

THE INFLUENCE OF ADDITIVES ON PREPARING THE FONDANT

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ABSTRACT

This paper presents the influence that certain additives have on the content of dry substance of the fondant mass and on the ratio between the liquid phase and the solid phase. Depending on the results obtained we shall establish the final destination of the fondant mass. In order to achieve these tests we have used the following additives: vinegar, honey, inverted sugar in different concentrations.

Keywords: fondant mass, cremosa, paveu, fondant candies

INTRODUCTION

The products obtained on a sugar, honey and glucose basis are called sugar products or sweets. These are widely appreciated by the consumers due to their high energetic value and their psycho-sensorial taste properties, flavour and colour. The high content of dry substance formed especially by the carbohydrates confers a high energetic value to sweets.

Consumed in moderate quantities these products have the advantage of being easily digested and assimilated being indicated especially for intense physical activities, food for sportsmen and other categories of intense working (furnaces, foundries).

The psycho-sensorial properties specific to sweets are the main attractions for children and sometimes determine an abusive consuming with negative follow-ups for health: obesity, over-solicitation of the pancreas, cholesterol raise, higher blood pressure as well as tooth decay.

Under the name of "laboratory products" we have grouped a large and varied range of sugar products which are characterized by a mild consistency and a high food value due to the additives from other materials such as: greasy stones, fruit confis, cocoa powder, yolk. These products are fondant candies, products with a foamy consistency, jellified products (jellies).

The fondant is a white paste tasting sweet and having the consistency of a cream. From a physical-chemical point of view it is a heterogeneous system consisting of a solid phase (saccharose crystals of different shapes), a liquid phase formed of a saccharose saturated solution in the presence of glucose or of inverted sugar and a gaseous phase formed from the air incorporated during preparation.

The ratio between the solid phase and the liquid phase of the fondant mass determines the rheological, textural and sensorial characteristics of the product. The product properties of flowing depend on the percentage of the liquid phase and of its composition. Of all textural characteristics, hardness and cohesivity depend a lot on the liquid phase percentage. The sensorial characteristics influenced by the phase ratio are unctuousity and softness.

The nucleuses for fondant candies are formed of fat stones (nuts, peanuts, almonds and apricots) which are grinded and stirred in the fondant mass until an homogeneous paste is formed that has a pleasant taste and can be flavoured and coloured. This paste is called marzipan.

Some products formed on a fondant basis (saloon candies, paveu, cremosas) are subjected to the operation of candisation. This consists in the coverage of the exterior surface with a thin stratum of fine sugar crystals which is realized

by keeping these products for 6-8 hours in a cold sugar syrup usually called candis syrup.

The fondant candies consist of marzipan nucleus and o fondant coverage in the following proportions: 35-40% nucleus and 60-65% coverage form the weight of the candy.

The paveu is a candy consisting of fondant which is acetous, coloured and then stirred with fruit confis sliced in tiny pieces. Usually they have a parallelepiped shape, a pleasant taste and are formed by cutting. After their formation and cooling they are subjected to the operation of candisation. The fondant for the paveu is prepared from sugar with a small additive of glucose syrup which gives the paveu a greater degree of plasticity; also by adding the syrup one can avoid the brittleness of the candy when cut and can maintain their softness for a longer period of time.

The cremosas and the saloon candies are actually identical from the point of view of composition and properties but they are different when it comes to their shape and wrapping up. The candies are composed of flavoured coloured and a little acidous fondant and are formed by pouring the fondant in shapes covered in starch.

The sherbet is a product which is prepared as an ointmentous paste, flavoured, coloured and acidous. The flavour comes from different fruit (orange, lemon or raspberry) and the colour is in accordance with the flavour. Besides the simple sherbet one can also prepare the special sherbet (with cocoa, coffee, fruit or milk) in which we add the ingredients that confer their specific character. The sherbet can also be flavoured and coloured with burnt sugar in which case it is not acidulated. The cocoa, coffee and milk sherbet are not acidulated as well.

MATERIALS AND METHODS

The Basic material used in fabricating the fondant is sugar to which we add drinking water in the following ratio: 4:1. In order to obtain laboratory products with a different content of dry substance we have added different substances with an anti crystallization

role: acetous acid, honey and inverted sugar in different quantities.

For the preparation of the nucleuses we have used fried nuts and peanuts.

For the flavouring and colouring of the products obtained on a fondant basis we have used food colours and aromatization substances.

Machinery and arrays used:

- Analytical balance for the weighing of the basic and auxiliary materials.
- Boiling vessel for the preparation of the fondant syrup;
- Cooling system for the fondant syrup and thermometer for measuring the syrup temperature;
- System for beating the sugar system for the preparation of the crystalline mass;
- Refractometer for reading the dry substance content;
- Mechanical pressing machine for the separation of the liquid phase and the solid phase of the fondant.

Preparation of the fondant

The fondant is a white paste tasting sweet and having the consistency of a cream.

In order to consider the fondant one of superior quality it must have sugar crystals whose dimension mustn't be more than 12 μ and the ratio between the liquid phase and the solid phase should assure the necessary plasticity for the destination it is supposed to have. The presence within the fondant of crystals of 20 μ and above, in a proportion of more than 20 % makes it lose its creamy character becoming a harsh paste, and if there are crystals with dimensions of more than 40% these are felt when tasting (a massed product).

The preparation of the syrup for the fondant is made following the corresponding recipes in accordance with the reason why it is used.

The syrup for the fondant used for preparing fondant candies or the paveu is prepared only of sugar or with just a small quantity of glucose syrup in proportions that

vary from 10 to 25% according to the product we try to prepare. This is the procedure:

- the fondant mass for the nucleuses of fondant candies must have great fluidity when pouring ; for its preparation we must use 20-25% glucose syrup compared to the quantity of sugar and the final humidity is of 12-12,5%.

- the fondant mass for the glaze and for the fondant candies covering must have a great consistency; for its preparation we must use 7-10% glucose syrup compared to the sugar and the final humidity is of 9-11%.

The syrup preparation is made by boiling the sugar with the water paying attention to the following:

- the process of dissolving the sugar and boiling the syrup must be done in the shortest time possible.

- the glucose syrup or inverted sugar, honey, must be added at the end of the boiling;

- the waiting time of the syrup in a warm status must be reduced to the minimum until it is processed in the fondant machinery. That's why we recommend a technological process in a continuous flux.

All these measures reduce or remove the possibility of formation of reducing substances by dissociating the sugar. These are water-absorbing products and they influence negatively the products quality.

It is also necessary that the syrup boiling must be done in the shortest time possible, the water of the dissolved sugar must be properly dosed; water in excess prolongs the time of boiling.

The sugar syrup is boiled until it reaches the temperature of 110-112%, when the glucose syrup, the honey and the inverted sugar syrup are added and the boiling is continued until it reaches the temperature of 117-120% when the process is stopped; then the syrup is processed.

The preparation of the crystalline mass is realized by cooling and beating. Here we want to form the solid phase of the fondant under the form of very thin sugar crystals. The size of the crystals is influenced by a series of factors as follows:

- the final temperature of the syrup at which the fondant mass is rubbed;

- the quantity of anti-crystallisation substances which was introduced in the recipe.

- the humidity of the syrup;

- the duration of rubbing of the fondant.

It is very important that the syrup is cooled immediately after preparation, because it becomes a supersaturated solution and favourable condition for an intense crystallisation are formed; on the other side, by cooling, the syrup viscosity raises and this stops the formation of big saccharose crystals. It was demonstrated that the final temperature of the syrup must be fixed in accordance to the recipe. When the installation does not permit a more advanced cooling of the syrup and we want to obtain a fondant with a proper micro-crystalline structure it is necessary to increase the quantity of glucose syrup or inverted sugar in the fondant syrup.

The formation in a big quantity of small crystals is explained by the fact that the additives raise the viscosity of the sugar solutions and slow down the movement and the increase of the saccharose crystals.

The dimension of the crystals is also influenced by the humidity of the fondant syrup because higher humidity leads to the prolonging of the period necessary to form the fondant which makes the percent of big crystals grow.

Another factor that influences the dimension of saccharose crystals from the fondant is the beating duration.

At the beginning of the beating process the syrup is troubled, then it becomes white, the syrup consistency becomes viscous from liquid and the fondant mass is formed. This process happens faster if the beating is done more energetically.

The solid phase and the liquid phase of the fondant mass being in direct contact also react between them after the fondant is prepared, that means that from the base solution the saccharose crystals that improve the solid phase separate. At the same time, the liquid phase, losing the saccharose, becomes less viscous and as a consequence the fondant gets more pronounced plastic properties.

The equilibrium formed between the liquid phase and the solid phase at a fondant can be ruined due to exterior or interior causes:

- if there are exterior phases the fondant loses its humidity, the liquid phase concentrates, another quantity of saccharose crystallizes enriching the solid phase and the fondant consolidates. In order to avoid the fondant dryness we add sorbitol which acts as a stabilizer and preserves the rapport between the liquid and the solid phase.

- if due to interior causes the fondant contains a big percentage of reductant substances, it absorbs water from the atmosphere, the liquid phase grows, a part of the small crystals dissolve and the fondant becomes a soft and humid cream.

The method of determination of the liquid and solid phase content from the fondant mass is a method of calculation similar to that of the determination of the rapport between different strata of the candies; it is based on the determination of the two components and on the determination of the dry substance content in the entire product and in the liquid phase. With these values one can determine the content of liquid phase of the fondant mass, using the relation $S=100XU_{MF}/U_S$ in which S represents the proportion of liquid phase in the fondant mass and U_{MF} , U_S – the content of humidity in the fondant mass, and the liquid phase respectively.

RESULTS AND DISCUSSIONS

According to the process described in the previous chapter we have realized four samples, as follows:

- Sample I – we have used vinegar in a proportion of 1% of the sugar quantity as an additive at the preparation of the syrup. Using the refractometric method we could read the content of dry substance of the sample to be analyzed; S.U.= 90%.

The fondant obtained was used as an additive at the preparation of the syrup for fondant candies.

- Sample II – we have used as an additive honey in proportion of 10 % of the sugar quantity for the preparation of the fondant syrup. Using the refractometric relation we could read the dry substance content of the sample to be analyzed; S.U.= 88%

The fondant thus obtained was utilized to prepare the sherbet;

- Sample III - we have used as an additive inverted sugar syrup in proportion of 10 % of the sugar quantity for the preparation of the fondant syrup. Using the refractometric relation we could read the dry substance content of the sample to be analyzed; S.U.= 86%.

The fondant thus obtained was utilized to prepare the sherbet;

- Sample IV- we have used as an additive inverted sugar syrup in proportion of 8 % of the sugar quantity for the preparation of the fondant syrup. Using the refractometric relation we could read the dry substance content of the sample to be analyzed; S.U.= 92%.

The fondant thus obtained was utilized to prepare the paveu candy;

To determine the proportion between the liquid phase and the solid phase of the fondant mass previously prepared we have used a mechanical press. The fondant mass is covered in a filtering tissue and the press is introduced; thus we obtain a small quantity of liquid. We can determine refractometrically the dry substance content in the entire product and in the liquid obtained by pressing and the proportion of liquid phase from the fondant mass will be calculated on the grounds of the humidity sum in the entire product and in the liquid obtained by pressing. The results obtained – table no 1.

Destination of the fondant	Composition of the syrup					Fondant phases		
	sugar,%	vine gar, %	honey, %	Inverted sugar%	humidity%	liquid%	solid %	proportion L/S phase
Fondant covering	100	1	-	-	90	32,8	67,2	0,49
Cremosa and saloon candies	100	-	5	-	88	35,6	64,4	0,55
Sherbet	100	-	-	10	86	39,2	60,8	0,64
Paveu	100	-	-	8	92	30,0	70,0	0,43

CONCLUSIONS

Taking account of the factors that influence the final properties of the fondant and of the fact that the fondant is widely used in preparing sweets, it is necessary to pay considerable attention to its preparation. For this we must take into account first of all the destination of the fondant and according to it to fix and respect the technological parameters and the preparation recipe.

By raising the inverted sugar percentage we raise the liquid phase quantity and the fondant becomes more plastic, being suitable to poured products (saloon candies, cremosas).

The fondant for the fondant covering and for the paveu must be more consistent, that means it must have a bigger quantity of solid phase.

As for the sherbet fondant we must pay special attention since the formation of syrup and to a certain extent the mustiness of this product is a consequence of the lack of equilibrium between the liquid phase and the solid phase.

The liquid phase excess separates at the surface under the form of syrup when it's not sufficiently concentrated and it constitutes a favorable medium for the development of must.

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