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Rajdeep Gandhi
Department of Processing and Food Engineering, College of Agricultural Engineering and Technology, Anand Agricultural University, Godhra, Gujarat, India

Dr. Navneet Kumar
Department of Processing and Food Engineering, College of Agricultural Engineering and Technology, Anand Agricultural University, Godhra, Gujarat, India

Abhi Mistry
Food Safety, Quality Assurance & Regulatory Technician at Cargill, ON Canada

Corresponding Author:
Rajdeep Gandhi
Department of Processing and Food Engineering, College of Agricultural Engineering and Technology, Anand Agricultural University, Godhra, Gujarat, India

Physicochemical characterization of steam blanched parijat (*Nyctanthes arbor-tristis* L.) leaves

Rajdeep Gandhi, Dr. Navneet Kumar and Abhi Mistry

Abstract
This study investigated the impact of steam blanching on the physical and chemical parameters of parijat leaves. The mass, length, width, and thickness of the leaves also decreased during the blanching process. Regarding chemical parameters, the ascorbic acid content decreased significantly from 180.31±8.44 mg per 100 grams to 135.09±8.44 mg per 100 grams after steam blanching, indicating a reduction in vitamin C content. Similarly, the total phenolic content decreased from 231.72±1.36 mg GAE/g to 200.88±1.36 mg GAE/g. In contrast, the TSS content increased from 2.06±0.05 °Brix to 2.93±0.05 °Brix, and the pH increased from 5.43±0.04 to 6.87±0.04 with increasing blanching time. Peroxidase activity decreased substantially from 62.77% to 4.87% after 150 seconds of blanching, indicating effective enzyme inactivation. These findings are valuable for understanding the changes occurring in parijat leaves during steam blanching, which could be crucial for optimizing blanching processes in various applications.

Keywords: Physicochemical characterization, parijat, *Nyctanthes arbor-tristis* L.

1. Introduction
Parijat (*Nyctanthes arbor-tristis*) is a popular ornamental plant with traditional medicinal properties. The leaves of Parijat are high in bioactive substances such as polyphenols, flavonoids, and essential oils, all of which have anti-inflammatory and antioxidant characteristics (Rawat *et al*., 2019) [7]. Because of these bioactive ingredients, Parijat leaves are useful for a variety of uses, including herbal beverages, nutritional supplements, and natural cures.

The preservation of Parijat leaves is difficult because to their high perishability and sensitivity to enzymatic degradation, which results in nutritional loss and poor quality. Traditional techniques of preservation, such as sun drying, frequently result in nutritional deterioration, colour change, and decreased sensory characteristics (Jena *et al*., 2016) [2]. As a result, there is a need for novel preservation strategies that can preserve the nutritional value and cosmetic attractiveness of Parijat leaves.

Steam blanching, a moderate heat treatment procedure that uses saturated steam, is commonly used in the food business for a variety of fruits, vegetables, and herbs. Blanching includes briefly exposing plant material to high-temperature steam, followed by quick cooling, which inactivates enzymes responsible for quality deterioration and increases product shelf life (Vallverd-Queralt *et al*., 2014) [10]. Furthermore, steam blanching has been shown to keep the nutritional content and sensory properties of food better than other preservation procedures (Ramos *et al*., 2013) [5]. Steam blanching may contribute to the preservation of the vibrant green colour and aroma of the leaves, enhancing their marketability and consumer acceptance.

In this research study, we aim to investigate the effects of steam blanching on the of Parijat leaves. We will evaluate the impact on parijat leaves after steam blanching, such as the retention of physical, colour, Biochemical, and sensory attributes of the leaves. The results will contribute to the development of innovative strategies for the efficient utilization of Parijat leaves, enabling their integration into diverse applications in the food, pharmaceutical, and nutraceutical industries.

2. Material and Methods
The parijat leaves were collected from the college campus of Anand Agricultural University's College of Agricultural Engineering and Technology in Godhra, Gujarat, India. For this research, good-quality parijat leaves were used.

2.1 Blanching
Samples of 30 g parijat leaves were placed in a vessel holding water for steam generation and blanched in steam for 30, 60, 90, 120, and 150 seconds obtained from boiling water at ambient pressure.

2.2 Physical Properties
The sample was weighed utilizing a digital balance that had a precision of 0.001g. The dimensions of the 5 parijat leaves, which were randomly selected, were measured. The length and breadth were measured using a digital vernier caliper with an accuracy of 0.02 mm. The thickness of the parijat leaves was assessed using a standardized thickness gauge. Each treatment was examined in quintuplicate, and the average results were recorded. To measure the colour (L*, a*, b*) colourimeter was employed, employing the CIE Lab scale. Prior to the measurements, the instrument was calibrated using a white standard. The colour L* value indicates the range from black to white, the colour a* value represents the range from green to red, and the colour b* value signifies the range from blue to yellow. The variation in response *viz*. mass. length, width, thickness, Colour (L*, a*, b*) were represented as:

$$\text{Variation in response}(\%) = \frac{\text{Final response} - \text{Initial response}}{\text{Initial response}} \times 100 \ldots (3.1)$$

2.3 Biochemical Properties
The moisture content of the sample was determined by removing the water through a tray dryer, with a precision of±1, at 105 °C for 24 hours on a wet basis (Ramallo *et al*., 2001) [4]. To estimate the ascorbic acid content, the standard 2,6 dichlorophenolindophenol titration method suggested by Ranganna (1986) [6] was employed. The Total Soluble Solids (TSS) were measured using a reflectometer, while the pH of the samples was evaluated using a digital pH meter. The sample (0.5 g) was extracted three times with 10 ml of methanol in each instance, and the resulting extract was stored in a plastic bottle.

For the determination of total phenolic content using gallic acid concentration in the sample, a portion (0.5 ml) of the extract was mixed with water and a diluted Folin-Ciocalteau reagent. After 5 minutes, a sodium carbonate solution was added, and the mixture was left to stand for 1 hour. The absorbance of the solution was measured at 765 nm using a spectrophotometer. The concentration of gallic acid was then determined, and the total phenols were expressed in milligrams of gallic acid equivalents per gram. Standard solutions with varying concentrations of gallic acid were prepared, and their absorbance values were used to construct a standard curve (Siddiqui *et al*., 2017) [9]. To assess enzymatic activity, peroxidase activity was investigated. Parijat leaves up to 10 mm in height were placed into test tubes for the purpose of estimating residual activity. The absorbance of the samples at 720 nm was calculated using a UV-VIS Spectrophotometer. The approach described by Sheu and Chen (1991) [8] is used to estimate residual enzymatic activity, and it is expressed as.

$$\text{Residual activity}\ (\%) = \frac{\text{absorbance of fresh sample} - \text{absorbance after blanching}}{\text{absorbance of fresh sample}} \times 100$$

2.4 Sensory analysis
A semi-trained panel of 10 panellists was tasked with scoring the samples on a hedonic rating scale (Ranganna, 1986) [6], where 1 indicates the lowest score and 9 represents the highest score, based on colour, texture, and general acceptability. The outcome for this investigation was taken into account as the overall acceptability, which takes into account all sensory qualities.

3. Result and Discussion
3.1 Physical Parameters
The study investigated how steam blanching affected the mass changes of a specific material at different time intervals. Initially, the parijat leaves weighed 759.04±135.93 mg, but after steam blanching, their mass reduced to 447.61±139.60 mg. The researchers represented the percentage of mass change over time in Fig. 1 (A). The results demonstrated a continuous decline in mass as the blanching process advanced. At 30 seconds, there was a 5.5% reduction in mass, which further decreased to -19.5% at 60 seconds, -46.8% at 90 seconds, -50.8% at 120 seconds, and finally -53.5% at 150 seconds. This consistent reduction in mass indicated that steam blanching effectively removed water content from the material, attributed to moisture loss during the treatment. The data in Table 1 (A) also supported the significant variation in mass concerning process time (p<0.05). Additionally, Table 2 highlighted a negative correlation between the mass of parijat leaves and the duration of blanching.

The initial length of parijat leaves was 11.02±1.17 cm, and steam blanching led to a reduction in length to 10.87±1.16 cm. Figure 1 (B) in the study illustrates the percentage of length change at different time points during the blanching process. The findings showed that there was no significant change in length (0.0% change) after 30 seconds of steam blanching. However, with increased blanching time, the parijat leaves displayed noticeable shrinkage: 0.8% at 60 seconds, 1.1% at 90 seconds, 1.4% at 120 seconds, and 2.3% at 150 seconds. The negative percentages indicate that steam blanching caused a reduction in length, likely due to moisture loss. Table 1 (B) confirms that the variation in length concerning process time is significant (p<0.05). Additionally, Table 2 indicates that the length of parijat leaves has a negative correlation with blanching time and a positive correlation with mass.

The initial width of parijat leaves measured 5.64±0.74 cm, but after steam blanching, it reduced to 5.49±0.70 cm. Fig. 1 (C) in the study illustrates the percentage of width change at different time points during the blanching process. As time progressed, the width experienced changes. No width change (0.0%) occurred at 30 seconds, while at 60 seconds, it decreased by 1.7%. Similarly, at 90 seconds, the reduction was 2.2%, and at 120 seconds, it decreased by 3.3%. The most significant reduction of 5.5% was observed at 150 seconds. The steam blanching process led to a continuous decrease in width over time. Additionally, Table 1 (C) indicates a significant variation of width concerning process time (p<0.05). Moreover, Table 2 reveals that the width of parijat leaves is positively correlated with mass and length, but negatively correlated with blanching time.

The initial thickness of parijat leaves was 0.30±0.05 mm, but it decreased to 0.22±0.0376 mm after steam blanching. Figure 1 (D) in the study illustrates the percentage of thickness change at different time points during the blanching process. The thickness of the parijat leaves gradually reduces over time. Specifically, at 30 seconds, the thickness decreases by 24.2%. This reduction further increases to 25.7% at 60

seconds, 27.1% at 90 seconds, 28.8% at 120 seconds, and 29.2% at 150 seconds. This decrease in thickness is likely caused by moisture loss and changes in the cell structure due to the application of heat and steam during the treatment. The relationship between thickness and process time is statistically significant (p<0.05), as shown in Table 1 (D). Additionally, Table 2 reveals a positive correlation between thickness and mass, length, and width of parijat leaves, while a negative correlation exists between thickness and blanching time.

The initial colour L* of parijat leaves was 52.75±1.31, which was increased to 53.09±1.29 due to steam blanching. It can be observed from Fig. 1 (E) presented in the study showcases the percentage of colour L* change at various time points during the blanching process. The colour L* of the food item changes over time. At 30 seconds, there is a 0.5% change, and at 60 seconds, a 0.6% change is observed. Continuing to 90 seconds, the L* value maintains a 0.6% change, while at 120 seconds, it increases slightly to 0.7%. Finally, at 150 seconds, there is a significant 1.0% change in the L* value. It can be observed from Table 1 (E) that the variation of colour L* with respect to process time is not significant (p>0.05). It can be observed from Table 2 that colour L* of parijat leaves is positively correlated with blanching time, and negatively correlated with length, width and thickness.

The initial colour a* of parijat leaves was -4.36±0.85, which was decreased to -4.762±0.92 due to steam blanching. It can be observed from Fig. 1 (F) presented in the study showcases the percentage of colour a* change at various time points during the blanching process. The percentage of change in the colour a* parameter was measured at different time intervals. The colour a* parameter characterizes the redness or greenness of the food item. At 30 seconds, the colour a* value increased by 3.9%. After 60 seconds, it further increased by 7.1%. At 90 seconds, the colour a* value showed a 9.6% increase, and at 120 seconds, it increased by 10.5%. Finally, at 150 seconds, the colour a* value exhibited the highest increase of 14.7%. It can be observed from Table 1 (F) that the variation of colour a* with respect to process time is significant (p<0.05). It can be observed from Table 2 that colour a* of parijat leaves is positively correlated with blanching time and colour L*, and negatively correlated with mass, length, width and thickness.

The initial colour b* of parijat leaves was 9.65±1.79, which was increased to 11.65±2.43 due to steam blanching. It can be observed from Fig. 1 (G) presented in the study showcases the percentage of colour b* change at various time points during the blanching process. The colour b* was measured at different time intervals. At 30 seconds, the colour b* was 14.2, This value increased to 16.1 at 60 seconds, 20.2 at 90 seconds, 25.4 at 120 seconds, and 26.9 at 150 seconds. It can be observed from Table 1 (G) that the variation of colour b* with respect to process time is significant (p<0.05). It can be observed from Table 2 that colour b* of parijat leaves is positively correlated with blanching time, colour L*, colour a*, and negatively correlated with mass, length, width and thickness.

The initial moisture content of parijat leaves was 68.09±0.26. It can be observed from Fig. 1 (H) the moisture content change at various time points during the blanching process at 30 seconds, the moisture content is 68.93%, which reduces to 65.31% at 60 seconds, 63.71% at 90 seconds, 60.83% at 120 seconds, and 57.11% at 150 seconds. It can be observed from Table 1 (H) that the variation of moisture content with respect to process time is significant (p<0.05). It can be observed from Table 2 that moisture content of parijat leaves is positively correlated with mass, length, width and thickness, and negatively correlated with blanching time, colour L*, colour a* and colour b*.

3.2 Chemical Parameters

The concentration of ascorbic acid in the leaves was measured in milligrams per 100 grams of the sample. The initial ascorbic acid of parijat leaves was 180.31±8.44. It can be observed from Fig. 1 (I) the results revealed a gradual decline in ascorbic acid content as the blanching time increased. At the initial blanching duration of 30 seconds, the ascorbic acid content was found to be 170.47 mg/100 g. However, after 60 seconds of steam blanching, the concentration decreased to 164.04 mg/100 g. With a blanching time of 90 seconds, the ascorbic acid content further dropped to 154.39 mg/100 g. A blanching time of 120 seconds resulted in a concentration of 144.74 mg/100 g, and finally, after 150 seconds of steam blanching, the ascorbic acid content decreased to 135.09 mg/100 g. These findings indicate that longer blanching durations lead to a significant reduction in the ascorbic acid content in parijat leaves, that decresing in ascorbic acid simialr reported for Moringa (*Moringa oleifera* L.) Leaves by Nobosse *et al*., 2017. It can be observed from Table 1 (I) that the ascorbic acid with respect to process time is significant (p<0.05). It can be observed from Table 2 that the ascorbic acid of parijat leaves is positively correlated with mass, length, width, thickness, and moisture content, and negatively correlated with blanching time, colour L*, colour a* and colour b*.

The total phenolic content was measured in milligrams of Gallic Acid Equivalent per gram (mg GAE/g) of the sample. The initial total phenolic content of parijat leaves was 231.72±1.36. It can be observed from Fig. 1 (J) the results revealed that steam blanching led to a gradual reduction in the total phenolic content. At the initial blanching time of 30 seconds, the total phenolic content was recorded at 228.72 mg GAE/g. However, as the blanching time increased to 150 seconds, the total phenolic content significantly decreased to 200.88 mg GAE/g. These findings suggest that prolonged steam blanching negatively impacts the retention of phenolic compounds in parijat leaves, potentially affecting their overall nutritional and functional properties. The decresing in total phenlic content after blanching similar reported for vegetables by Bamidele *et al*., 2017. It can be observed from Table 1 (J) that the total phenolic content with respect to process time is significant (p<0.05). It can be observed from Table 2 that total phenolic content of parijat leaves is positively correlated with mass, length, width, thickness, moisture content and ascorbic acid, and negatively correlated with blanching time, colour L*, colour a* and colour b*.

The TSS was measured in °Brix of the parijat leaves. The initial TSS of parijat leaves was 2.06±0.05. It can be observed from Fig. 1 (K) the results revealed that the TSS content of the parijat leaves increased as the steam blanching time extended. Specifically, the TSS content started at 2.30 °Brix at 30 seconds and progressively increased to 2.43 °Brix at 60 seconds, 2.57 °Brix at 90 seconds, 2.73 °Brix at 120 seconds, and 2.93 °Brix at 150 seconds. These findings suggest that longer steam blanching durations lead to higher concentrations of soluble solids within the parijat leaves. It can be observed from Table 1 (K) that the TSS with respect to

process time is significant (p<0.05). It can be observed from Table 2 that TSS of parijat leaves is positively correlated with blanching time, colour L*, colour a* and colour b* and negatively correlated with mass, length, width, thickness, moisture content and ascorbic acid and total phenolic content.

The pH was measured in °Brix of the parijat leaves. The initial pH of parijat leaves was 5.43±0.04. It can be observed from Fig. 1 (L) the results revealed a consistent increase in pH as the blanching time increased. At the initial 30 seconds of steam blanching, the pH level was recorded at 6.07. Subsequently, at 60 seconds, the pH increased to 6.32. After 90 seconds of blanching, the pH further rose to 6.53. This trend continued, and at 120 seconds of steam blanching, the pH reached 6.74, and finally, after 150 seconds, the pH value was 6.87. These findings indicate a clear alkaline shift in the parijat leaves' pH during the steam blanching process. It can be observed from Table 1 (L) that the pH with respect to process time is significant (p<0.05). It can be observed from Table 2 that pH of parijat leaves is positively correlated with blanching time, colour L*, colour a*, colour b* and TSS, and negatively correlated with mass, length, width, thickness, moisture content and ascorbic acid and total phenolic content.

The peroxidase activity (residual activity) was measured at different time intervals of steam-blanched parijat leaves. It can be observed from Fig. 1 (M) After 30 seconds of blanching, the peroxidase activity remained at 62.77%. Subsequently, at 60 seconds, it decreased to 31.63%, and further dropped to 8.88% after 90 seconds. Continuing to 120 seconds, the activity reduced to 7.91%, and finally, after 150 seconds, only 4.87% of the original activity remained. The results demonstrate a gradual decline in peroxidase activity with increasing blanching time, indicating effective inactivation of the enzyme during the process. It can be observed from Table 1 (M) that the peroxidase activity with respect to process time is significant (p<0.05). It can be observed from Table 2 that peroxidase activity of parijat leaves is positively correlated with mass, length, width, thickness, moisture content and ascorbic acid and total phenolic content, and negatively correlated with blanching time, colour a*, colour b*, TSS and pH.

Fig. 1 (N) shows the overall acceptability of parijat leaves at different time intervals during steam blanching. After 30 seconds, the overall acceptability was rated at 6.45, which slightly decreased to 5.75 at 60 seconds. After 90 seconds, it further decreased to 5.40, but then increased back to 5.75 at 120 seconds. Finally, at 150 seconds, the overall acceptability was recorded at 5.70. The ratings fluctuate at different time intervals, which suggests that the steam blanching process has varying effects on the overall acceptability of the parijat leaves. It can be observed from Table 1 (N) that the peroxidase activity with respect to process time is not significant (p<0.05).

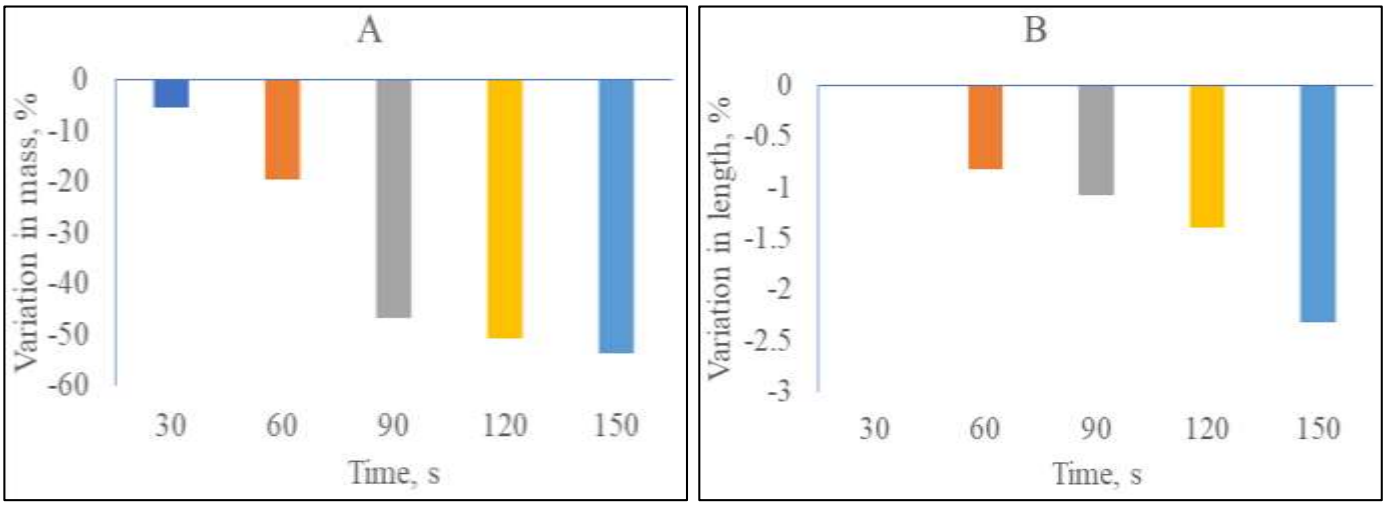
3.3 Statistical analysis

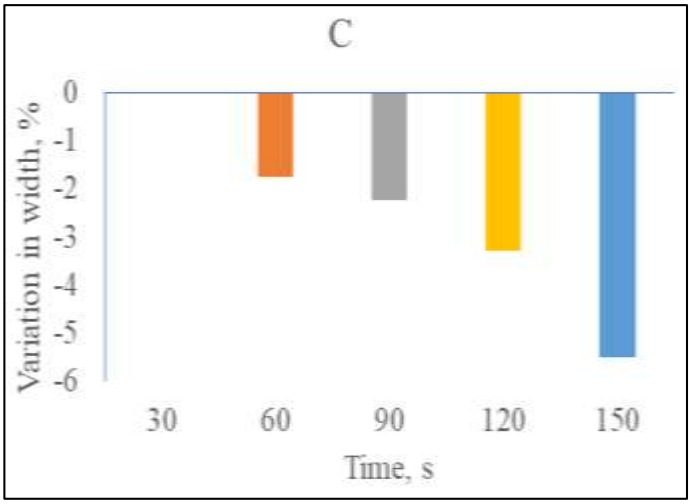
The reduced chi-square values were found to be 73.39 for mass, 0.04848 for length, 0.25186 for width, 0.15188 for thickness, 0.00979 for Colour L*, 0.65303 for Colour a*, 1.30011 for Colour b*, 0.39069 for moisture content, 1.37934 for ascorbic acid, 2.70288 for total phenolic content, 7.04E-04 for TSS (Total Soluble Solids), 0.0015 for pH, 155.03253 for peroxidase activity, and 0.124 for sensory evaluation. These values suggest varying degrees of goodness of fit for the statistical models used to analyze the respective parameters. A lower reduced chi-square value indicates a better fit between the observed and expected data.

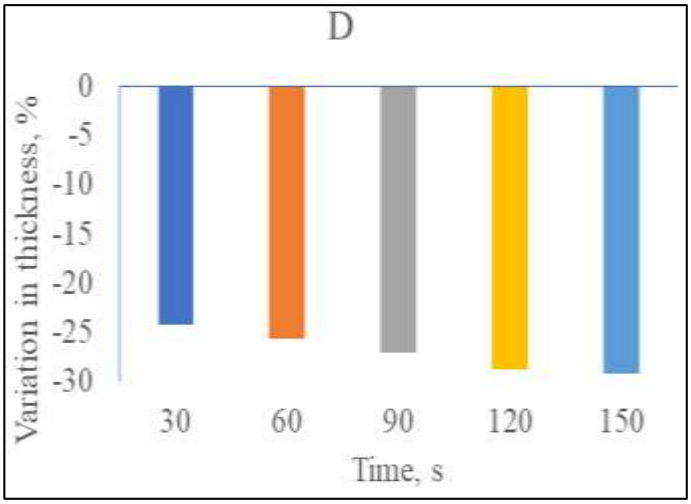
Pearson's correlation coefficient (r) was calculated for the parameters, revealing interesting relationships. For instance, mass showed a strong negative correlation (r = -0.93847) with steam blanching, indicating a reduction in mass during the process. On the other hand, TSS exhibited a strong positive correlation (r = 0.99573), suggesting an increase in total soluble solids due to steam blanching. Similarly, ascorbic acid (r = -0.99746) and peroxidase activity (r = -0.89844) showed significant negative correlations, suggesting a decline in these factors.

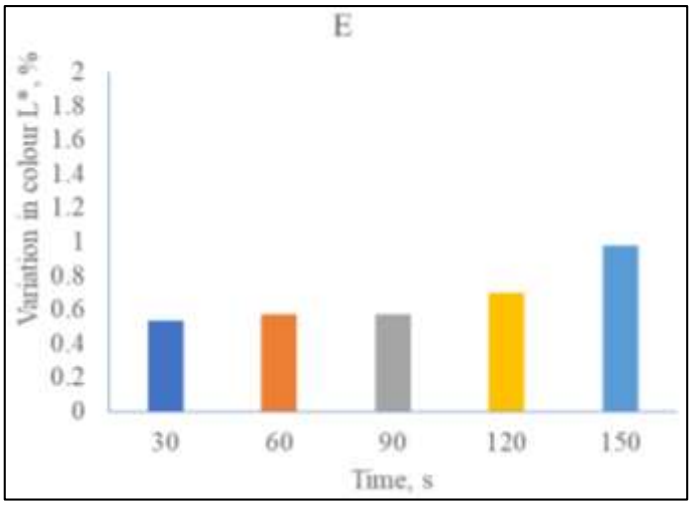
The coefficient of determination (R-Square) values were computed to determine how well the variation in one variable can be explained by another. Notably, parameters like mass (R-Square = 0.88073), length (R-Square = 0.94933), and width (R-Square = 0.95423) demonstrated high R-Square values, indicating that a substantial portion of their variation is explained by the steam blanching process.

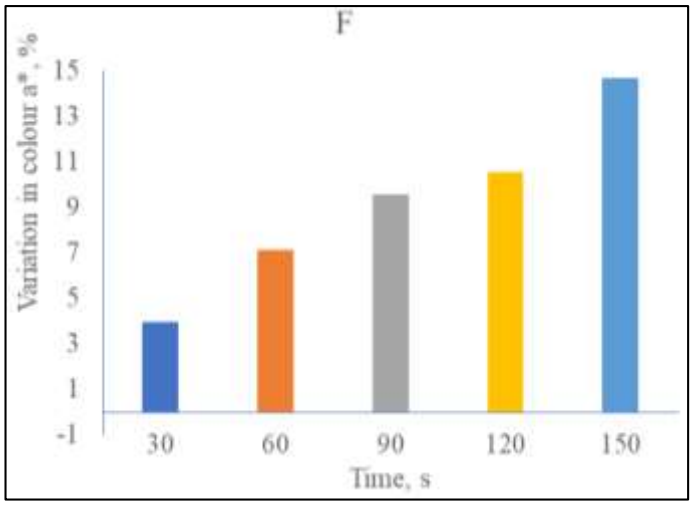
The root mean square error (Root-MSE) was determined to assess the accuracy of the model predictions. For example, Colour L* exhibited a low Root-MSE value of 0.09895, suggesting a good fit between the observed and predicted values for this parameter.

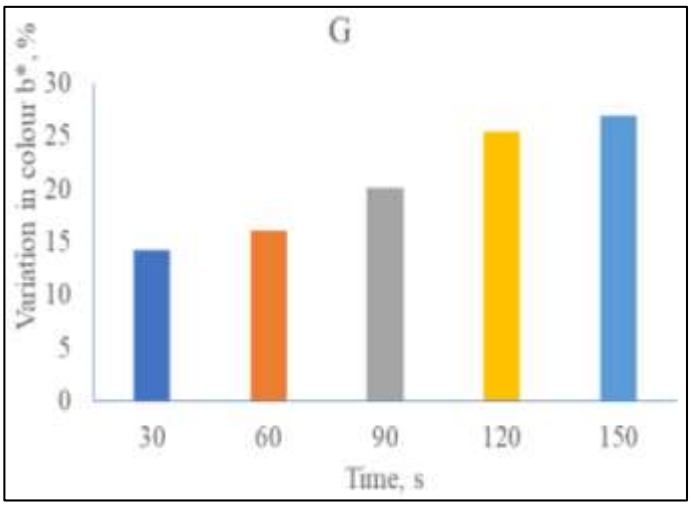


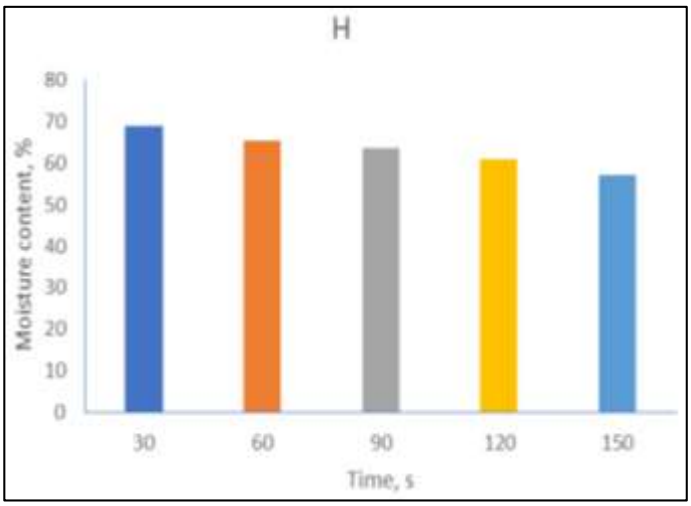

C
Variation in width, %
0
-1
-2
-3
-4
-5
-6
30
60
90
120
150
Time, s


D
Variation in thickness, %
0
-5
-10
-15
-20
-25
-30
30
60
90
120
150
Time, s


E
Variation in colour L*, %
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
30
60
90
120
150
Time, s


F
Variation in colour a*, %
15
13
11
9
7
5
3
1
-1
30
60
90
120
150
Time, s


G
Variation in colour b*, %
30
25
20
15
10
5
0
30
60
90
120
150
Time, s


H
Moisture content, %
80
70
60
50
40
30
20
10
0
30
60
90
120
150
Time, s

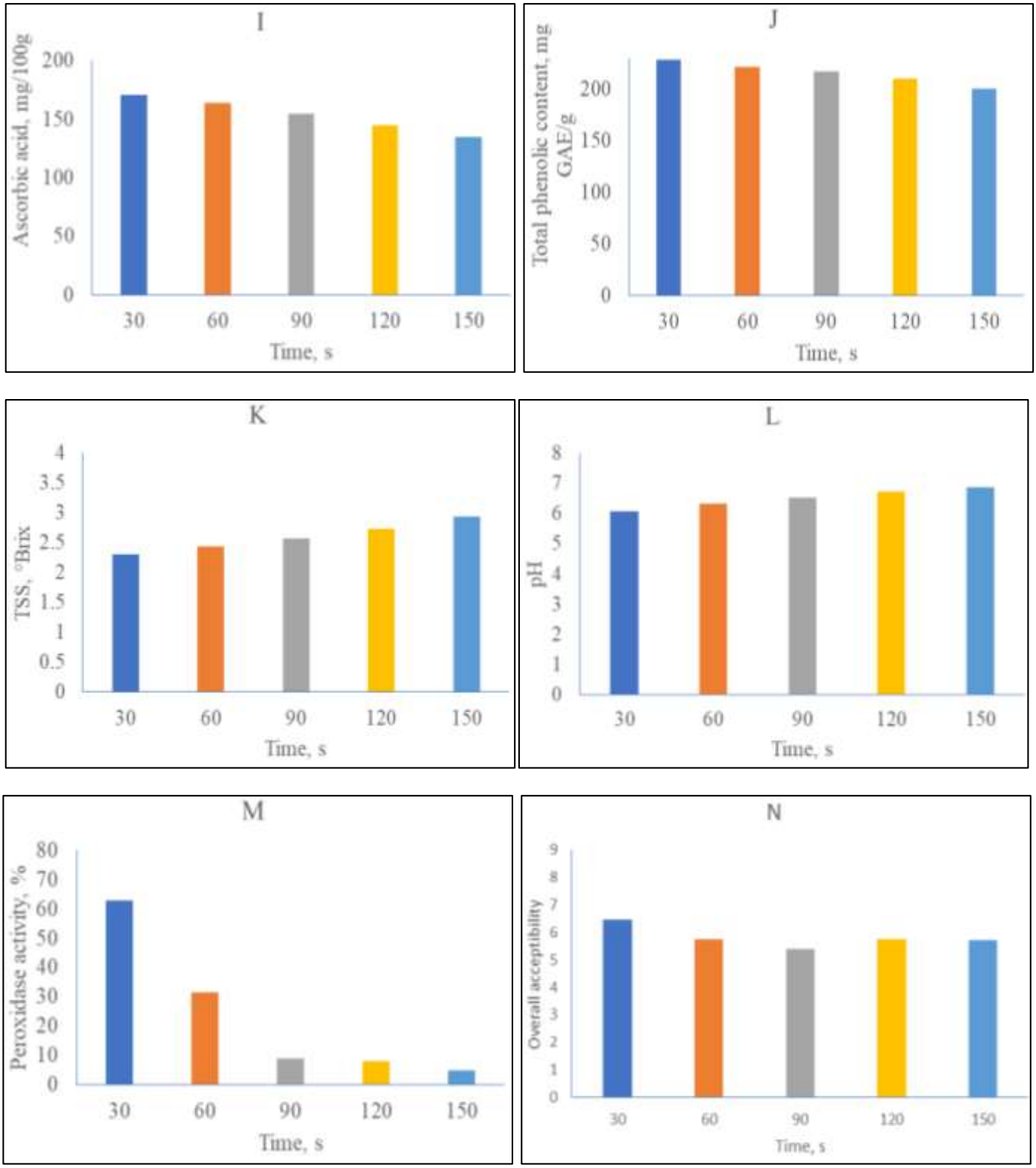


Fig 1: Variation in physical, colour and biochemical parameters of leaves during steam blanching

Table 1: ANOVA for variation of physical, colour and biochemical of parijat leaves

Source of Variation	SS	df	MS	F	P-value	F crit
Mass (A)						
Between Groups	9229.93	4.00	2307.48	460.16	0.00	2.87
Within Groups	100.29	20.00	5.01			
Total	9330.22	24.00				
Length (B)						
Between Groups	14.35305	4	3.588263	14.93445	8.37E-06	2.866081
Within Groups	4.805348	20	0.240267			
Total	19.1584	24				
Width (C)						
Between Groups	82.55	4.00	20.64	56.48	1.29E-10	2.87
Within Groups	7.31	20.00	0.37			
Total	89.85	24.00				
Thickness (D)						
Between Groups	85.82	4.00	21.46	4.79	0.007117	2.87
Within Groups	89.59	20.00	4.48			
Total	175.41	24.00				
Colour L* (E)						
Between Groups	0.66	4.00	0.16	1.79	0.17	2.87
Within Groups	1.84	20.00	0.09			
Total	2.50	24.00				
Colour a* (F)						
Between Groups	318.73	4.00	79.68	4.23	0.01	2.87
Within Groups	376.75	20.00	18.84			
Total	695.48	24.00				
Colour b* (G)						
Between Groups	624.30	4.00	156.07	5.80	0.002877	2.87
Within Groups	538.02	20.00	26.90			
Total	1162.32	24.00				
Moisture content (H)						
Between Groups	240.64	4.00	60.16	143.51	8.7E-09	3.48
Within Groups	4.19	10.00	0.42			
Total	244.83	14.00				
Ascorbic acid (I)						
Between Groups	2445.57	4.00	611.39	98.50	5.46E-08	3.48
Within Groups	62.07	10.00	6.21			
Total	2507.64	14.00				
Total phenolic content (J)						
Between Groups	1374.24	4.00	343.56	490.91	1.9951E-11	3.48
Within Groups	7.00	10.00	0.70			
Total	1381.24	14.00				
TSS (K)						
Between Groups	0.74	4.00	0.19	39.79	4.12E-06	3.48
Within Groups	0.05	10.00	0.00			
Total	0.79	14.00				
pH (L)						
Between Groups	1.24	4	0.3104	235.16	7.66E-10	3.48
Within Groups	0.01	10	0.0013			
Total	1.25	14				
Peroxidase activity (M)						
Between Groups	7236.52	4.00	1809.13	889.67	1.03E-12	3.48
Within Groups	20.33	10.00	2.03			
Total	7256.86	14.00				
Sensory evaluation (N)						
Between Groups	5.97	4.00	1.49	1.11	0.36	2.58
Within Groups	60.48	45.00	1.34			
Total	66.45	49.00				

Table 2: Correlation matrix of parijat leaves during steam blanching.

	Time	Mass	Length	Width	Thickness	Colour L*	Colour a*	Colour b*	Moisture content	Ascorbic acid	Total phenolic content	TSS	pH	Peroxidase activity	Sensory
Time	1														
Mass	-0.9385	1													
Length	-0.9743	0.8760	1												
Width	-0.9768	0.8619	0.9975	1											
Thickness	-0.9866	0.9604	0.9351	0.9365	1										
Colour-L*	0.8813	-0.6763	-0.9164	-0.9375	-0.8045	1									
Colour-a*	0.9845	-0.9170	-0.9933	-0.9883	-0.9503	0.8950	1								
Colour-b*	0.9843	-0.9326	-0.9220	-0.9324	-0.9887	0.8455	0.9393	1							
Moisture content	-0.9927	0.9000	0.9918	0.9947	0.9675	-0.9133	-0.9893	-0.9622	1						
Ascorbic acid	-0.9975	0.9250	0.9668	0.9733	0.9797	-0.8990	-0.9783	-0.9880	0.9885	1					
Total phenolic content	-0.9911	0.8861	0.9871	0.9938	0.9615	-0.9322	-0.9848	-0.9657	0.9980	0.9914	1				
TSS	0.9957	-0.9054	-0.9791	-0.9859	-0.9703	0.9208	0.9840	0.9777	-0.9949	-0.9977	-0.9978	1			
pH	0.9946	-0.9604	-0.9612	-0.9595	-0.9958	0.8306	0.9740	0.9812	-0.9824	-0.9862	-0.9754	0.9811	1		
Peroxidase activity	-0.8984	0.9714	0.8695	0.8442	0.9247	-0.6122	-0.8972	-0.8645	0.8755	0.8694	0.8487	-0.8573	-0.9336	1	
Sensory	-0.6139	0.7764	0.6314	0.5786	0.6448	-0.2774	-0.6617	-0.5350	0.5988	0.5628	0.5516	-0.5541	-0.6714	0.8861	1

Table 3: Statical analysis of parijat leaves during steam blanching.

	Reduced Chi-Sqr	R-Square (COD)	Root-MSE (SD)
Mass	73.3884	0.88073	8.5667
Length	0.04848	0.94933	0.22019
Width	0.25186	0.95423	0.50185
Thickness	0.15188	0.97345	0.38972
Colour L*	0.00979	0.77677	0.09895
Colour a*	0.65303	0.96927	0.8081
Colour b*	1.30011	0.96876	1.14022
Moisture content	0.39069	0.98539	0.62505
Ascorbic acid	1.37934	0.99492	1.17445
Total phenolic content	2.70288	0.9823	1.64404
TSS	7.04E-04	0.99147	0.02653
pH	0.0015	0.98915	0.0387
Peroxidase	155.03253	0.80719	12.45121
Sensory	0.124	0.37688	0.35214

4. Conclusion

In conclusion, steam blanching had significant effects on the physical and chemical parameters of parijat leaves. The process led to a reduction in mass, length, width, thickness, ascorbic acid, total phenolic content, and peroxidase activity, while increasing colour a*, colour b*, TSS, and pH. The study provides valuable information for understanding the changes occurring in parijat leaves during steam blanching, which could be crucial for optimizing blanching processes for various applications. Steam blanching at 60 s was found to be suitable for processing parijat leaves, achieving a 90% decrease in peroxidase activity. The ascorbic acid, pH, TSS, and total phenolic content after microwave blanching were 65.31%, 164.03 mg/100 g, 6.32, 2.43 °Brix, 31.63 mg GAE/g, respectively.

5. References

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