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Effect of Thermal Processing and Storage Periods on the Quality Attributes of Mango Pulp

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ABSTRACT

This study aimed to evaluate the impact of thermal pasteurization and storage periods (6 and 12 months) on the physicochemical properties, bioactive compounds, antioxidant activity, vitamin C, and microbiological quality of mango pulp. The results showed that pasteurization and storage significantly increased total soluble solids (TSS), while pH decreased from 4.23 to 3.96, and acidity increased from 0.79% to 0.95%. Additionally, color parameters declined, indicating the degradation of carotenoids.

After pasteurization, viscosity increased due to pectin dissolution and enzyme inhibition. Fat content increased from 2.59% to 5.07% because of fat release from the seeds during cracking, while phenols, flavonoids, and carotenoids decreased significantly during storage. Antioxidant activity also decreased considerably, and vitamin C showed a 88.5% degradation after 12 months of storage.

Microbiologically, pasteurization eliminated harmful microorganisms, confirming its effectiveness in ensuring microbial safety. However, pasteurization caused a significant loss of non-thermally stable nutrients during long-term storage.

Conclusion: The pasteurization significantly affects the chemical composition, physicochemical properties, and bioactive compounds of mango pulp. While pasteurization ensures microbial safety, it leads to a loss in nutritional quality, particularly bioactive compounds like antioxidants and vitamin C. Storage further accelerates the degradation of these compounds. However, pasteurization's ability to eliminate harmful microorganisms and extend the product's shelf life is a key benefit.

Keywords: Mango pulp – Flavonoids – Phenolic compounds – Carotenoids – Microbiological quality.

INTRODUCTION

Mango (Mangifera indica L.) is one of the most important tropical fruits widely consumed around the world due to its pleasant flavor, sweetness, and richness in bioactive compounds such as carotenoids, vitamin C, and polyphenolic compounds, which contribute to its health-promoting properties **(Barrón-García *et al.*, 2022).** Fruit-based products, including juices and pulps, play a crucial role in human health since they are rich in antioxidants and anti-inflammatory compounds that reduce the risk of chronic diseases such as cancer, metabolic disorders, and cardiovascular diseases **(Moyo *et al.*, 2020).** Moreover, fruit juices and pulps are valued for their high nutritional content, including vitamins, minerals, organic acids, fibers, and phytochemicals **(Arena *et al.*, 2024).**

Despite their nutritional benefits, fruit pulps and juices are highly perishable due to microbial activity and enzymatic degradation. Therefore, thermal processing, particularly pasteurization, remains the most widely applied preservation method in the fruit industry, ensuring microbial safety and extending shelf life **(Mandha *et al.*, 2023).** However, heat treatment often results in undesirable changes, particularly in sensitive nutrients such

as ascorbic acid, which is one of the most unstable vitamins and rapidly degrades when exposed to heat, light, and oxygen **(Wang *et al.,* 2019).** For example, pasteurization of mango juice was reported to cause up to 27% reduction in vitamin C **(Mandha *et al.,* 2023),** while storage at ambient temperature further accelerates this degradation **(Guan *et al.,* 2016).** Similar losses have been observed in guava juice, with reductions exceeding 60% after pasteurization **(Kalsi *et al.,* 2023)** and continuous decline during storage due to enzymatic oxidation **(Dutta *et al.,* 2023).**

In addition to vitamin C, other bioactive compounds such as phenolics are also affected by processing and storage. Phenolic compounds, which are natural antioxidants, contribute to reducing oxidative stress and protecting against chronic diseases **(Prestes *et al.,* 2023)**. However, their stability during thermal processing is variable: in some cases, pasteurization reduces phenolic content, while in others, it increases extractability due to matrix breakdown **(Bie *et al.,* 2024).**

Although several studies have investigated the effect of heat treatments on juices and nectars, limited information is available regarding the combined assessment of microbial, physicochemical, and bioactive quality attributes of mango pulp subjected to pasteurization and extended storage. Addressing this gap is important to establish a comprehensive understanding of quality changes during processing and storage, which can guide the fruit industry in optimizing preservation strategies.

Therefore, the present study aims to evaluate the impact of pasteurization at 110 °C for 40 s on mango pulp, followed by storage for 6 and 12 months, with emphasis on microbial safety, physicochemical parameters, and bioactive compounds. The findings will provide valuable insights into the stability and quality of mango pulp during thermal processing and long-term storage.

2. MATERIALS AND METHODS

2.1. Materials:

2.1.1. Raw materials:

Mango fruits (*Mangifera indica*) was obtained from Baltim city in Kafr El Sheikh Governorate, Egypt during season 2024.

2.1.2. Chemicals:

All chemicals used for chemical analysis and Microbiological examination media (Total plate count (TPC), MacConkey agar, MRS Agar and Potato dextrose agar (PDA)) were purchased from El-Gomhouria Pharmaceutical Company, El-Mansoura, El-Dakahlia Governorate, Egypt.

2.2. Methods

2.2.1 Technological methods:

For preparing mango pulp, the following steps were carried out:

A) Firstly, Mango fruits were received from approval suppliers, washing and sorting manually to remove the immature and any damage fruits.

B) Secondly, rinsing step by hot water at 80˚C for 60 sec were used for reducing microbial load for Mango fruit also facilitating to remove mango peels.

C) Thirdly, Mango fruit was crushed for extraction pulp, then filtration process for removing seeds from Mango pulp, collected in stainless steel tank and transferred to pasteurized advice Model (TEKME S.R.L.REGGIO CALABRIA- ITALY- 2004) for pasteurization process at (110˚C for 40 sec).

D) Finally, Mango pulp was cooled at 35˚C and packaged in sterile packaging (aseptic packaging), and they were ready for preparation of Mango nectar. (**Mushtaq, 2018).**

3. 1. Chemical analyses:

Moisture, ash, crude fat, crude protein and crude fibers content were determined according to the method described by **A.O.A.C, (2019).** While Total carbohydrates was measured by difference from the following equation:

Carbohydrates content = %100- [% protein + % ash + % lipids + % fibers].

3.2. Determination of Viscosity:

Viscosity of Mango pulp was measured by using Bostwick according to **(CODEX, 1981).**

3.3. Determination of color:

Color was determined using a Hunter colorimeter (HunterLab colorflex EZ, according to the method was described by **(Perkins-Veazie and Collins, 2004)** where L* value (indicates of lightness), a* value indicates of (red to green) and the b* value indicates (Yellow to blue).

3.4. Physiochemical analysis:

Physiochemical attributes (TSS, pH and total acidity) were determined according to the method described by **A.O.A.C. (1995)**

3.5. Determination of Total Phenolic compounds content:

Total phenolic compounds in all samples were determined using spectrometer (model T80, UK) according to the method was deccribed by **(Attard, 2013)**.

3.6. Total Flavonoid Compounds content:

Total Flavonoid compounds were determined using Spectrometer (model T80, UK) according to the method adopted by **Zhuang, (1992).**

3.7. Total Carotenoids Compounds content:

Total Carotenoids Compounds were determined using Spectrometer (model T80, UK) according to the methods described by **Milczarek, and Tatarowska, (2017).**

3.8. Determination of radical scavenging activity DPPH% (antioxidant activity):

The antioxidant activity of the samples was assessed using the DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging activity method by using spectrometer (model T80, UK) according to the method was described by **(Zhang *et al.,* 2017).**

3.9. Determination of ascorbic acid (vitamin C):

Ascorbic acid was determined using 2, 6 Dichlorophenol - Indophenol according to the method described by **Nielsen (2017)**

3.10. Determination of reducing sugars:

Reducing sugars were determined by spectrophotometer (model T80, UK) according to the method described by **(Bello Gil *et al.*, 2006)**.

3.2.4.1 Microbiological examination:

Total Plate Count (TPC) was performed by using Trypton soya agar (TSA) medium according to **(ISO 4833:2013-1protocol)**, Potato dextrose agar medium was used for yeast and mold counting **(ISO 21527-2:2008)**, MacConkey agar medium was used for counting coliform bacteria according to **(ISO 21528-2:2004)**, MRS agar medium was used for Lactobacillus counting **(ISO 20128:2006 (E))**

3.2.4.9. Statistical analysis:

The statistical analysis was carried out using ANOVA with one factor under significance level of 0.05 for the whole results using SPSS (ver. 20). Data were treated as a complete randomization design according to **(Steel *et al.*, 1997).**

3. RESULTS AND DISCUSSIONS

3.1. Effect of pasteurization process and storage periods on chemical composition during manufacturing of mango pulp:

The change in chemical composition content in mango pulp during pasteurization and storage periods were presented in **Table (1) and Fig. (1)**

Table (1): Effect of pasteurization process and storage periods on chemical composition of mango pulp

Parameter	Raw mango	Mango pulp after pasteurization	Mango pulp after storage after 6 months	Mango pulp after storage after 12 months	LSD (0.05)
Moisture %	$83.36^{a} \pm 0.04$	$82.69^{b} \pm 0.03$	$82.52^{b} \pm 0.1$	$82.45^{b} \pm 0.11$	0.19
Protein %	$2.79^{a} \pm 0.02$	$2.35^{b} \pm 0.02$	$2.16^{c} \pm 0.04$	$1.87^{d} \pm 0.02$	0.06
Fat %	$2.59^{d} \pm 0.03$	$5.07^{a} \pm 0.03$	$3.38^{b} \pm 0.02$	$2.94^{c} \pm 0.03$	0.06
Ash %	$0.46^{a} \pm 0.02$	$0.42^{a} \pm 0.02$	$0.4^{a} \pm 0.01$	$0.36^{a} \pm 0.02$	0.06
Fiber %	$82.32^{a} \pm 0.16$	$76.46^{b} \pm 1$	$80.24^{b} \pm 0.15$	$81.86^{c} \pm 0.55$	1.1
Carbohydrate %	$11.83^{c} \pm 0.1$	$15.7^{a} \pm 0.98$	$13.83^{b} \pm 0.17$	$12.97^{c} \pm 0.58$	1.08
Reducing sugar (mg/mL)	$1.45^{c} \pm 01$	$1.88^{a} \pm 0.01$	$1.65^{b} \pm 0.02$	$1.41^{c} \pm 01$	0.06

Values are expressed as mean ± standard deviation (n = 3). Data were analyzed using one way ANOVA. Differences were considered statistically significant at p < 0.05 according to the LSD test

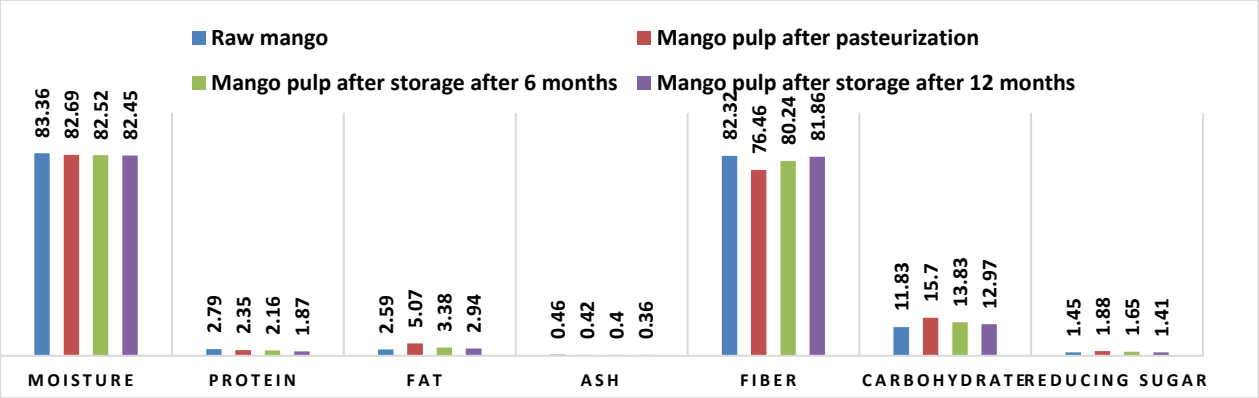

Fig. (1): Effect of pasteurization process and storage periods on chemical composition of mango pulp.

Data presented in **Table (1) and Fig (1)** showed that, the moisture decreased after pasteurization of mango pulp from 83.36 % in raw mango to 82.69 % then, its decreased from 82.52 % to 82.45 % in mango pulp during all storage periods and this had no significant (P>0.05). Our results were in accordance with (**Giavoni *et al.*, 2022)** who observed that the pasteurization process affected the orange pulp, as the moisture content decreased from 86.2% to 83.7%.

Also, protein decreased in mango pulp from 2.79 %, 2.35 %, 2.16 %, and 1.87 % in raw mango, after pasteurization, and during all storage periods respectively, and this decreased was statistically highly significant (P<0.05). Our results were in accordance with **Sameh *et al.*, (2021)** who observed that the pasteurization process negatively affected protein and led to a decrease from 0.72% to 0.22%.

Data presented in **Table (1) and Fig (1)** showed that, The fat increased from 2.59 % in raw mango to 5.07 % in mango pulp after pasteurization, and this increase is highly significant (P<0.05), while it decreased to 3.38 % and 2.94 % during all storage periods respectively, and this decreased was highly significant (P<0.05). Our results were disagreement with **Sameh *et al.* (2021),** who observed that the pasteurization process negatively affected fat and led to a decrease from 0.23% to 0.06%.

The results obtained in **Tables (1) and Fig (1)** indicated that, The ash decreased in mango pulp from 0.46 %, 0.42 % , 0.4 %, and 0.36 % in raw mango, after pasteurization, and all storage periods, respectively, and this decreased had not significant (P>0.05). Our results were in accordance with (**Giavoni *et al.*, 2022)** who observed that pasteurization had a negative effect on ash content in orange pulp and decreased it from 3.2% to 2.7%.

The results obtained are also shown in **Tables (1) and Fig (1)**. The fiber decreased from 82.32 % in raw mango to 76.46 % in mango pulp after pasteurization, and this decreased is statistically significant (P<0.05), while it increased again to 80.24 % and 81.86 % after storage for 6 and 12 months, respectively, and this decrease is statistically significant (P<0.05). Our results were in accordance with **(Giavoni *et al.*, 2022 and Sui *et al.*, 2025)** who observed that, fiber content decreased from 27.1 % to 20.4 % and mentioned that cellulose, hemicellulose, and pectin can undergo hydrolysis and breakdown by heat treatments, which can lead to the solubilization of low- and medium-molecular-weight polysaccharides and oligosaccharides as well as the loss of lignin. Also extended storage lead to structural changes in cell-wall polysaccharides and improved water-holding capacity, which can explain the observed rise in apparent dietary fiber following storage.

Table (1) and Fig. (1) showed that, the total carbohydrate increase in mango pulp after pasteurization from 11.83% in raw mango to 15.7%. Also, it can be observed that reducing sugar is also increased after pasteurization of mango pulp from 1.45 mg/mL in raw mango to 1.88 mg/mL, and this increase was significant at (P<0.05), but after all storage periods, the total carbohydrate is decreased from 13.83% to 12.97%, and reducing sugar is decreased from 1.65 mg/mL to 1.41 mg/mL, respectively, and this decreased was not significant (P>0.05). Our results were in accordance with (**Duong and Chi, 2025)** who observed that, during the pasteurization process (70-80°C for 5-10 minutes), an increase in reducing sugars can occur.

3.2. Effect of pasteurization process and storage periods on physiochemical properties of mango pulp:

The change in the content of physiochemical properties in mango pulp during pasteurization and during storage periods were presented in **Table (2) and Fig. (2)**

Table (2): Effect of pasteurization process and storage periods on physiochemical properties during pasteurization of mango pulp

Parameter	Raw mango	Mango pulp after pasteurization	Mango pulp after storage after 6 months	Mango pulp after storage after 12 months	LSD (0.05)
TSS (°Brix)	$17.0^{b} \pm 0.1$	$17.8^{a} \pm 0.1$	$18.0^{a} \pm 0.3$	$18.1^{a} \pm 0.1$	0.29
pH	$4.23^{a} \pm 0.02$	$4.13^{a} \pm 0.03$	$4.07^{a} \pm 0.43$	$3.96^{a} \pm 0.01$	0.42
Acidity (%)	$0.79^{d} \pm 0.02$	$0.86^{c} \pm 0.01$	$0.91^{b} \pm 0.01$	$0.95^{a} \pm 0.01$	0.021
Color (L*)	$52.96^{a} \pm 0.1$	$52.54^{b} \pm 0.1$	$51.98^{c} \pm 0.1$	$51.88^{d} \pm 0.1$	0.02
Color (a*)	$14.8^{a} \pm 0.1$	$7.5^{b} \pm 0.1$	$6.6^{c} \pm 0.1$	$5.6^{d} \pm 0.1$	0.19
Color (b*)	$34.6^{a} \pm 0.1$	$31.4^{b} \pm 0.1$	$30.5^{c} \pm 0.2$	$29.5^{d} \pm 0.1$	0.19
Viscosity (cm/30 sec.)	$9.5^{a} \pm 0.1$	$8.5^{b} \pm 0.1$	$7.0^{c} \pm 0.1$	$6.4^{d} \pm 0.2$	0.25

Values are expressed as mean ± standard deviation (n = 3). Data were analyzed using one way ANOVA. Differences were considered statistically significant at p < 0.05 according to the LSD test

L*: Lightness **a*:** Red-green **b*:** Yellow-blue

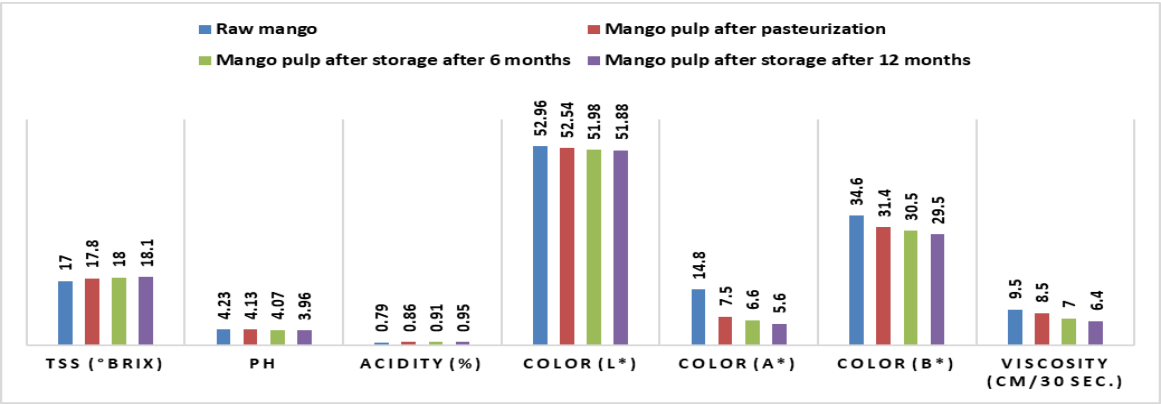

Fig. (2): Effect of pasteurization process and storage periods on physiochemical properties of mango pulp.

From the obtained results in **Table (2) and Fig (2)**, it can be observed that, the TSS increased after Pasteurization of mango pulp from 17.0 in raw mango to 17.8 and this increase is statistically ($P<0.05$) while, after all storage periods, its increased from 18.0 to 18.1 respectively, and this increase had no significant difference during all storage periods. Our results were in line with **(Sabanci and Icier, 2017 and Nguyen *et al.,* 2025)** who observed that, the increase in TSS during storage periods occur because polysaccharides namely starch hydrolysis into monosaccharides namely sugars also, increase in TSS may occur because evaporation of some simple moisture during Thermal Processing such as pasteurization.

pH and Total Acidity: Obtained results also shown in **Table (2) and Fig (2)**, it can be observed that, the pH is decreased after pasteurization on mango pulp and due all storage periods and this decreased had not significant statically ($p>0.05$). decreased in pH also lead to increase in total acidity from 0.79, 0.86, 0.91 and 0.95 in raw mango, mango pulp after pasteurization, all storage periods respectively and this increase is significant ($p<0.05$).

Our results were in accordance with **(Elsheikh *et al.,* 2014)** who observed that, the increase in acidity could be due to partial hydrolysis of organic acid lead to accumulation of organic acid.

Color parameters (L*, a*, b*): Obtained results are also shown in **Table (2) and Fig (2)**, it can be observed that the color parameters [L* (Lightness), a* (redness), and b* (yellowness)] are decreased after pasteurization process of mango pulp and during all storage periods. statistically analysis showed a highly significant ($P<0.05$). these may be occur because of the reduction of carotenoids by the pasteurization process and storage because an oxidation reaction may occur and a non-enzymatic browning formation and may lead to the loss of carotenoids. Which ultimately leads to a decrease of color parameters [L* (Lightness), a* (redness), and b* (yellowness)] (**Santhirasegaram *et al.*, 2015).**

Also, our results were in accordance with (**Lopes *et al.,* 2021),** who observed that color a* (redness) of mango pulp decreased from 5.27 to 3.09; also, color b* (yellowness) also decreased from 69.81 to 29.86.

Data presented in **Table (2) and Fig (2)** showed that the viscosity increased after pasteurization process of the mango pulp, as well as during all periods storage. This increase were highly significant ($P<0.05$).

Our results were in accordance with **(Mundanat *et al.,* 2025),** who observed that, when the PME is inactivated by pasteurization process, the degradation of pectin is reduced, which can lead to an increase of viscosity in mango pulp.

3.3. Effect of pasteurization process and storage periods on bioactive compounds and ascorbic acid of mango pulp:

The change in the bioactive compounds and ascorbic acid in mango pulp during manufacturing and after storage periods were presented in **Table (3) and Fig. (3)**.

Table (3): Effect of pasteurization process and storage periods on bioactive compounds and ascorbic acid of mango pulp

Parameter	Raw mango	Mango pulp after pasteurization	Mango pulp after storage after 6 months	Mango pulp after storage after 12 months	LSD (0.05)
Total phenolic compounds (mg/g)	$11.89^{a} \pm 0.02$	$6.66^{b} \pm 0.02$	$5.55^{c} \pm 0.06$	$3.12^{d} \pm 0.01$	0.06
Total flavonoids (mg/g)	$19.6^{a} \pm 0.13$	$15.78^{b} \pm 0.28$	$14.04^{c} \pm 0.14$	$13.82^{c} \pm 0.08$	0.33
Total carotenoids (mg/100g)	$6.87^{a} \pm 0.02$	$5.89^{b} \pm 0.01$	$5.83^{b} \pm 0.01$	$5.67^{c} \pm 0.02$	0.06
Antioxidant Activities (%)	$90.92^{a} \pm 0.05$	$85.98^{b} \pm 0.16$	$82.15^{c} \pm 0.06$	$35.79^{d} \pm 0.22$	0.27
Ascorbic acid (mg/100g)	$70.72^{a} \pm 2.06$	$31.53^{b} \pm 5.63$	$15.38^{c} \pm 1.32$	$8.11^{d} \pm 2.7$	6.31

Values are expressed as mean ± standard deviation (n = 3). Data were analyzed using one way ANOVA. Differences were considered statistically significant at $p < 0.05$ according to the LSD test

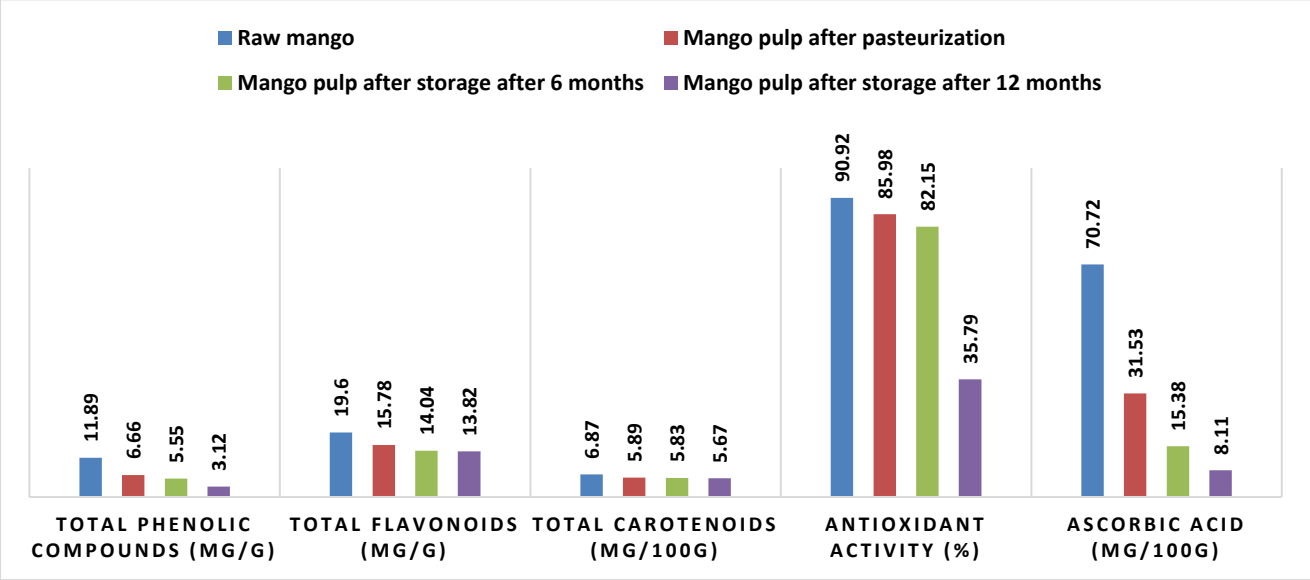

Fig. (3): Effect of pasteurization process and storage periods on bioactive compounds and ascorbic acid of mango pulp.

From the obtained results in **Table (3) and Fig. (3)**, it can be observed that the total phenolic compounds decreased in mango pulp from 11.89, 6.66, 5.55, and 3.12 mg/g in raw mango, mango pulp after pasteurization, and mango pulp after storage for 6 and 12 months, respectively, this decreased was statistically significant ($P<0.05$). Our results were in accordance with **(Azofeifa *et al.*, 2015),** who observed that the total phenol content in mango juice decreased significantly after heat treatment by 38% at 90°C for 60 seconds.

Total flavonoids also decreased in mango pulp from 19.6, 15.78, 14.04, and 13.82 mg/g in raw mango, mango pulp after pasteurization, and during storage periods respectively, this decreased was statistically significant ($P<0.05$). Our results were in accordance with **(Behfar *et al.*, 2024)** who observed that the pasteurization process negatively affected flavonoid content.

On the other hand, **Tables (3) and Fig. (3)**. showed that, the total carotenoids decreased in mango pulp from 6.87, 5.89, 5.83, and 5.67 mg/100g in raw mango, mango pulp after pasteurization, and mango pulp after storage for 6 and 12 months, respectively, this decrease is statistically significant ($P<0.05$) but between after pasteurization and after storage for 6 months is not significant statically ($P>0.05$). Our results were in accordance with **Marin-Castro *et al.*, (2022)** who observed that, the pasteurization process in mango pulp leads to a significant decrease in the total carotenoid content. Also our results were in accordance with **Saadia *et al.*, (2023)** who mentioned that, total carotenoids was decreased from 6.7 to 5.9 mg/100g after pasteurization of orange juice at 85 C/45 sec, also decreased after storage for 2 months from 5.8 to 5.19 mg /100g

Data in **Table (3) and Fig. (3)** also observed that the antioxidant activity decreased in mango pulp from 90.92, 85.98, 82.15, and 35.79% in raw mango, mango pulp after pasteurization, and mango pulp after storage for 6 and 12 months, respectively, and this decrease is statistically significant ($P<0.05$). A decrease in antioxidant activity after pasteurization and after storage occurs because antioxidant compounds such as total phenolic compounds, total carotenoids, and vitamin C are decreased after pasteurization and after storage, leading to decreased antioxidant activity. This is due to the loss of some bioactive compounds such as vitamin C and total phenolic content. Therefore, pasteurization of mango juice leads to a decrease in antioxidant activity **(Tembo *et al.*, 2017).**

With corresponding of ascorbic acid, it was decreased in mango pulp from 70.72, 31.53, 15.38, and 8.11 mg/100g in raw mango, mango pulp after pasteurization, and mango pulp after storage for 6 and 12 months, respectively, this decrease is statistically significant ($P<0.05$). As shown in **Table (3) and Fig. (3)**, Ascorbic acid was extremely sensitive to temperature; high temperatures would exacerbate the loss of ascorbic acid in juice. Our results were in accordance with **(Guan *et al.*, 2016 and Mandha *et al.*, 2023)** who observed that thermal processing such as pasteurization negatively affected the vitamin C content of mango juice.

4.1 Microbiological examination during pasteurization and storage periods of mango pulp:

Total Plate Count (TPC), Mold and yeast, coliform group and Lactobacillus were detected in raw mango, mango pulp after pasteurization, mango pulp after storage for 6 and after 12 months storage period are shown in **Table (4)**

Table (4): Microbiological examination during pasteurization and storage periods of mango pulp

Microbiological assay (CFU/g)	**TPC**	**M and Y**	**Coliform group**	***Lactobacillus SP***
Raw mango	3×10^1	3×10^1	0×10^1	3×10^1
Mango pulp after pasteurization	0×10^1	0×10^1	0×10^1	0×10^1
Mango pulp after storage for 6 months	0×10^1	0×10^1	0×10^1	0×10^1
Mango pulp after storage for 12 months	0×10^1	0×10^1	0×10^1	0×10^1

TPC: Total Plat Count **M and Y:** Mold and Yeast **CFU:** Colony Forming Unit

"In this table, 10^1 represents a 1:10 dilution of the sample

It can be observed that, TPC, mold, yeast, and Lactobacillus in raw mango were 3×10^1, 3×10^1, and 3×10^1, respectively, while coliform groups were not detected in raw mango. While after pasteurization process of mango pulp, all the examined microorganisms were not detected during all storage periods.

The presence of microorganisms in raw mango before pasteurization is normal, but after the pasteurization process, all microorganisms that were detected are destroyed by the pasteurization process, it means that the pasteurization process of mango pulp is a positive effect on destroying all microorganisms. The effectiveness of thermal processing is measured by its ability to reduce or inhibit microbial growth to safe levels, providing consumers with a safe product free of spoilage, pathogenic microorganisms and increases the shelf life of the product **(Barth *et al.*, 2009).**

Also, our results were in accordance with **(Shalaby *et al.*, 2018)** who observed that, no TPC, Mold, yeast and coliform group were detected in guava nectar after pasteurization.

4. CONCLUSION

The study demonstrated that pasteurization significantly affects the chemical composition, physicochemical properties, and bioactive compounds of mango pulp. While pasteurization ensures microbial safety, it leads to a loss in nutritional quality, particularly bioactive compounds like antioxidants and vitamin C. Storage further accelerates the degradation of these compounds. However, pasteurization's ability to eliminate harmful microorganisms and extend the product's shelf life is a key benefit.

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