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Physicochemical and organoleptic evaluation of a puree obtained from degraded tomatoes (*Lycopersicon esculentum* L.)

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ABSTRACT

Tomatoes are a fruit vegetable widely consumed around the world due to their nutritional value and antioxidant properties. Eating tomatoes promotes good health and can reduce the risk of developing certain diseases. Unfortunately, their high-water content sometimes limits their shelf life, causing significant post-harvest losses during peak season. This study therefore aims to reduce post-harvest losses of tomatoes by processing them into purée and storing them without preservatives at room temperature and in refrigeration. To do this, four (4) different batches of puree were prepared. These were untreated crushed tomatoes, crushed tomatoes without concentrated blanching, blanched crushed tomatoes, and concentrated blanched crushed tomatoes. These samples were subjected to physicochemical and organoleptic analyses. The results showed that the acidity at 29°C and 6°C varied from 0.35 to 1.90% and from 0.30 to 1.90% respectively, the dry matter from 2.30 to 11.11% and from 2.51 to 10.36%, the Brix degree from 0.57 to 12.10% and from 2.67 to 9.67%, and the browning index from 1.92 to 3.73 and from 2.05 to 3.78. With regard to color, brightness, and redness, their intensity decreased, unlike yellowing. Bleaching and concentration are treatments that have made it possible to preserve the purees without the presence of mold.

Keywords: Puree, damaged tomatoes, preservation, treatments, temperature

1. INTRODUCTION

Tomatoes are one of the most important fruit vegetables in the world due to their economic and nutritional value (FAO 2021). They are widely consumed around the world in various forms such as ketchup, juice, paste, purée, sauces, and can improved overall eating patterns, and ultimately, better health. (Burton-Freeman and Reimers 2011). Nutritionally, they are valuable because they are rich in growth elements such as vitamins, minerals, antioxidants, and phytonutrients such as beta-carotene and lycopene (Sarkar et al, 2025). In addition, tomatoes are a dietary food because they are recognized for their nutritional and medicinal values. Consuming tomatoes helps prevent several diseases such as cancer, obesity, and cardiovascular disease. It also helps reduce the risk of type 2 diabetes (Khan, 2021). Tomatoes have also been shown to have beneficial effects on male fertility in roosters by improving reproductive performance (Zadeh et al 2025).

Tomato production remains unorganized in Côte d'Ivoire. It is characterized by a short period of abundance followed by a long period of scarcity. When abundant, significant post-harvest losses are reported due to limited control of post-harvest

operations and a lack of appropriate processing technologies. Tomatoes have a limited shelf life because they are very sensitive to mechanical damage, insect pests, and disease (Ochida et al 2019). However, other factors can also impact losses, such as harvesting methods, stage of ripeness at harvest, misuse of fungicides, and packaging and storage methods (Ochida et al 2019). From transport from the field to marketing, tomatoes are subjected to mechanical shocks due to warehousing and storage, causing them to become deformed (Dossou et al., 2007). These post-harvest losses also lead to a decrease in the quantity of tomatoes available for consumption at different stages of the supply chain. In addition to quantitative losses, the fruit also loses quality, leading to a decrease in economic and nutritional value.

In response to these losses and their consequences, a number of research projects have been undertaken, ranging from agricultural practices to the fresh storage of tomatoes in a controlled atmosphere. For example, research by Biswas et al (2012) has shown that long-term low-temperature storage of ripe green tomatoes is currently risky due to the likely development of cold damage. They propose combining this with intermittent warming. However, the effectiveness of such treatment depends heavily on the cultivar and/or production conditions. Foliar treatment with selenium stimulates the antioxidant defense system of tomato plants, making the fruit more resistant to post-harvest rot caused by gray mold (Zhu et al 2016). These practices require a certain amount of care that most local producers are unable to provide. The technique of storing tomatoes at room temperature in a single layer improves the fruit's shelf life but results in a loss of nutrients (Ekissi et al 2021). Similarly, Akpo's 2023 research has shown that post-harvest treatments are not very effective and that an alternative is to treat tomato plants in the field with *Ocimum* herbal tea to prevent *Alternaria* leaf blight. Treatment with 120 μ M melatonin extends the shelf life of tomatoes by 15 days, while maintaining quality and consumer acceptability (Ahmad et al 2025). While these methods yield satisfactory results, they remain inaccessible to rural populations. Hence the need to develop other accessible alternatives. The overall objective of this study is therefore to add value to damaged tomatoes by processing them into a stable purée.

2. MATERIAL AND METHODS

The plant material used for this study is the tomato (*Lycopersicon esculentum* Mill.) of the "COBRA" variety, which is damaged and bright red in color (Fig. 1)



Fig. 1: Damaged tomatoes of the "COBRA" variety, bright red in color

The tomatoes were purchased at the small market in Abobo (Abidjan municipality) and transported in polyethylene bags to the Laboratory of Food Biochemistry and Tropical Product Technology (LBATPT). Five hundred (500) grams of damaged tomatoes were selected by sorting them according to specific criteria (bright red color and misshapen). The selected tomatoes were washed, cut with a knife, and seeded. They were either crushed directly or blanched. Blanching was carried out using a colander containing the chopped tomatoes, which were immersed in hot water at 95°C for 15 seconds before being crushed using a Moulinex Blender. The crushed tomatoes, with or without blanching, were concentrated for 15 minutes to evaporate all the water and obtain a purée. Thus, depending on the different types of treatment, four types of samples were obtained:

Batch 1: Paste that had not undergone any treatment, the control (bleaching or concentration)

Batch 2: Paste that had undergone concentration only

Batch 3: Paste that had undergone bleaching only

Batch 4: Paste that had undergone bleaching and concentration

These ground mixtures were placed in jars that had been washed and sterilized at 100°C for 30 minutes. After filling, the jars were immersed in boiling water in a pot at 100°C for 15 minutes and then left to cool at room temperature. Finally, the jars were labeled and stored at room temperature (29°C) and at refrigeration temperature for 1 week, 2 weeks, and 3 weeks.

2.1 Determination of physicochemical properties of tomato puree

2.1.1 Titratable acidity of tomato puree

Acidity was measured using a PAL-BX-ACID91 dual-scale digital refractometer (ATAGO, France). One-gram (1g) of purée was weighed using an electronic scale and then brought to fifty (50g) grams with distilled water. The mixture was homogenized by manual stirring. A drop of the mixture was placed on the prism plate of the acidimeter. Titratable acidity is expressed as a percentage of organic acids (%), the main component of which in tomatoes is citric acid (Tharanathan *et al.*, 2006).

2.1.2 Dry matter of tomato puree

The dry matter content was determined using the AOAC method (2000). Five grams (5 g) of sample were weighed (M_1) using a balance in a crucible of known mass (M_0). The 5 g test sample was placed in an oven (105 °C) for 24 hours. The oven-dried sample was cooled in a desiccator and then weighed again (M_2). The dry matter was determined using the following formula

$$MS (\%) = ((M_1 - M_2) / (M_1 - M_0)) * 100$$

2.1.3 Soluble dry extract of tomato puree

The soluble dry extract expressed as a percentage (%) was measured using a PAL-BX-ACID model digital dual-scale Brix-acid refractometer (ATAGO, France) equipped with a temperature corrector (10 to 40°C). A sample of tomato purée was squeezed using Wattman paper to obtain juice. A drop of the juice obtained was placed on the prism plate of the refractometer.

2.1.4 Determining the color of tomato puree

Colorimetry consists of a set of data and methods for objectively quantifying color. These are assessed using three coordinates: "CIEL * a * b *," corresponding respectively to luminance (L^*); red-green balance (a^*) and yellow-blue balance (b^*). For this reason, color measurements of tomato purees will be performed using a chromameter (COLOR READER CR-10 plus) with a 10° viewing window and a D65 light source. After calibrating the device with a white standard ($L^* = 93.87$, $a^* = 0.18$; $b^* = 2.71$), the CIEL * a * b * coordinates of the tomatoes will be identified on the basis of three determinations from three different tests. This will be done by direct reading, placing the chromameter eyepiece in contact with the purée to be analyzed.

2.1.5 Browning index of tomato puree

The browning index was determined using the method described by Pathare *et al.* (2013). The color of the purée is evaluated using the CR-10 chromameter, which provides the parameters used to calculate the browning index (BI) of the purées according to the formulas below.

$$BI = \frac{(x - 0,31)}{0,172} \text{ with } x = \frac{(a^* + 1,75 L^*)}{5,645 L^* + (a^* - 3,012 b^*)}$$

2.2 Sensorial analysis of tomato puree

The sensory analysis consisted of conducting descriptive tests on different tomato purees obtained after storage at room temperature and refrigeration temperature for three weeks. The data will be collected from 15 panelists, consisting of male and female students selected from NANGUI ABROGOUA University who have been trained in advance.

Each week, eight samples are presented to them for evaluation based on the following attributes on a scale of 1 to 5 points.

- Color (not red to extremely red),
- Texture (not smooth to extremely smooth),
- Appearance (not dark to extremely dark),
- Tomato smell (not pronounced to extremely pronounced),
- Mold growth (not pronounced to extremely pronounced),
- Musty smell (not pronounced to extremely pronounced),
- Shine (not pronounced to extremely pronounced)

2.3 statistical analysis

Statistical analysis of the results was performed using STATISTICA software version 7.1. Comparisons between dependent variables were determined by analysis of variance (ANOVA). The homogeneous subset test was performed using Duncan's test at a 5% significance level.

3. RESULTS

3. 1 Value of the physicochemical parameters of preserved tomato puree

3.1.1 Changes in the titratable acidity of tomato purees

141 The titratable acidity of tomato purees stored at 29°C and 6°C decreases significantly during storage, with the exception of
 142 blanching crushed tomatoes (BCT) stored at 29°C, where a significant increase is observed (Table 1). Blanching crushed
 143 tomatoes have lower acidity compared to the control and concentrated purees during the first week of storage (6°C and
 144 29°C). Concentrated unblanched puree (CUP) has higher acidity than blanching pulp until day 7. From day 14 to day 21,
 145 the acidity of concentrated unblanched paste (CUP) is lower than that of concentrated blanching pulp. This phenomenon is
 146 observed at both storage temperatures.

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 148 **3.1.2 Changes in the dry matter of tomato purees**

149 The dry matter content of the different tomato puree samples remained stable during storage (6°C and 29°C) with the
 150 exception of the unblanched concentrated puree (CUP) stored at 6°C (Table 2). For both storage temperatures, blanching
 151 had no significant effect on dry matter content during storage. The dry matter content of the control sample was virtually
 152 identical to that of the blanching sample (3.10 ± 0.59 to 2.65 ± 1.25) and (3.15 ± 0.17 to 2.45 ± 0.08). The concentration of
 153 the puree greatly increases the dry matter content, as is the case with concentrated unblanched shredded material (10.36
 154 ± 0.14 to 11.30 ± 0.08) and (6.91 ± 0.42 to 7.25 ± 0.19) for concentrated blanching puree (CBP). However, when stored at
 155 6°C, the dry matter content of concentrated shredded material stored at refrigeration temperature varies from 10.36 ± 0.14
 156 to 6.50 ± 0.23 .

157 **Table 1:** Changes in the acidity of tomato purée during storage

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	Ambient temperature 29°C				Refrigeration temperature 6°C			
Ech.	Day 0	Day 7	Day 14	Day 21	Day 0	Day 7	Day 14	Day 21
UCT	0.5 ± 0.44^c	0.43 ± 0.02^d	0.38 ± 0.03^e	0.36 ± 0.01^{cd}	0.5 ± 0.04^c	0.36 ± 0.03^{de}	0.3 ± 0.01^{ef}	0.31 ± 0.01^d
CUP	1.9 ± 0.08^a	1.66 ± 0.05^a	0.75 ± 0.03^c	0.43 ± 0.08^{cd}	1.9 ± 0.08^a	0.91 ± 0.05^c	0.79 ± 0.05^c	0.72 ± 0.03^b
BCT	0.36 ± 0.01^c	0.36 ± 0.01^{de}	0.47 ± 0.03^d	0.48 ± 0.03^c	0.36 ± 0.01^c	0.31 ± 0.03^e	0.31 ± 0.01^f	0.30 ± 0.02^d
CBP	1.37 ± 0.15^b	1.35 ± 0.05^b	1.05 ± 1.01^b	0.74 ± 0.07^b	1.37 ± 0.15^b	1.32 ± 0.03^b	1.26 ± 0.03^a	1.15 ± 0.08^a

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173 In the same row and column, values marked with the same letters do not show significant differences at the 5% level according to the Tuckey test

174 **UCT:** Untreated crushed tomatoes; **CUP:** Concentrated unblan
 175 ched puree; **BCT:** blanching crushed tomatoes; **CBP:** concentrated blanching puree

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 179 **Table 2:** Changes in the dry matter content of tomato puree during storage

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	Ambient temperature 29°C				Refrigeration temperature 6°C			
Ech.	Day 0	Day 7	Day 14	Day 21	Day 0	Day 7	Day 14	Day 21
UCT	3.10 ± 0.59^c	2.41 ± 0.3^c	2.39 ± 0.74^c	2.65 ± 1.25^c	3.10 ± 0.59^c	2.82 ± 0.39^c	2.78 ± 0.38^c	2.73 ± 0.38^c
CUP	10.36 ± 0.14^a	10.91 ± 0.18^a	10.13 ± 0.52^a	11.30 ± 0.08^a	10.36 ± 0.14^a	6.38 ± 0.23^b	6.68 ± 0.89^b	6.50 ± 0.23^b
BCT	3.15 ± 0.17^c	2.39 ± 0.11^c	2.30 ± 0.32^c	2.45 ± 0.08^c	3.15 ± 0.17^c	2.76 ± 0.1^c	2.72 ± 0.37^c	2.51 ± 0.24^c
CBP	6.91 ± 0.42^b	6.71 ± 0.18^b	6.64 ± 0.57^b	7.25 ± 0.19^b	6.91 ± 0.42^b	7.15 ± 0.64^b	7.42 ± 0.62^b	7.07 ± 0.71^b

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197 In the same row and column, values marked with the same letters do not show significant differences at the 5% level according to the Tuckey test

198 **UCT:** Untreated crushed tomatoes; **CUP:** Concentrated unblanched puree; **BCT:** blanching crushed tomatoes; **CBP:** concentrated blanching puree

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 200 **3.1.3 Changes in the Brix degree of tomato purees**

201 The Brix degree of the different tomato puree samples remains stable during storage (6°C and 29°C) with the exception of
 202 the unblanched concentrated puree (CUP) stored at 6°C, which increases (Table 3). For both storage temperatures, the
 203 Brix degree of the control sample was virtually identical to that of the blanching sample (3.03 ± 0.11 to 0.57 ± 0.40) and
 204 3.10 ± 0.2 to 2.20 ± 0.1). The concentration of the purée increases the Brix degree at different temperatures (6°C and
 205 29°C).

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 207 **3.1.4 Changes in the color of tomato purees**

208 The results of the evolution of color parameters (L^* , a^* , b^*) during storage at two temperatures (6°C and 29°C) show a
 209 decrease, with the exception of yellowing (b^*) (Table 4). Statistical analysis of the data shows no significant difference on

day 0 between the different tomato puree samples (at 6°C and 29°C). On day 7, a difference in brightness was observed at 29°C. The brightness (L*) of the control (at 29°C) differed from that of the unbleached concentrated puree (CUP), the bleached puree (BCT), and the bleached concentrated puree (CBP). The values are (26.67± 0.25, 24.17±0.32, 25.30±0.53 and 25.17±0.71) respectively. On day 7, the red color of the concentrated purees is higher than that of the non-concentrated purees (29°C). The unbleached concentrated pulp (28.03±0.72) and bleached concentrated pulp (29.27±1.26) are redder than the untreated pulps (26.73±0.25) and bleached pulp (26.70±0.60) at 29°C. The same changes were observed at 6°C. With regard to yellowing, no significant difference was observed at 29°C. However, at 6°C, statistical analysis showed a significant difference between concentrated samples (CBP and (CUP) and unconcentrated ones (UCT and BCT).

Table 3: Changes in the Brix degree of tomato purees

Ech.	Ambient temperature 29°C				Refrigeration temperature 6°C			
	Day 0	Day 7	Day 14	Day 21	Day 0	Day 7	Day 14	Day 21
UCT	3.03 ±0.11 ^c	2.60 ±0.1 ^e	1.83±0.15 ^f	0.57±0.40 ^g	3.03 ±0.11 ^c	3.03 ±0.06 ^d	3.0±0.1 ^e	2.9 ±0 ^d
CUP	9.67 ±0.47 ^a	10.87± 0.06 ^a	11.0± 0.61 ^a	12.1± 0.36 ^a	9.67 ±0.47 ^a	6.10±0.2 ^c	5.03 ±0.06 ^c	4.9±0.36 ^d
BCT	3.10 ±0.2 ^c	2.33± 0.06 ^f	2.27± 0.06 ^{ef}	2.2± 0.1 ^f	3.10 ±0.2 ^c	2.7±0 ^{de}	2.67± 0.06 ^{de}	2.67± 0.06 ^{ef}
CBP	5.7± 0.17 ^b	5.87±0.06 ^c	6.40± 0 ^c	7.93± 0.06 ^b	5.70± 0.17 ^b	7.93± 0.06 ^b	7.8± 0 ^b	7.5± 0.1 ^b

In the same row and column, values marked with the same letters do not show significant differences at the 5% level according to the Tuckey test
UCT: Untreated crushed tomatoes; **CUP**: Concentrated unblanched puree; **BCT**: blanched crushed tomatoes; **CBP**: concentrated bleached puree

Table 4: Changes in the color of tomato purees

Ech.	Days	Ambient temperature 29°C			Refrigeration temperature 6°C		
		L*	a*	b*	L*	a*	b*
UCT	Day 0	27.4±0.5a	26.9±0.7b	22.8±0.6b	27.4±0.5a	26.9±0.7b	22.8±0.6b
	Day 7	26.7±0.3a	26.7±0.3a	22.4±0.6b	21.9±0.2c	22.9±0.8c	20.03±0.8c
	Day 14	26.2±0.7a	26.5±0.6b	24.4±0.4b	25.2±0.3a	27±0.6b	24.8±0.12b
	Day 21	24.8±0.4a	24.1±0.6b	24.6±0.8b	24.6±0.6a	26.3±0.9b	26.8±1.7b
	Day 0	25.9±1.01a	29.2±0.4a	26.7±0.4a	25.9±1a	29.2±0.4a	26.7±0.4a
CUP	Day 7	24.2±0.3b	28.03±0.7a	26.6±1.12a	24.1±0.23b	26 ±0.3b	25.2±0.7b
	Day 14	24.6±0.4b	28.2±0.5ab	27.3±1ab	25.2±0.3a	27.8±0.7ab	28.7±0.9a
	Day 21	23.9±0.5a	28.4±0.6a	29.9±0.5a	24.23±0.2a	29.8±0.64a	30.13±0.9a
	Day 0	26.7±0.8a	27.1±1.3b	22.8±1.4b	26.7±0.8a	27.1±1.3b	22.8±1.5b
	Day 7	24.5±0.4b	26.7±0.6a	23.5±1b	24.9±0.20a	26.4±0.3ab	24.2±0.3b
BCT	Day 14	25.3±0.5ab	26.7±0.6b	24.9±1.7b	25.3±0.5a	26.9±0.6b	25.4±0.6b
	Day 21	25±0.85a	26.7±0.7a	27.4±1.4a	24.5±0.3a	28.6±0.8a	25.9±0.7b
	Day 0	26.1±1.3a	30.9±0.1a	26.1±0.3a	26.1±1.3a	30.9±0.1a	26.1±0.3a
	Day 7	24.4±0.5b	26.6±0.9a	25.9±1.01a	24.2±0.3b	27.7±0.7a	28.3±0.7a
	Day 14	25.2±0.7ab	29.2±1.3a	28.2±1.01a	25.2±0.7a	28.5±0.4a	29.9±0.78a
CBP	Day 21	24.03±0.2a	28.1±0.6a	29.1±1.34a	25.1±0.4a	30 ±0.21a	29.8±0.9a

In the same row and column, values marked with the same letters do not show significant differences at the 5% level according to the Tuckey test
UCT: Untreated crushed tomatoes; **CUP**: Concentrated unblanched puree; **BCT**: blanched crushed tomatoes; **CBP**: concentrated bleached puree

3.1.5 Evolution of the browning index of tomato purees

The browning index during storage of tomato puree increases slightly at 29°C and 6°C (table 5). Statistical analysis shows a significant difference between the different tomato puree samples during storage at 29°C and 6°C. The browning index of concentrated purees (CUP) and (CBP) is higher than that of treated or untreated purees on days 0 to 21. It increased from 2.77 ± 0.04 to 3.73 ± 0.08 and from 2.68 ± 0.17 to 3.57 ± 0.28 for the CUP and CBP samples stored at room

280 temperature, respectively. The same is true for these samples stored at 6°C, whose values increase from 2.76 ± 0.04 to
 281 3.74 ± 0.23 and from 2.68 ± 0.17 to 3.45 ± 0.26, respectively.

282 **Table 5: Tomato crushed browning index**

	Ambient temperature 29°C				Refrigeration temperature 6°C			
Ech.	Day 0	Day 7	Day 14	Day 21	Day 0	Day 7	Day 14	Day 21
UCT	2.05±0.08b	2.21±0.07b	2.41±0.19c	2.56±0.18b	2.05±0.08b	2.37±0.13c	2.57±0.05b	2.97±0.18bc
CUP	2.77±0.04a	3.05±0.19a	3.08±0.16ab	3.73±0.08a	2.76±0.04a	2.83±0.07ab	3.19±0.16a	3.74±0.23a
BCT	2.07±0.11b	2.49±0.13b	2.78±0.23bc	3.11±0.18a	2.07±0.11b	2.59±0.07ab	2.64±0.10b	2.89±0.06c
CBP	2.68±0.17a	2.88±0.09a	3.27±0.13a	3.57±0.27a	2.68±0.17a	3.15±0.51a	3.44±0.07a	3.45±0.26ab

284 In the same row and column, values marked with the same letters do not show significant differences at the 5% level according to the Tuckey test
 285 **UCT**: Untreated crushed tomatoes; **CUP**: Concentrated unblanched puree; **BCT**: blanched crushed tomatoes; **CBP**: concentrated bleached puree
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287 **3.2. Sensory profile of different tomato samples**

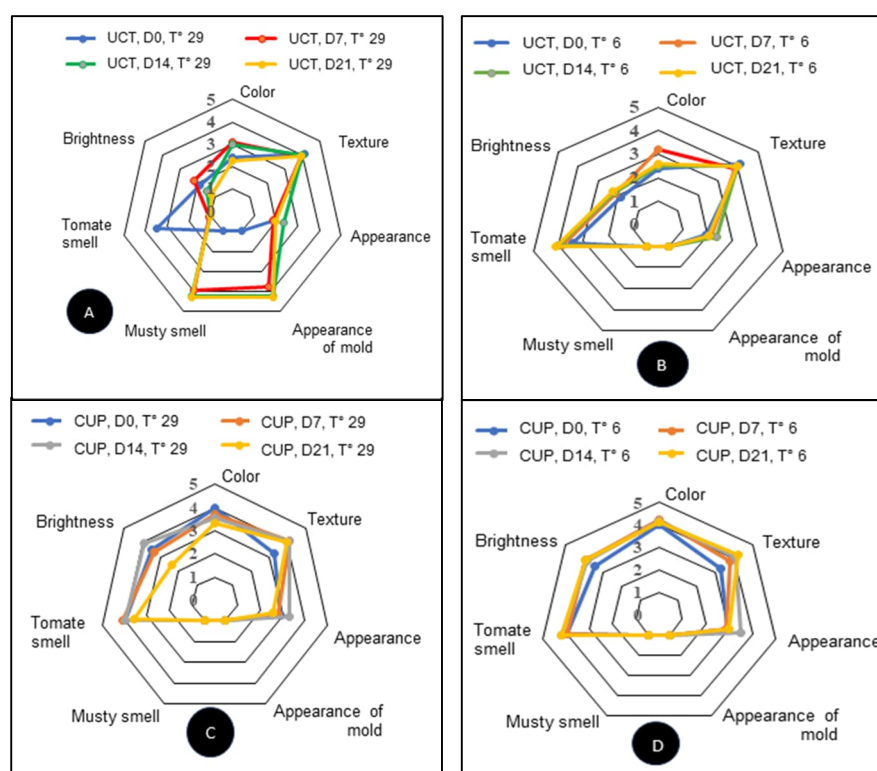
288 Sensory evaluation of the different tomato purees shows significant differences (Fig. 2). Untreated purees stored at 29°C
 289 (Fig. 2A) undergo significant changes during storage in terms of odor and mold growth. The tomato aroma disappears,
 290 replaced by a musty odor. These changes are observed from day 7 onwards. The same samples stored at 6°C show a
 291 different evolution (Fig. 2B). The organoleptic properties of the purees are preserved, except on day 7. At both storage
 292 temperatures, color, texture, and appearance are less affected.

293 For concentrated unblanched tomato purees (Fig. 2C and 2D), the sensory attributes did not change during storage at
 294 29°C (Fig. 2C) and 6°C (Fig. 2D). In both cases, there was no mold or associated aroma.

295 No differences were observed in the blanched tomato pulp stored at temperatures of 29°C and 6°C (Fig. 2E and 2F). Here
 296 too, no mold was observed.

297 There were no significant differences between the concentrated blanched purees stored at temperatures of 29°C and 6°C
 298 (Fig. 2G and 2H). There was no mold or associated odor. For the samples stored at 29°C, a slight decrease in sensory
 299 attributes (Fig. 2G) was observed, with the exception of the texture of the tomato purée. The opposite phenomenon was
 300 observed in terms of gloss for the samples stored at 6°C (Fig. 2H).

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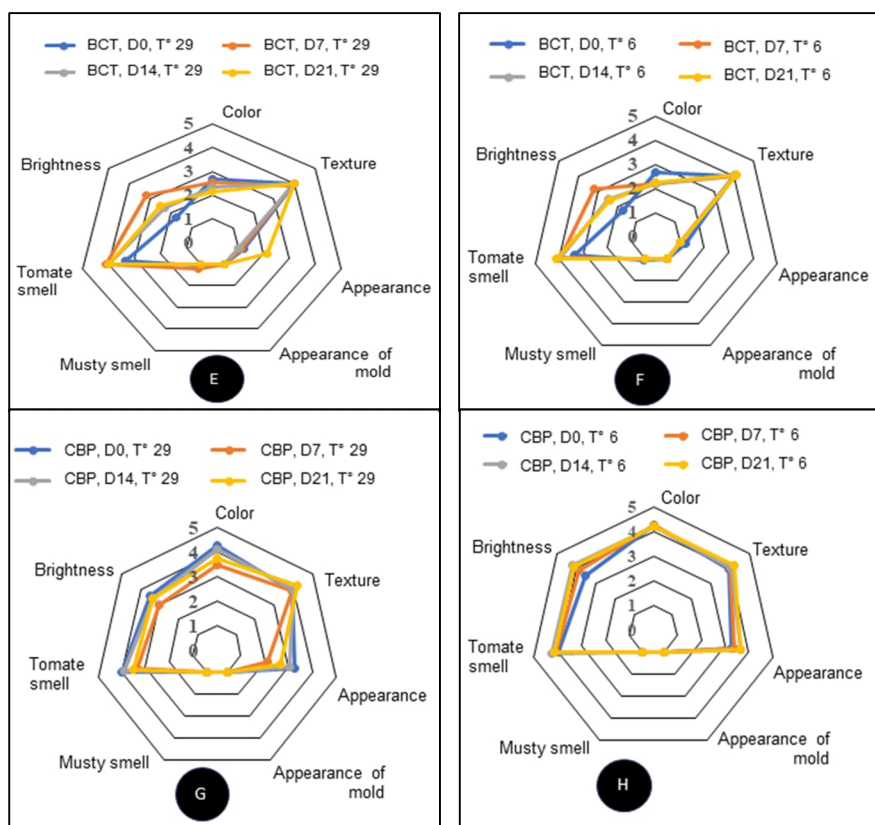


Fig.2 Sensory profile of different tomato purees stored at 29°C and 6°C.

UCT: Untreated crushed tomatoes; **CUP:** Concentrated unblanched puree; **BCT:** blanched crushed tomatoes; **CBP:** concentrated bleached puree. D0, T°6: Day 0 conserved at 6°C; D7, T°6: Day 7 conserved at 6°C; D14, T°6: Day 14 conserved at 6°C; D21, T°6: Day 21 conserved at 6°C. D0, T°29: Day 0 conserved at 29°C; D7, T°29: Day 7 conserved at 29°C; D14, T°29: Day 14 conserved at 29°C; D21, T°29: Day 21 conserved at 29°C.

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4. DISCUSSION

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349 Titratable acidity is higher in both blanched and unblanched concentrated tomato pomace. This could improve the shelf
350 life of these formulations. According to **Ortega-Salazar et al (2025)**, acidity influences the storability, quality, and safety of
351 tomato products. This value also tends to decrease during storage at 29°C more than at 6°C. Dry matter is also higher in
352 tomato purees than in non-concentrated purees. It tends to increase during storage at 29°C more than at 6°C. This could
353 be explained by possible water evaporation during storage at 29°C. Variations in moisture content were also observed by
354 **Sarkar et al (2025)** during the storage of tomato purée. The dry matter content remains low compared to that obtained by
355 **Rahman et al (2024)**, which is around 25% in tomato sauces. These increases in titratable acidity and dry matter could be
356 due to the concentration of the tomato pulp. This phenomenon also improves the stability of solutes, as shown by the Brix
357 degree values. This trend was observed by **Ekissi et al (2021)** during work on the preservation of tomato balls after
358 processing. Also, in view of the results, storage at a temperature of 6°C mitigates the effect of solute loss.

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360 The browning index results showed significant differences between samples during storage. The browning index of the
361 control and bleached ground coffee was lower than that of the concentrated ground coffee. This means that concentration
362 causes the color of ground coffee to vary.

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363 The color results showed a variation in lightness (L^*), redness (a^*) and yellowness (b^*) during storage at 29°C. Lightness
364 and redness decreased, while yellowness (b^*) increased. This decrease is due to the heat treatment applied to the
365 tomatoes before grinding. Changes in color parameters were also observed by **Sarkar et al (2025)**.

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367 The results of the sensory analysis showed a change in the color, brightness, and appearance of mold in the untreated
368 shredded material at room temperature. The change in color and brightness is due to the heat treatment applied to the
369 shredded material. In addition, the appearance of mold was due to the fact that the untreated shredded material had not
370 undergone any treatment and, furthermore, its high-water content promoted microbial growth. However, no change was
371 observed in the same sample at 6°C because the refrigeration temperature slows down the proliferation of
372 microorganisms. The titratable acidity content of the concentrated or bleached samples could explain the absence of
373 mold.

372

4. CONCLUSION

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374 Our work consisted of storing degraded tomato purees without adding preservatives at different temperatures in order to
375 assess the stability of certain of their physicochemical and organoleptic parameters. It should be noted that storage
376 temperature plays an important role in the preservation of fruit and vegetables. The purees could be stored at room
377 temperature, but were better preserved at refrigeration temperature. In terms of sensory analysis, untreated purees stored

378 at 29°C underwent significant changes in odor and mold growth during storage. Blanching and concentration are
379 treatments that allowed the purees to be preserved without mold growth.

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