

Shelf-life Evaluation of Condensed Milk-based Ready-to-Eat Desserts: Physicochemical, Texture and Sensory Characteristics

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Abstract Background: Currently, consumers are increasingly becoming more demanding regarding the quality of food, holding high expectations from the time of purchase to the consumption of foodstuffs. Thus, food should be safe and sensory alterations should be minimized. The shelf-life of most perishable foodstuffs is based on the study of the survival and growth of microorganisms. However, this study is insufficient to assure the quality and safety of food, making it necessary to carry out physicochemical and sensory analysis to ensure the final quality of products. **Scope and Approach:** The objective of this study was to characterize the physicochemical, microbiological and sensory properties of two ready-to-eat (RTE) Portuguese condensed milk-based desserts during storage time. The desserts were stored for 30 days at a refrigeration temperature of 4°C. Throughout the study, the following parameters were determined: pH, moisture, hardness and adhesiveness. A sensory analysis was performed according to a semi-trained panel that evaluated the following attributes: appearance, odor, texture and flavor. **Key Findings and Conclusions:** Results showed a slight increase of pH, moisture, hardness and adhesiveness during storage time. It was concluded that the different RTE desserts comply with the parameters of microbiological quality and food safety according to the guidelines set by Health Protection Agency and Institute of Food Science and Technology. As for sensory analysis results, the panel did not detect differences up to 8 days of storage time. As a result, an expiration date of 8 days could be granted to these four products analyzed.

Keywords Shelf-life, Ready-to-Eat (RTE), Desserts, Physicochemical, Microbiological and Sensory Analysis

1. Introduction

The consumption of ready-to-eat (RTE) meals has been rapidly increasing [1]. More consumers are opting to buy RTE products, as they are easier to prepare and have a shorter cooking time. Consumer's current lifestyles have influenced their perceptions and requirements regarding foodstuffs, namely their versatility, convenience, consumer's satisfaction, nutritional quality and safety [2].

Foodstuffs can be defined as any substance or product, raw or processed, which is suitable for human consumption. RTE products, on the other hand, are edible products that can be consumed immediately, either directly or after being heated [3].

In Regulation (EC) No. 2073/2005 (modified by Regulation (EC) No. 1441/2007) RTE products are defined as "food meant intended by the producer or the manufacturer for direct human consumption without the need for cooking or other processing effective to eliminate or reduce to an acceptable level micro-organisms of concern" [4, 5]. In other words, any foodstuff usually consumed in its raw state or any foodstuff that is handled, transformed, mixed, cooked or prepared in a way it can be consumed immediately, without subsequent treatment/anti-bacterial treatment/measures [6]. It is the producer or manufacturer's responsibility to assure safety and microbiological quality of the food being offered to RTE products consumers [7].

Some examples of RTE foodstuffs include sliced charcuterie [6, 8, 9], smoked salmon and fish sticks [6, 10], assorted cheeses [6], compotes [6], processed meat [6, 11, 12, 13], cooked and salted seafood, such as caviar fish eggs [6], sliced fruit [6, 14, 15] and salads [14, 16, 17], sous vide products [18], vegetables [19, 20] and cereal [21-24] products made from pasteurized liquid egg [25] and street

food [6, 26].

Currently, consumers are becoming more demanding in what concerns food quality, with their expectations extending to the period of time from when an item was purchased to its ingestion. As a result, foodstuffs should remain safe and sensory changes must be kept to a minimum [27]. Even though shelf-life studies are usually based on microbiological tests, these alone are not enough to assure the safety and quality of a food product, making it necessary to carry out physicochemical and sensory studies [28].

A key factor in determining a food product's success is its shelf-life, which signals the period of time in which a product keeps its integrity and attributes, before it starts to deteriorate, as long as all storage conditions are met [7, 29].

A food product's life or shelf-life can be defined as the length of time for which a foodstuff is considered safe for consumption and retains its quality for consumers [30].

According to the *Institute of Food Science and Technology's* (IFST) directives, a foodstuff shelf-life is the length of time for which a product stays safe, keeping the necessary sensory, chemical, physical and microbiological features, in compliance with the information featured on the nutritional declaration on the label, under adequate storage conditions [31]. This definition succeeds in identifying the key factors to be taken into account when assessing shelf-life, also stressing the importance of adequate storage conditions and how they affect that life [27, 32]. *Codex Alimentarius* defines shelf-life as the period in which a product keeps its microbiological safety and conformity at a specific storage temperature [28].

Validating shelf life is vital to assure a product's microbiological safety, particularly perishable, RTE foodstuffs that make it possible for pathogens, such as *Listeria monocytogenes* to develop [28].

The current study has aimed to characterize two RTE desserts (*Brigadeiro* and *Brigadeiro Branco*¹) stored for 30 days at 4°C, in what concerns their physicochemical, microbiological, texture and sensory attributes.

2. Materials and Methods

2.1. Materials

The samples of condensed milk-based RTE products were provided by “Doce Larica”, a company that specializes in sweets. The composition of the two different formulations studied is given in Table 1. The samples were stored at 4°C prior to testing and all measurements were performed within the shelf-life period of each sample. The ingredients used in the formulations included condensed milk (Nestlé, Portugal), cream (Páturages, France), butter (Vaqueiro, Portugal), chocolate powder (Nestlé Nesquick, Portugal) and egg yolk (Derovo Group, Portugal).

Table 1. Percentage of each ingredient in the product's composition

Ingredients (%)	milk-based ready-to-eat products	
	“Brigadeiro”	“Brigadeiro Branco”
Condensed milk	72,6	75,3
Cream	18,3	18,9
Butter	3,7	3,8
Chocolate powder	5,5	0
Egg yolk	0	1,9

¹ Two condensed milk-based desserts produced by “Doce Larica”, a Portuguese company that specializes in sweets/desserts.

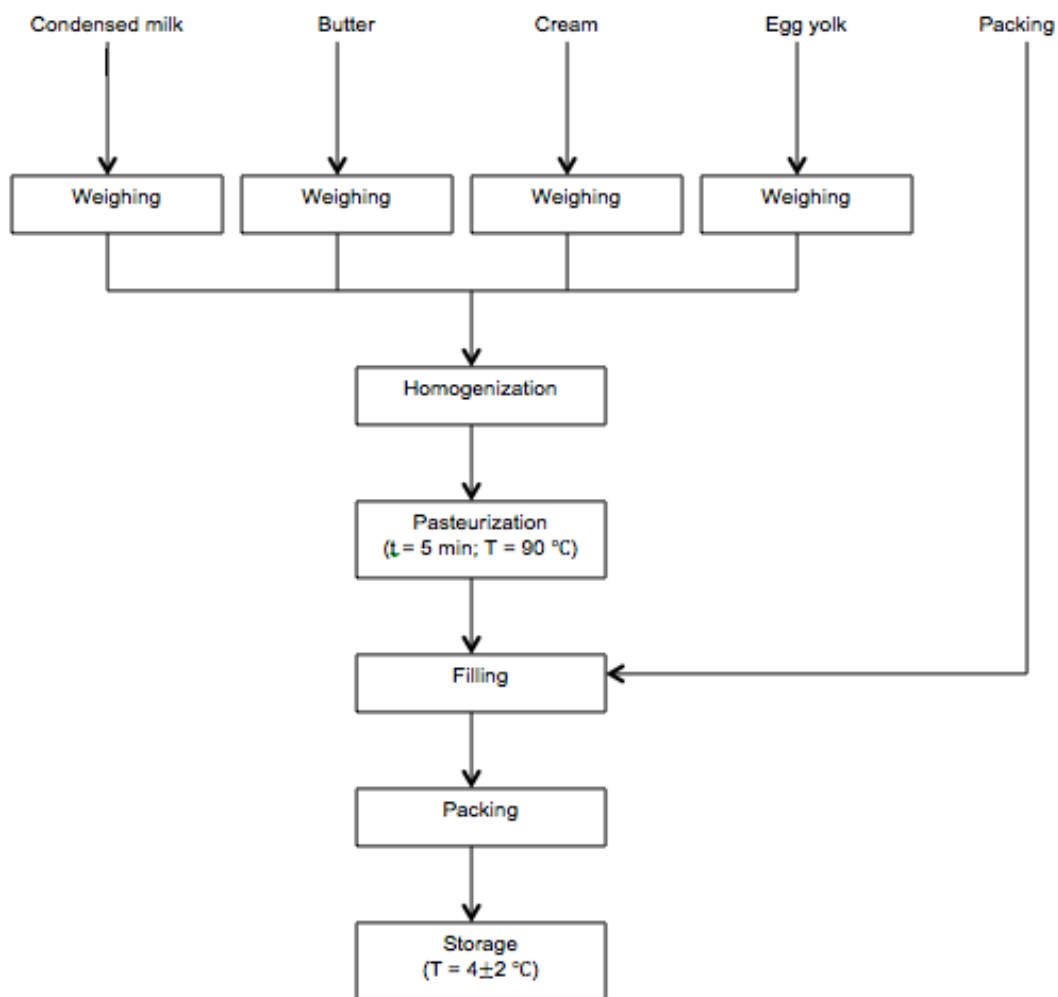


Figure 1. Flow diagram of production of milk-based ready-to-eat products: Brigadeiro Branco



(a)

(b)

Figure 2. Pictures from the different desserts; (a) Brigadeiro, (b) Brigadeiro Branco

2.2. Production Process

Figure 1 depicts a fluxogram illustrating the production process of the dessert *Brigadeiro Branco* (used here as an example), being that the same process is followed when producing the other desserts, using different ingredients.

The products were produced by the company in controlled production conditions and stored at a temperature of 4°C. They were then delivered to the Food Engineering labs where they were kept at a controlled temperature of 4°C.

In order to prepare the different desserts, all the ingredients were weighed and then homogenized and pasteurized. The pasteurization was carried out for 5 minutes at a temperature of 5°C.

Without letting them cool down, the products were placed in containers, packed and stored for 30 days at a temperature of 4°C. Samples were collected on days 0, 2, 4, 8, 15, 22 and 30 of storage.

In Figure 2 we can see the products packed in polystyrene cups (PS 6) and adequately covered with lids made from the same material. The packages have a bottom diameter of 2.9cm, a top diameter of 4.1 cm and a height of 4.7cm.

2.3. Physicochemical Analyses

The pH values of the desserts were measured using a solid pH meter model pH 25+ (Crison instruments, Spain) that had previously been calibrated with three standard solutions - pH 4.01, pH 7.00 e pH 9.21. The electrode was inserted in the center of the different homogenized samples that were then measured. Following that, the results were recorded. The analyses were carried out in triplicate and two samples of each product were used.

Moisture content was determined by applying method AOAC 920.116:1995 [33]. The samples, weighing approximately 3 gr each, were placed in crucibles that had been previously dried out and weighed using an analytical scale (Sartorius, BP 221S). Following that, they were introduced in a forced air oven (Heraeus, UT6) at 105 °C and left to dry for a period of 48 hours, therefore dispensing weight verification in order to achieve constant weight. The results are displayed based on the percentage of moisture (wet basis). The analyses were carried out in triplicate and two samples of each product were used.

2.4. Microbiological Analysis

The microbiological analyses were carried out at the Applied Microbiology Unit – UMA, a unit that is part of the Superior School of Technology Management – Polytechnic Institute of Viana do Castelo – an accredited test laboratory that is in compliance with standard NP EN ISO/IEC 17025, certificate number L0359 issued by the Portuguese Accreditation Institute (IPAC).

The microbiological parameters used as indicators to study the shelf-life of the selected products are described in Table 2.

Table 2. Microbiological parameters analyzed and corresponding reference method.

Parameter	Reference method
Enumeration of <i>Enterobacteriaceae</i>	ISO 21528-2:2004 [34]
Enumeration of <i>Escherichia coli</i>	ISO 16649-2:2001 [35]
Enumeration coagulase positive staphylococci	ISO 6888-1:1999/Amd 1:2003 [36]
Enumeration of <i>Listeria monocytogenes</i>	ISO 11290-2:1998/Amd 1:2004 [37]
Enumeration of microorganisms at 30 °C	ISO 4833-1:2013 [38]
Detection <i>Salmonella</i> spp	ISO 6579:2002 [39]

2.5. Texture Analysis

Penetration profiles of biscuits were determined using the TAXT plus texture analyzer (Stable Micro Systems, TA.XT. plus, UK). Samples in polystyrene cups were placed on a heavy duty platform table and the penetration test was performed using a P/4 cylinder probe 4 mm, moving at 60 mm per minute at a distance of 8 mm, so that a hole was made through the dessert. Hardness (N), as the value of maximum force on the acquired plot, along with adhesiveness (N/s) - as the area below the curve – was calculated. The analyses were carried out on fresh desserts, i.e. on those prepared on the day of cooking, as well as after 0, 2, 4, 8, 15, 22 and 30 days of storage. The analysis was repeated ten times.

2.6. Sensory Analysis

The sensory analysis was carried out performing a Quantitative Descriptive Analysis (QDA) test at the Sensory Analysis lab in Viana do Castelo's Superior School of Technology Management. It was conducted in a room equipped with eight individual sensory tasting booths, in compliance with ISO standard 8587:2006 [40].

The taste panel was made up by 7 semi-trained tasters who defined the key attributes, scales and verbal anchors to be used in the taste/sensory profile form to be used in the trial. The sensory attributes taken into consideration were: appearance, odor, texture and flavor. These attributes were ranked according to a non-structured hedonic 9-point scale. In compliance with ISO standard 8586-1:1993 [41], the panel was first subjected to training by undergoing a trial sensory test. The product used in this trial was the *Brigadeiro*, produced using the core ingredients that make up its composition. The sensory analysis was carried out within 0, 2, 4, 8, 15, 22 and 30 days of storage.

2.7. Statistical Analysis

The results stemming from the assessment of

physiochemical and sensory characteristics were then subjected to an analysis of variance (ANOVA), with 95% confidence intervals, in order to compare the means of each parameter. The Tukey test, also with 95% confidence levels, was used to compare the differences in the means for the different samples. In order to relate a set of variables, the multivariable Principal Component Analysis (PCA) was carried out. The software used for this analysis was *Statistica* from *StatSoft* (version 7).

3. Results and Discussion of the Results

3.1. pH Analysis and Moisture Content

The pH measures how acidic or alkaline a product is. The lower the pH, the more acidic a product is. Food's pH can vary over time due to microbial activity, composition and/or formulation. The pH and acidity affect the survival and growth of pathogenic agents in food [28].

The data gathered from the pH analysis on the products *Brigadeiro* and *Brigadeiro Branco*, over a 30-day storage period are depicted in Figure 3. Based on the data analysis, it can be established that the pH values of the two products undergo significant variations ($p < 0.05$) over the 30-day storage period.

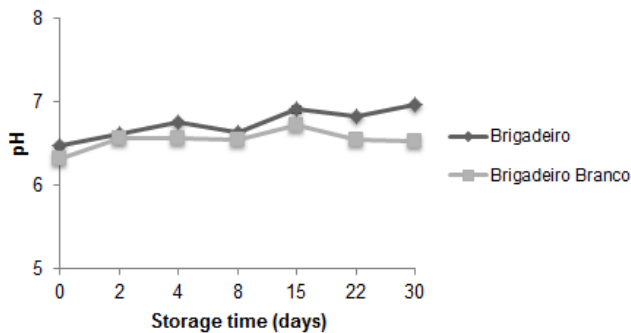


Figure 3. pH variation over storage time for the four products under analysis: *Brigadeiro* (◆) and *Brigadeiro Branco* (■). Mean \pm standard deviation of three replicates of two samples

As the storage time increases, so do the pH values of the two products. In the *Brigadeiro* it was observed an increase of approximately 7% and in *Brigadeiro Branco* a 3% increase.

It has also been observed that the products *Brigadeiro* and *Brigadeiro Branco* have a pH value between 6.5 e 7, and can, therefore be considered neutral pH products, thus increasing the possibility of growing microorganisms [28].

The moisture content in foodstuffs is not identical to water activity. Some foodstuffs can have similar moisture content and display different levels of water activity. E.g. compote/jam both have high moisture content levels,

however, moisture is linked to the presence of sugar in jam not allowing microbiological growth, thus resulting in jam having low water activity [28]. But both moisture and water activity are important parameters when controlling quality, as they primarily affect a product's shelf life [42].

In Figure 4 shows the data regarding the moisture content in the *Brigadeiro* and *Brigadeiro Branco*, over a 30-day storage period. Based on the data analysis, it can be established that the moisture content of the two products undergoes significant variations ($p < 0.05$) over the 30-day storage period.

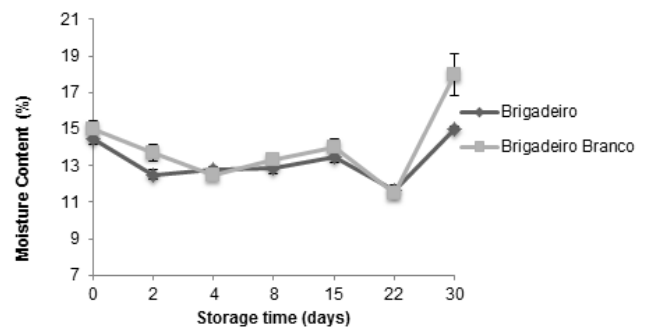


Figure 4. Moisture content variations over the storage period of the four products under analysis: *Brigadeiro* (◆) and *Brigadeiro Branco* (■). Mean \pm standard deviation of three replicates of two samples

As the storage time increases, so does the moisture content value of the two products. In the *Brigadeiro* it was observed an increase of approximately 4% and in *Brigadeiro Branco*. This can be explained by the fact that the products' packages are not hermetic, thus making it possible for the humidity from the surrounding environment to infiltrate the product [43].

In the specific case of the *Brigadeiro*, the moisture content decreases from day 0 (14.4%) to day 2 (12.5%). After that, it increases again up to day 15 (13.5%), and decreases on day 22 (11.7%), only to rise again on day 30 (15%), exhibiting moisture content values similar to those displayed at the beginning of the study.

3.2. Microbiological Analysis

As a way of promoting food and consumer safety, it is vital that the existence of microorganisms in RTE products is assessed and motorized. The existence of microorganisms that are indicative of hygiene in ready to eat products can signal food components or raw material's poor quality, cross-contamination, improper hygienization processes, and a deficient control of time-temperature processing [44].

Microorganism counts at 30°C are a quality characteristic, not a safety indicator, and might not play a direct role towards assessing the safety of RTE products [44].

Table 3. Data gathered from the microbiological analyses carried out on the product *Brigadeiro*

Parameter	Units	Time (days)				
		0	8	15	22	30
Enumeration of <i>Enterobacteriaceae</i>	ufc/g	<10	<10	<10	<10	<10
Enumeration of <i>Escherichia coli</i>	ufc/g	<10	<10	<10	<10	<10
Enumeration coagulase positive staphylococci	ufc/g	<10	<10	<10	<10	<10
Enumeration of <i>Listeria monocytogenes</i>	ufc/g	<10	<10	<10	<10	<10
Enumeration of microorganisms at 30°C	ufc/g	Ne=40	Ne=90	<10	Ne=50	1,2×10 ²
Detection <i>Salmonella</i>	in 25g	Nd	Nd	Nd	Nd	Nd

Notes: Ne - Estimated Number; Nd – Not detected

Table 4. Data gathered from the microbiological analyses carried out on the product *Brigadeiro Branco*

Parameter	Units	Time (days)				
		0	8	15	22	30
Enumeration of <i>Enterobacteriaceae</i>	ufc/g	<10	<10	<10	<10	<10
Enumeration of <i>Escherichia coli</i>	ufc/g	<10	<10	<10	<10	<10
Enumeration coagulase positive staphylococci	ufc/g	<10	<10	<10	<10	<10
Enumeration of <i>Listeria monocytogenes</i>	ufc/g	<10	<10	<10	<10	<10
Enumeration of microorganisms at 30 °C	ufc/g	Ne=40	<10	Ne=60	<10	2,5×10 ²
Detection <i>Salmonella</i> spp	in 25g	Nd	Nd	Nd	Nd	Nd

Notes: Ne - Estimated Number; Nd – Not detected

Quality criteria follow the guidelines of the guide values established by the *Health Protection Agency*(HPA) “*Guidelines for Assessing the Microbiological Safety Ready-to-Eat Foods Placed on the Market*”, European rules - Regulation (CE) No. 1441/2007 from the Committee, dated December, 5, 2007, that modified Regulation (CE) No. 2073/2005 regarding the microbiological criteria applicable to foodstuffs, and the guides defined by the *Institute of Food Science and Technology* (IFST) “*Development and use of Microbiological Criteria for Foods*”, that provides guidance and an interpretation key for foodstuff’s microbiological criteria [4, 5, 31, 44].

Based on these premises, microbiological analyses were carried out over the storage period, as to assess microbiological stability and food safety in the products being studied: *Brigadeiro* (Table 3) and *Brigadeiro Branco* (Table 4).

From the data in table 3 regarding the microbiological results of the product *Brigadeiro*, over a 30-day storage period, it can be concluded that these are satisfactory and in compliance with the safety and quality parameter established by Regulation (CE) No. 2073/2005, as well as by the *Health Protection Agency* (HPA) and the *Institute of Food Science and Technology*’s (IFST) guides [4, 31, 44].

According to Regulation (CE) No. 2073/2005 and the HPA and IFST’s guides, the data regarding the microbiological results of the product *Brigadeiro Branco*

over the 30-day storage period (displayed in Table 4), shows that the product keeps its microbiological stability over time and is in compliance with all the safety and quality parameters [4, 31, 44].

3.3. Texture Analysis

Hardness can be defined as the strength needed to achieve a certain degree of deformity [45]. Hardness was calculated based on the analyses of the charts deriving from the experimental procedures carried out. In Figure 5 it is possible to observe the hardness of all the products over the 30-day storage time. Starting on day 0, the product with the one presenting the least hardness is *Brigadeiro* ($p < 0.05$).

The product *Brigadeiro* becomes harder as storage time progresses ($p < 0.05$). As for the product *Brigadeiro Branco*, no significant changes on hardness values are observable on the period ranging from day 0 to day 2 ($p > 0.05$). After day 4 and up to the end of trial, there are significant differences ($p < 0.05$), as the hardness increases, reaching a value close to 0.153 N.

A research carried out by Oliveira e Benassi [46] focusing on puddings with sugar, demonstrates that the hardness of one of the puddings is very similar to that of *Brigadeiro Branco* on day 0. *Brigadeiro* display a lower value of hardness. The hardness of *Brigadeiro*, 0.07 N, is very close to that displayed from the pudding of Brand C - 0.09 N.

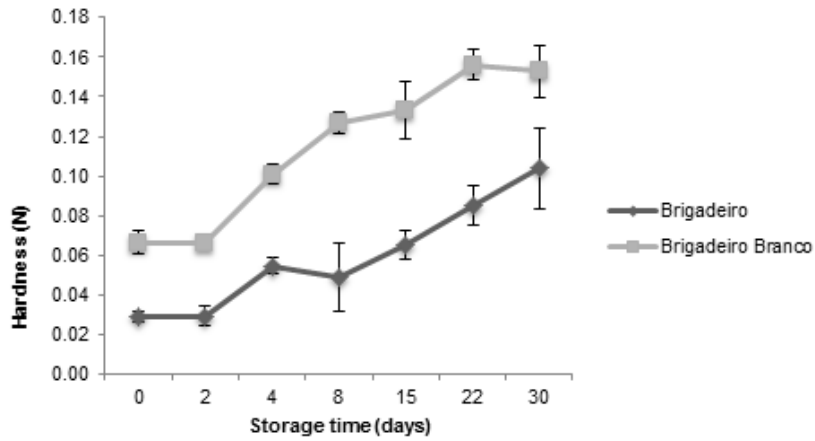


Figure 5. Hardness variation over the storage period of the four products under analysis: *Brigadeiro* (◆) and *Brigadeiro Branco* (■). Mean±standard deviation of ten replicates of two samples

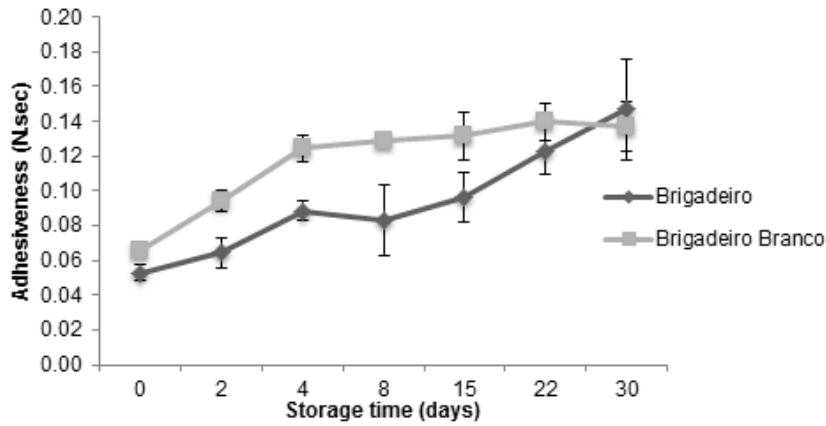


Figure 6. Adhesiveness variation over the storage period of the four products under analysis: *Brigadeiro* (◆) and *Brigadeiro Branco* (■). Mean±standard deviation of ten replicates of two samples

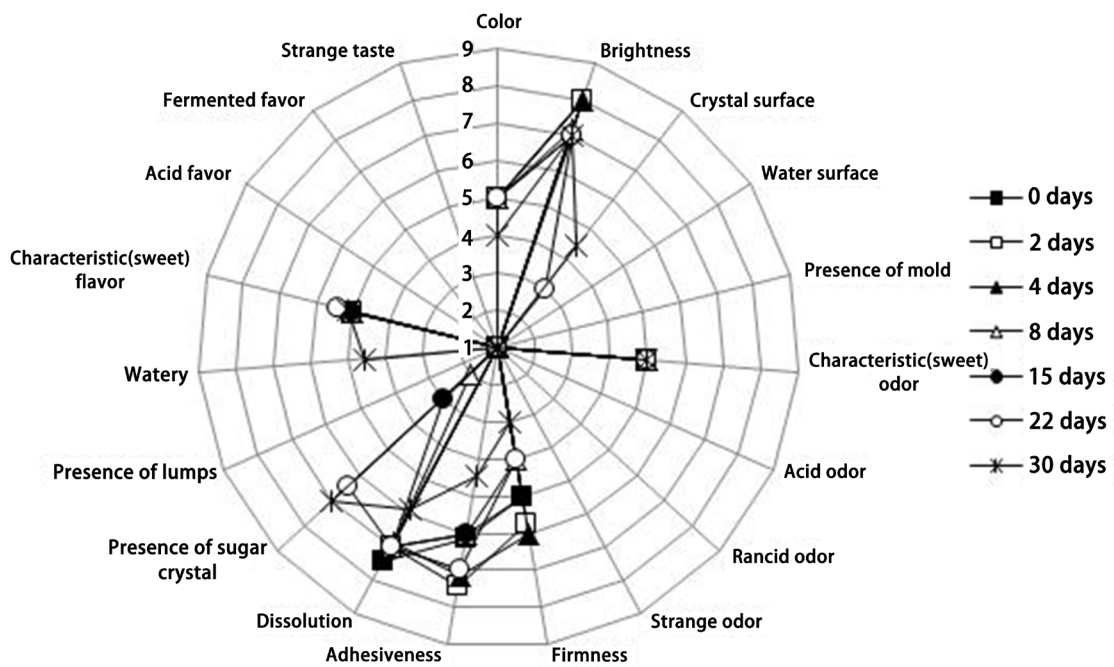


Figure 7. Graphical representation of the sensory analysis carried out on Brigadeiro over a 30-day storage period

Adhesiveness can be defined as the work that is necessary to overcome the attraction force between the surface of the foodstuff and the surface of other materials with which it comes into contact [45]. In Figure 6, shows the adhesiveness values for the four products over the 30-day storage period. Based on the data presented, it can be confirmed that the product displaying a higher value of adhesiveness is *Brigadeiro Branco*, closely followed by *Brigadeiro*.

A research carried out by Oliveira e Benassi [46] focusing on puddings with sugar, demonstrates that the adhesiveness of puddings on day 0 is very similar to that of the products analyzed in this study. The products *Brigadeiro* – 0.05 N.sec - and *Brigadeiro Branco* – 0.17 N.sec - display adhesiveness values close to those from the pudding of brand B.

3.4. Sensory Analysis

A sensory analysis with a trained panel was carried out to describe the two desserts studied.

The results achieved from the sensory analysis carried out on the *Brigadeiro* during storage time are depicted in Figure 7. This analysis indicates that over the storage period, the panel did not detect significant changes ($p>0.05$) in any of the following parameters: color, water on the surface, presence of mold, characteristic (sweet) odor, rancid odor and strange odor, presence of lumps, acid flavor, fermented flavor and strange taste. However, the panel detect significant differences ($p<0.05$) in parameters such as brightness, crystal surface, firmness, adhesiveness,

watery and characteristic (sweet) flavor.

Despite the slight variation, it can be observed that the *Brigadeiro*'s color fades after 30 days, as it becomes lighter. As for the presence of crystals on the surface, it is first detected on day 22 and increases from that point on. The panel went as far as agreeing on the fact that “the crystals look bigger”. The taste panel also noticed an increase in firmness after 2 days, which intensified on day 4 of storage, having started to decrease after that point. In general, there was a gradual decrease in adhesiveness over time. These results go against those achieved through the texturometer (Figures 5 and 6), and can be explained by the presence of sugar crystals on the surface. As for the characteristic flavor, the panel of tasters considered that the product tasted sweeter after 22 days. As for mouth dissolving, the panel noticed a slight decrease over the 30 days storage-period.

Figure 8 shows the results obtained from the sensory analysis carried out on the *Brigadeiro Branco* during storage time (4 ± 2 °C). According to this analysis, over the storing period the panel of tasters did not detect significant changes ($p>0.05$) in any of the following parameters: color, water on the surface, presence of mold, acid odor, rancid odor and strange odor, presence of lumps, watery, acid flavor, fermented flavor and strange taste.

On the other hand, the panel detected significant differences ($p<0.05$) in parameters such as brightness, crystal surface, characteristic (sweet) odor, firmness, adhesiveness, dissolution, presence of sugar crystal and characteristic (sweet) flavor.

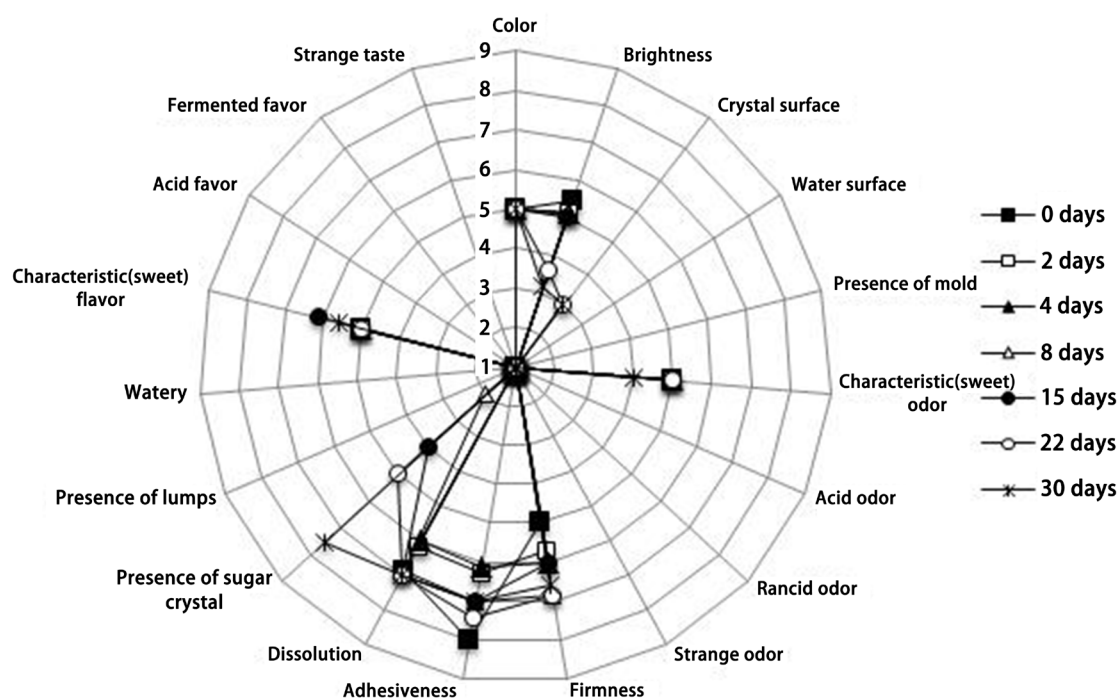


Figure 8. Graphical representation of the sensory analysis carried out on *Brigadeiro Branco* over a 30-day storage period

After 22 days, the panel noticed that the brightness started to fade and that there was an increase in the number of crystals on the surface, which persisted up to the 30 days. The panel stated that the product presented an increased firmness and adhesiveness over the 30-day period. These results are consistent with those yielded from the texturometer (Figures 5 and 6).

The panel of tasters first detected the presence of sugar crystals on the surface after 8 days of storage. After day 8, the amount of crystals gradually increased over the remaining days, with the panel stating “the crystals are so much bigger they are like having sand in your mouth”. By the end of the storage period they believe the product has become sweeter.

3.5. Statistical Analysis

The results concerning chemical and sensory parameters were compiled and analyzed through a Principal Component Analysis (PCA). This multivariable analysis makes it possible to demonstrate the relations between

variables within the same set of data. It aims at organizing all the variables (principal factors/components) in descending order, based on their importance, in a way that each factor or principal component corresponds to set of correlating variables. Principal component or factor 1 comprises the most important, thus more vital, information.

Based on the data gathered through the PCA, Figure 9 graphically represents factor1 vs. factor 2 regarding chemical parameters: pH and moisture content over the storage time for all the products under analysis (*Brigadeiro* and *Brigadeiro Branco*).

Based on the analysis of Figure 9, it is possible to group 100% of the variability observed on the data. Factor 1, to be found on the horizontal axis, clusters 59.96% of the initial information and expresses the variations observed over storage time for the pH and moisture parameters.

It was found that over the storage time there was an increase of moisture in *Brigadeiro Branco* and the *Brigadeiro* presented a higher pH value.

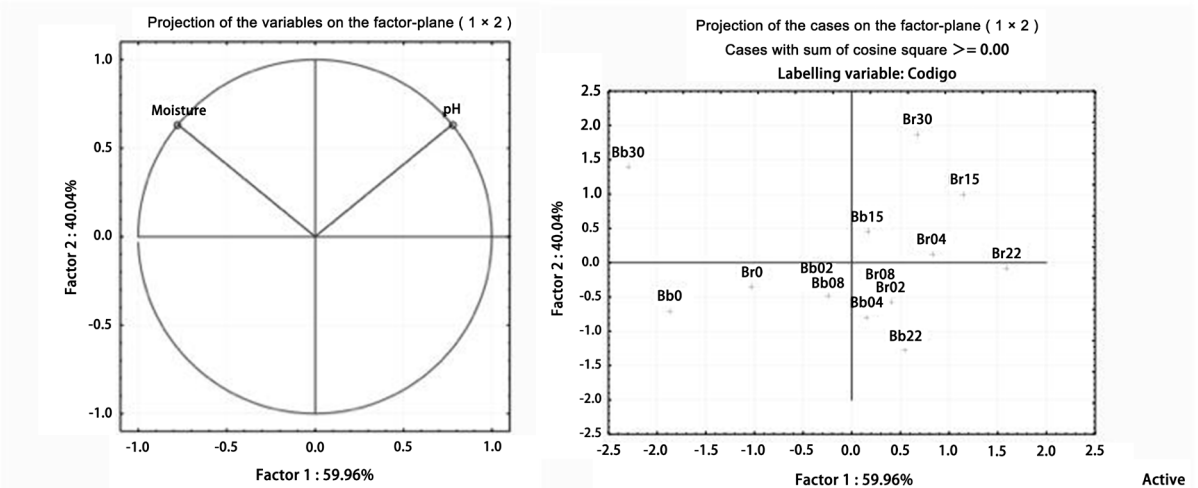


Figure 9. Analysis of the principal components of the chemical parameters moisture and pH (factor1 vs. factor2 – 59.96% vs. 40.04%), for the four products under analysis: *Brigadeiro* (Br) and *Brigadeiro Branco* (Bb). 0, 2, 4, 8, 15, 22 and 30 are the days of the analysis.

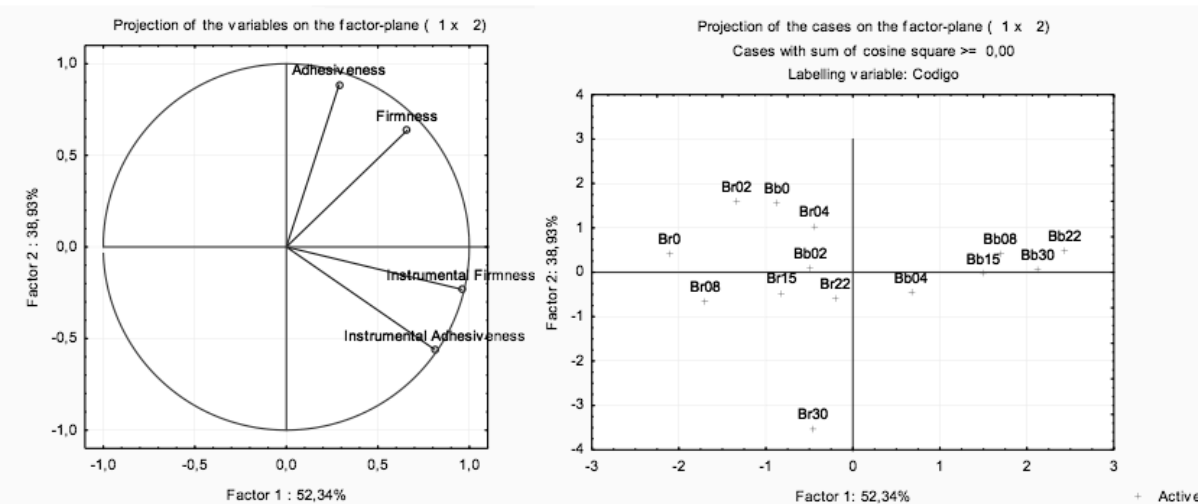


Figure 10. Analysis of the principal components of the instrumental texture and sensory parameters (factor1 vs. factor2 – 52.34% vs. 39.93%), for the four products under analysis: *Brigadeiro* (Br) and *Brigadeiro Branco* (Bb). 0, 2, 4, 8, 15, 22 and 30 are the days of the analysis

Figure 10 depicts factor 1 vs. factor 2, based on data from the PCA comparing the parameters instrumental texture (firmness and adhesiveness) and sensory analysis (firmness and adhesiveness in the mouth), over the storage period for the two products (*Brigadeiro* and *Brigadeiro Branco*).

Based on the analysis of Figure 10, it is possible to group 91.27% of the variability observed on the data. Factor 1 (horizontal axis) clusters 52.34% of the initial information, expressing the variations observed over storage time for in-mouth adhesiveness, firmness (based on sensory experiences) and the adhesiveness tested using the texturometer. Factor 2 (vertical axis), explains 38.93% of the initial information, expressing the differences between products over times, establishing that they are mostly due the firmness attained in instrumental analysis.

From this analysis it can be established that the panel and the results attained by the texturometer are not always correlated, and that, as was mentioned earlier, is mostly because the products presented sugar crystals.

The product *Brigadeiro Branco* has in-mouth adhesiveness on days 8, 15, 22 and 30, also attaining the highest values of adhesiveness and firmness.

4. Conclusions

Taking into consideration the results attained in the physicochemical, microbiological and sensory analyses carried out over a 30-day storage period on the products *Brigadeiro* and *Brigadeiro Branco*, it was established that the pH value varies in the course of that time, undergoing an increase of approximately 7% - *Brigadeiro* and 3% - *Brigadeiro Branco*. As for moisture content found in the products, it also experiences an increase: 4% - *Brigadeiro* and 17% - *Brigadeiro Branco*. There was an increase hardness and adhesiveness (instrumental) in both products over the 30-day storage period. At a microbiological level, in the parameters analyzed, products were considered to have displayed values that are in compliance with the limits set by law for a storage period up to 30 days at 4°C. Data gathered from sensory analysis made it possible to conclude that there are no significant differences between the products analyzed regarding: water on the surface, presence of mold, acid odor and fermented flavor. There are, however, significant differences in the following parameters: brightness, firmness, adhesiveness, dissolution and characteristic (sweet) flavor. As for the sensory features of the different products, the most relevant issues pointed out by the panel of tasters were appearance and texture (e.g. crystal surface and presence of sugar crystals) - *Brigadeiro* and *Brigadeiro Branco*. According to the analyses carried out, defining an expiration date for the two products should rely on sensory analysis. As a result, an expiration date of 8 days could be granted to these two products analyzed, as long as the storage temperatures (4°C) are observed.

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