large and hard ice block in which all water molecules are packed closely together. The closer the ice crystals are to each other, the harder the ice gets and the colder it feels in the mouth. Just think of an ice cube in a soda: that is a solid surface of many small ice crystals packed together. They release a lot of cold on your tongue which is why an ice cube feels very cold. The ice crystals in gelato are no longer a solid crystal grid. How does that work? Some of the solids in a recipe, such as sugars and proteins, dissolve in the water. We call this the matrix. The water molecules surround the sugar molecules, so the sugar dissolves in the water. When the matrix cools down, the water molecules can no longer freeze into a tight crystal grid because of the presence of these sugar particles in between the water particles. More cold is needed to get this done. You call this the anti-freezing power. This is why a gelato mix does not freeze at 0 degrees, but only at -2 or -3 degrees Celsius. So the more solids there are in the mix, the more cold it takes to form ice crystals. This also affects the size of the ice crystals. The water in the gelato mix is converted into very small ice crystals during the freezing. This is done in the Batch freezer where the mix is kept moving while simultaneously adding cold. All of this creates small ice crystals. When the finished gelato just comes out of the Batch freezer, the ice crystals are at their smallest. They are so small and finely divided that you don't taste them with your tongue, unlike the ice cube. Ice crystals not only form during gelato production, the water inside the gelato does not stand still after that either. When the gelato is extracted from the machine, the ice crystals are properly mixed into the gelato and are so small that they cannot be tasted. That changes as the gelato ages. If a container of gelato has been in the freezer for a while and you take it out to scoop a portion, the temperature of the surface will rise. As a result, the ice particles turn back into water and when the temperature drops again because the gelato is then returned to a colder freezer, this water refreezes. Only this time it does not freeze into the same small ice crystals, because they have disappeared, yet into larger ice crystals that you can taste. Also, when the gelato sits inside the gelato cabinet, this cycle continues. With the changing temperature of the gelato display, water melts and freezes again, resulting in bigger ice crystals over time. Apart from the formation of ice crystals and its function as a solvent for the solids in a recipe, water is also an ingredient for the transportation of flavour. Water melts in your mouth when you take a bite of gelato, which is what creates flavour release.



WATER AS A MEANS OF TRANSPORT

In addition to the temperature in your mouth, the melting speed is also important to experience the desired taste experience when eating gelato. The flavour is released when the ice crystals melt. The melting speed determines the time that a bite of gelato stays in your mouth and you experience the taste. How quickly the ice crystals melt is determined, among other things, by the amount of air in the gelato and the amount of stabiliser.
During the freezing of the gelato, many air bubbles are screwed in, on average about 30% to 40%. When eating gelato, these air bubbles slow down heat transfer, making it melt less quickly and feel less cold. A stabiliser slows down the melting rate by slowing the flow properties of the water. If the ice crystals melt too quickly, a lot of water will be released quickly resulting in a quick drop of temperature in your mouth. Due to the low temperature, you experience the taste less, which is also further diluted by the amount of water that is released. The watery melted substance then quickly washes away, cheating you out of the desired experience. When ice crystals melt too slowly, the opposite is the case. Too little melting water makes it harder to swallow the gelato, leaving it in your mouth for too long and thus creating a negative taste effect. The correct melting rate and the melted gelato viscosity are therefore essential to undergo the full flavour experience. Bottom line: water is not just water, but a very important ingredient in the gelato.

MILK

Traditionally, milk is one of the core ingredients for making gelato. Cow's milk, to be more exact.
Other dairy milks, such as buffalo milk, sheep milk and goat milk, can also be used for making gelato. Each of these has its own specifications in composition and taste. For non-dairy gelato, milk substitutes such as soy-, oat-, almond-, rice- and coconut drinks are often used. All of these sources have their own properties in the final gelato in terms of flavour and consistency as well. What they all have in common is that they are the main source of water in a gelato recipe.

RAW MILK

(Cow's)milk is not always the same. The most natural version of milk is raw milk. This milk is untreated and contains all the vitamins, minerals and flavours that the cow put in. This milk characterises itself by a fuller mouthfeel and a higher fat- and protein content than treated milk. The amount of fat and lactose changes by the season and therefore the Gelatiere often has to change the recipes in order to be accurate. In every country there are different rules and regulations about the use, pasteurisation, and storage of raw milk.

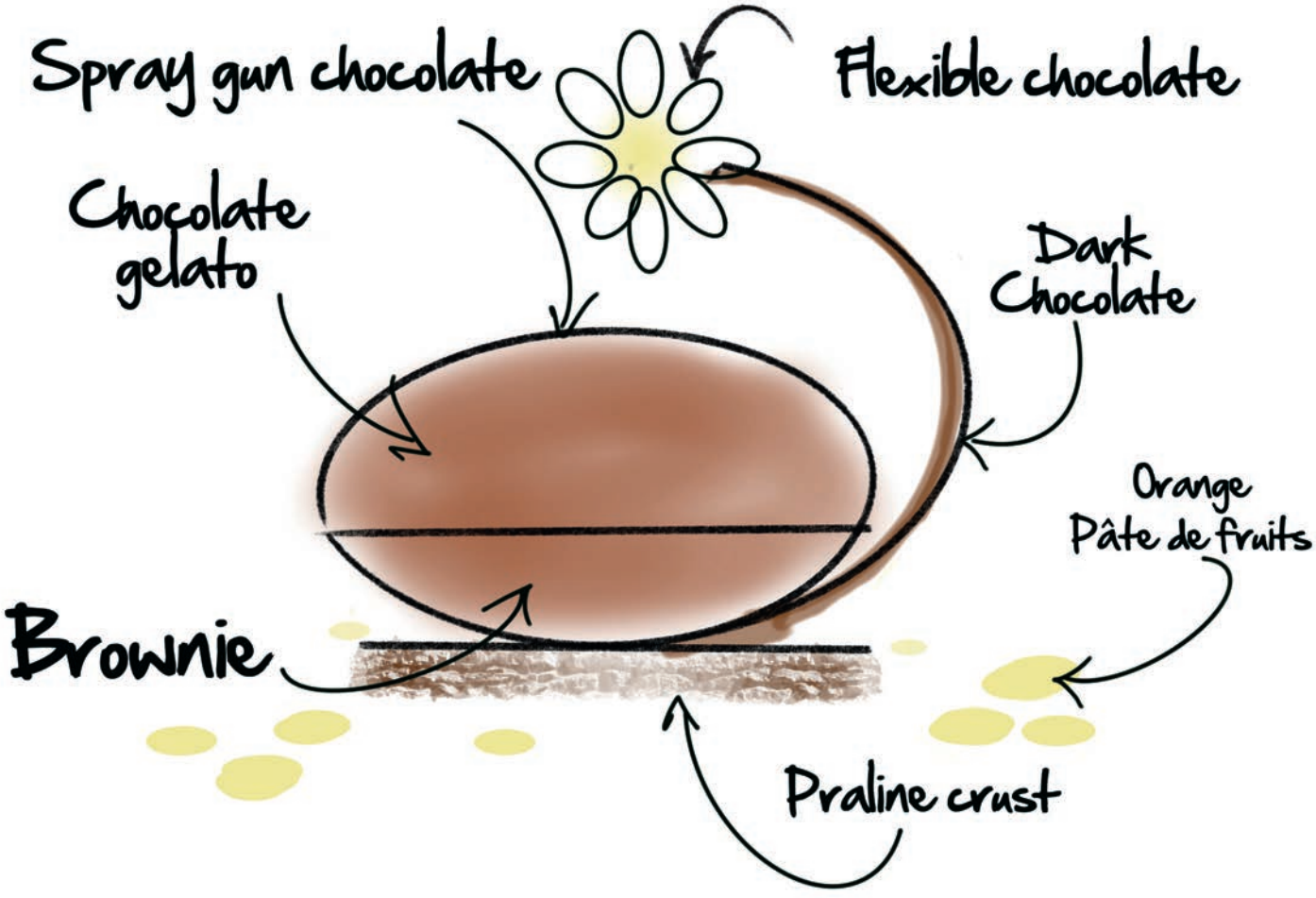
STANDARDISED MILK

Standardised milk is the one found in the supermarket and is characterised by the fact it is always the same. The milk companies separate the cream from the rest of the milk. The milk is pasteurised to assure the hygienic standards and the cream is homogenised and pasteurised. Then the necessary amount of fat is added to the milk to obtain whole milk (3.5% fat), Semi-skimmed milk (1.8% fat) or skimmed milk (0.2% fat). That way, standardised milk is always identical. Homogenization is an important step in the production cycle of milk. During the homogenization process, pressure is used to press the milk fat through small pores. The large fat globules are reduced, as a result of which the small fat globules no longer clump together and remain floating in the milk. Instead of a lump of fat on top of the milk, the fat is completely distributed throughout the whole milk. Almost all milk, including organic, is homogenised nowadays. Because of a better distribution of the fat globules in the milk, they also distribute better throughout the gelato mix. This results in a more stable final product, more air incorporation (overrun), and a creamy mouthfeel. This stability is important, especially when the shelf life has to be a little longer. Milk is not just milk, it is consists of different components. When balancing a gelato recipe, it is important to know what the milk is composed of.

Standardised whole milk 3.5% fat	
Water	87.9%
Fat	3.5%
Milk proteins	3.5%
Lactose	4.6%
Minerals and vitamins	0.5%

UHT MILK

The name UHT Milk is short for 'Ultra High Temperature', which means the milk has been sterilised at a temperature of 138°C for 1 second. This process was developed in the 1960's, but came to practise in the 70's. Not only milk goes through this process, it is also applied to fruit juices, yoghurt, wines and soups. The main purpose of this process is to extend the shelf life of the milk. Unopened packages of UHT have a shelf life of up to 6 months. This is ideal for countries where fresh milk isn't always available, or for the Gelatiere to have in store for emergencies during busy days. The downside of this type of preparation is the cooked flavour it carries. Because of the sterilisation, the lactose in the milk burns and gives the milk a cooked flavour. Also, because of all the treatments


Spray gun chocolate
Flexible chocolate
Chocolate gelato
Dark Chocolate
Orange Pâte de fruits
Brownie
Praline crust

AVOCADO

For 10 pieces
Ingredients:
150 g dark chocolate
3 g sunflower oil

For the praliné and soy sauce gelato:
900 g white base
90 g Callebaut praliné 50%
10 g soy sauce

For the avocado gelato:
600 g avocado pulp
154 g water
80 g condensed milk
80 g granulated sugar
45 g dextrose
30 g inulin powder
10 g fresh lime juice
1 g salt

For the candied pecan nuts:
200 g pecan nuts
Sugar syrup 70% with infused spices

Use a hand blender to mix the ingredients for the praline and soy sauce gelato. Leave the mixture to rest for a bit and then churn it to gelato in the batch freezer. Transfer the whole to a piping bag and pipe the gelato into half-sphere baking mats. Freeze until solid before unmoulding.

Use the hand blender to mix the ingredients for the avocado gelato. Leave the mixture to rest for a bit and then churn it to gelato in the batch freezer.

Melt the dark chocolate along with the sunflower oil and apply it to the avocado moulds. Shake out the excess chocolate and allow some time until the chocolate in the moulds has set well. Pipe the avocado gelato into the chocolate-lined moulds and press in the praline gelato. Briefly freeze and then remove from the mould.

Pre-heat the oven to 180°C. Briefly bake the pecan nuts in the sugar syrup, drain them well and distribute them on a baking mat. Bake for 8 minutes in the preheated oven.

Serve the avocado halves with the candied pecan nuts.