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Chemical and microbial analysis of Guava based Papaya fruit cheese

Pukhraj Meena and Indra Raj

Abstract
Fruit cheese, as products sweetened with fruit pulp or juice concentrates are called, are now the fastest-growing part of the preserves market. Non-existent 10 years ago, the spreads now represent 12 % of the retail market. Without getting too technical about fruit cheese making, adequate proportion of sugar to fruit is necessary for a properly set product with good flavor, the result of the balance between fruit, sweetening and acidity. In this physico-chemical study, we take five parameters i.e. Moisture, TSS, Total sugar (%), Acidity & pH and treatments were T_0, T_2, T_3 & T_4 resulting F(Cal) is greater than F(Tab), So, result were more significant at 5% level of significance. The guava fruit's availability is limited to several months it is highly perishable therefore it is essential to developed value added products so that they can be relished throughout the year.

Keywords: physico-chemical study, more significance, total sugar (%) & value added products.

1. Introduction
The papaya (*Carica papaya*) tree is belonging to small family caricaceae having four genera in world. The genus cariclinn is represented by four species in India, of which *Carica papaya* linn. is most widely cultivated and best-known species. Scientific name of papaya is *Carica papaya*. It is commonly known as Papaya Melon tree, Pawpaw or Papau, Kapaya, Lapaya, Papyas, Papye, Tapayas, Fan mu gua [5]. Papaya (*Carica papaya* L.) is an important fruit crop throughout the tropical and sub-tropical countries [13]. The ripe fruit is consumed fresh for dessert and in fruit salad or processed. It is highly accepted worldwide and the demand for fresh papaya fruit is increasing for its high content of vitamin C and provitamin A, which has a protective effect against cancer, and its low calorie status that is recommended for low hypo-caloric diets [10].
Fruit cheese has recently become very popular chewy fudge-like sweet; Fruit Cheese is best made with fresh guava and papaya. Guavas are a rich source of vitamin C - from 3-6 times more than in oranges to almost 30 times more than that found in bananas! Most of this vitamin C is found in the skin of the fruit.
Cheese is a nutritious food not only made from cow's milk but also milk from other mammals, including sheep, goats, buffalo, reindeer, camels and yaks. Fruits are an important supplement of the human diet as they possess almost all the nutritive components required for the growth and development of the human body leading to a healthy physique and mind. The product contains no actual dairy cheese; the term cheese refers only to the cheese like thick, soft consistency. Fruit cheese is also used on a sandwich to add an interesting flavor. Fruit cheese has recently become very popular. It is a confection of the type of Karachi Halwa and is prepared from fruit like guava, papaya, apple, pear and plum fruit cheese have a long shelf life. Fruit cheese contains a minimum 68% TSS and 45% prepared fruit in final product (F.P.O. specifications).
Guava (*Psidiumguajava* L.) is one of the most important sub-tropical fruit crop in India. It occupies the fourth position as regards area (0.162 million hectare) and production 1.685 million tonnes (2004-2005). Apart from India it is cultivated in USA (The state of Hawii and Florida), Pakistan, South Africa, Brazil, Colombia, Kenya, West Indies Israel and in other sub-tropical parts. Regarding its introduction, it is believed that it might have been brought in this country sometimes in the seventeen century.
It is reported that guava fruits can be used for making cheese. Blended juice would no doubt be a very good source of ascorbic acid. Result of the organoleptic evaluation revealed that a 60% cashew apple and 40% orange juice gave a good quality juice in terms of flavor, after taste and

overall acceptability. Papaya is highly perishable and thus has a limited shelf life and distribution channel. During transportation of fresh fruit, papaya is susceptible to chill injury, bruising, wrinkling, and softening, all of which affect the acceptability of this fruit [8].

A fruit cheese was prepared from mature, ripe papayas (*Carica papaya* var. Red Lady) and from puree blends of papaya + pineapple. The effects of varying pH, pectin levels and sucrose to invert syrup were investigated on gel set of the fruit cheese. A pH of 3.1, 1% pectin and processed to 80 degrees Brix were required for a good gel set papaya cheese [4].

2. Materials and methods

2.1 Materials

All chemicals used in this study were of analytical grade. The chemicals were procured from Hi-Media Laboratories Pvt. Ltd., Mumbai, India; Fisher Scientific, Mumbai, India; Merck Specialties Pvt. Ltd., Mumbai, India.

2.2 Manufacturing steps for preparation of guava cheese

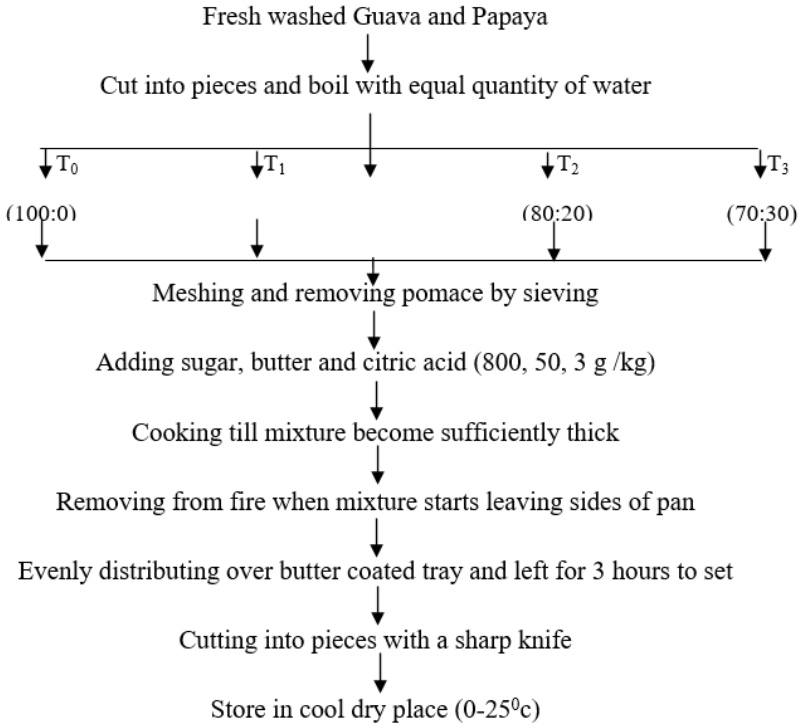

Fig 1: Flow chart of preparation for guava cheese

2.3 Physico-chemical analysis of guava based papaya fruit cheese

2.3.1 Moisture Content (AOAC, 1980)

Moisture content in fruit cheese sample was estimated by following the protocol. In washed preheated, cooled & weighed empty crucible, 5 gm of sample was weighed. The crucible was placed in pre-heated, hot air oven at 105^{0}C for 8 hours. After drying the crucible was cooled in the desiccators and weighed [2].

2.3.2 TSS (Total Soluble Solids)

TSS measurement of *Daucus carota* was done with the help of refractometer (Model- RFM 970 and make- Bellingham + Stanley) method. A little amount of sample was placed on the prism looking through the eye piece with the projection inlet facing towards light. The point on the scale was noted where the boundary line of the shaded area intersects the unshaved area, total soluble solids indicated by degree Brix was directly read from refractometer.

2.3.3 Total Sugar (%)

Take 25 ml of filtrate in a 50 ml volumetric flask and add 5 ml of HCL (1:1). Allow to stand for 24 hours at room temperature. Neutralize exactly with NaOH using phenolphthalein as indicator and make up to volume with water. Take an aliquot and determine the total invert sugars as in case of reducing sugars.

2.3.4 Acidity (%)

The titratable acidity as citric acid of fruit cheese was determined by titration method. Two g of the sample was well ground in a beaker with a flat glass rod by adding 3 ml of hot distilled water and diluted with another 7 ml distilled water. After adding 1 ml of 0.5 percent phenolphthalein indicator the contents were titrated against 0.1N NaOH with continuous stirring till a pink end point substituting for 15 sec. Acidity was expressed as citric acid per 100g of product.

2.3.5 Determination of pH

The pH values determined with the help of electronic pH meter. The electronic pH meter was calibrated using 7 pH and 4pH standard buffer solutions. The function selector switch was set to pH and reading of digital display was allowed to get stable before it was noted.

2.4 Determination of microbial population

2.4.1 Preparation of the samples (Serial dilution)

1 ml of sample was taken and transferred to the test tube with 9 ml of normal saline solution (0.9% NaCl).The samples were serially diluted up to 10^{-2} dilution. The test tube containing samples were homogenized for proper mixing.

2.4.2 Inoculation of sample

Inoculation was done aseptically in laminar air flow chamber by taking 0.1 g of the sample suspended in saline solution

from 10^{-2} transferred to petridishes with label 10^{-2} of nutrient agar media. Similarly, all the samples suspended in saline solution were transferred to the respective petridishes of nutrient agar media. Duplicate sample were taken for each dilution. a control of nutrient agar media was also kept without inoculation. The inoculated petridishes were incubated in incubator for 72 hour at 25°C temperature. Colony was counted after 72 hours.

3. Results and discussion

3.1 Chemical analysis of guava based papaya fruit cheese

3.1.1 Moisture

The data regarding moisture percent in fruit cheese sample of different treatments are presented in table 1, 2 & 3.

Table 1: Percentage moisture in samples of control and experimental fruit cheese

Replication		Treatments			
		T_0	T_1	T_2	T_3
R_1		13.17	13.07	15.11	16.82
R_2		13.87	17.39	18.62	19.89
R_3		13.34	16.78	18.46	18.66
R_4		16.38	17.32	17.55	17.72
R_5		13.71	15.48	16.12	16.88
	Mean	14.09	16.01	17.17	17.95
Range	Minimum	13.17	13.07	15.11	16.82
	Maximum	16.38	17.39	18.62	19.89
F- test		S			
S. Ed. (±)		0.62			
C. D. (p = 0.05)		1.36			

From the perusal of data of moisture percentage in fruit cheese samples of different treatments and control the highest mean moisture percentage was recorded in the fruit cheese sample of T_3, (17.95), T_2, (17.17), followed by T_1(16.01),T_0(14.09)

Table 2: ANOVA for percentage of moisture in samples of control and experimental Fruit cheese of different treatments

Source	d. f.	S.S.	M.S.S.	F. Cal.	F. Tab. 5%	Result
Replication	4	24.74	6.18	6.34	3.25	**S**
Treatment	3	42.24	14.08	14.43	3.49	**S**
Error	12	11.71	0.98	-	-	-
TOTAL	19	78.69	-			-

*Significant

1. As evident from the result of ANOVA given in Table 2. The F (Cal) value (14.43) was greater than the table value of F (3.49) at 5% level of significance. Therefore; the difference was significant, indicating significant effect of treatments on moisture percentage.
2. The significant difference thus obtained was further analyzed statistically to find out the C.D between and within the different treatment combinations. Results of C.D are presented in Table 3

Table 3: Critical difference in percentage of moisture in samples of control and experimental Fruit Cheese

Treatments		Average	T_0	T_1	T_2	T_3
			14.09	16.01	17.17	17.95
T_0		14.09		-1.92	-3.08	-3.86
T_1		16.01			-1.16	-1.94
T_2		17.17				-0.78
T_3		17.95				
C.D.=	1.36					

The following observations were made

The difference between the mean values of T_0-T_1 (1.92) was greater than the C.D. value, 1.36.Therefore, the difference was significant.

The difference between the mean values of T_0-T_2 (3.08) was greater than the C.D. value, 1.36.Therefore, the difference was significant.

The difference between the mean values of T_0-T_3 (3.86) was greater than the C.D. value, 1.36.Therefore, the difference was significant.

The difference between the mean values of T_1-T_2 (1.16) was less than the C.D. value, 1.36.Therefore, the difference was non-significant.

The difference between the mean values of T_1-T_3 (1.94) was greater than the C.D. value, 1.36.Therefore, the difference was non-significant.

The difference between the mean values of T_2-T_3 (0.78) was less than the C.D. value, 1.36.Therefore, the difference was non-significant.

It is therefore concluded that there was non- significant difference b/w the average moisture percentage of T_1-T_2, and T_2-T_3 and there was significant difference b/w the all other treatments, which may be ascribed to addition of different level of papaya and guava in the experimental treatments of fruit cheese.

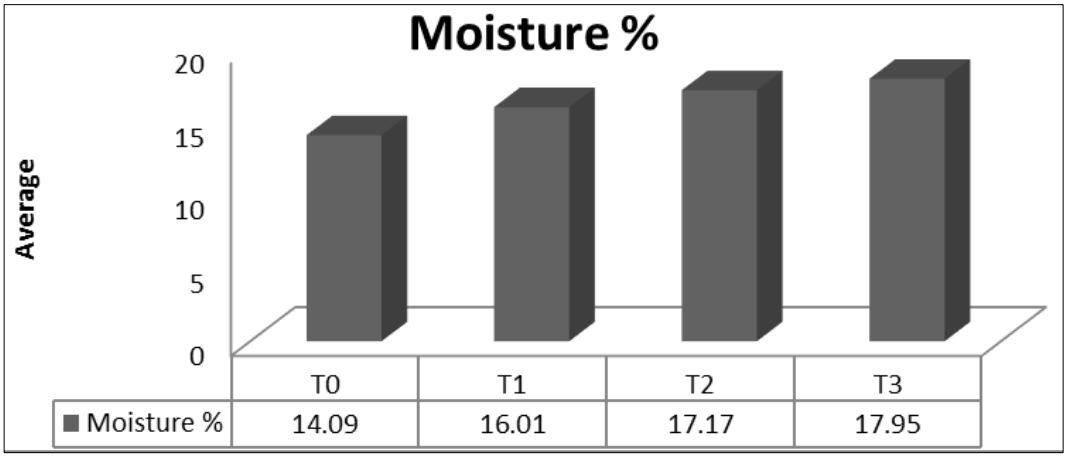

Fig 2: Percentage of Moisture in samples of control and experimental fruit cheese of different treatments

There:T_0 – Guava 100%., T_1 – Guava 90% and 10% Papaya, T_2– Guava 80% and 20% Papaya & T_3 – Guava 70% and 30% Papaya.

3.1.2 Total Soluble Solid (TSS)

The data regarding TSS percentage in fruit cheese sample of different treatments are presented in table 4 and figure 3

Table 4: Percentage TSS in sample of control and experimental Fruit Cheese

Replication		Treatments			
		T_0	T_1	T_2	T_3
R_1		69	70	74	76
R_2		70	72	75	77
R_3		69	72	74	76
R_4		71	70	76	75
R_5		70	73	75	78
	Mean	69.80	71.40	74.80	76.40
Range	Minimum	69	70	74	75
	Maximum	71	73	76	77
F- test		S			
S. Ed. (±)		0.60			
C. D. (p = 0.05)		1.30			

1. From the perusal of data on TSS percentage in fruit cheese samples of different treatments and control the highest mean TSS percentage was recorded in the fruit cheese sample of T_3(76.40) followed by T_2(74.80), T_1 (71.40) T_0 (69.80).

Table 5: ANOVA for percentage of TSS in sample of control & experimental fruit cheese

Source	d. f.	S.S.	M.S.S.	F. Cal.	F. Tab. 5%	Result
Replication	4	7.30	1.82	2.04	3.25	**NS**
Treatment	3	137.80	45.93	51.51	3.49	**S**
Error	12	10.70	0.89	-	-	-
TOTAL	19	155.80	-			-

* Significant

1. As evident from the result of ANOVA given in Table 5, the F (Cal) value (51.51) was greater than the table value of F (3.49) at 5% level of significance. Therefore; the difference was significant, indicating significant effect of treatments on TSS percentage.
2. The significant difference thus obtained was further analyzed statistically to find out the C.D between and within the different treatment combinations. Results of C.D are presented in Table 6

Table 6: Critical difference in percentage of TSS in samples of control and experimental fruit cheese

Treatments		Average	T_0	T_1	T_2	T_3
			69.80	71.40	74.80	76.40
T_0		69.80		-1.60	-5.00	-6.60
T_1		71.40			-3.40	-5.00
T_2		74.80				-1.60
T_3		76.40				
C.D.=	1.30					

The following observations were made

The difference between the mean values of T_0-T_1 (1.60) was greater than the C.D. value, 1.30.Therefore, the difference was significant.

The difference between the mean values of T_0-T_2 (5.00) was greater than the C.D. value, 1.30.Therefore, the difference was significant.

The difference between the mean values of T_0-T_3 (6.60) was greater than the C.D. value, 1.30.Therefore, the difference was significant.

The difference between the mean values of T_1-T_2 (3.40) was less than the C.D. value, 1.30.Therefore, the difference was non-significant.

The difference between the mean values of T_1-T_3 (5.00) was greater than the C.D. value, 1.30.Therefore, the difference was significant.

The difference between the mean values of T_2-T_3 (1.60) was greater than the C.D. value, 1.30.Therefore, the difference was significant.

It is therefore concluded that there was no non-significant difference b/w the average TSS percentage and there was significant difference b/w the all other treatments which may be ascribed to addition of different level of guava and papaya in the experimental treatments of fruit cheese.

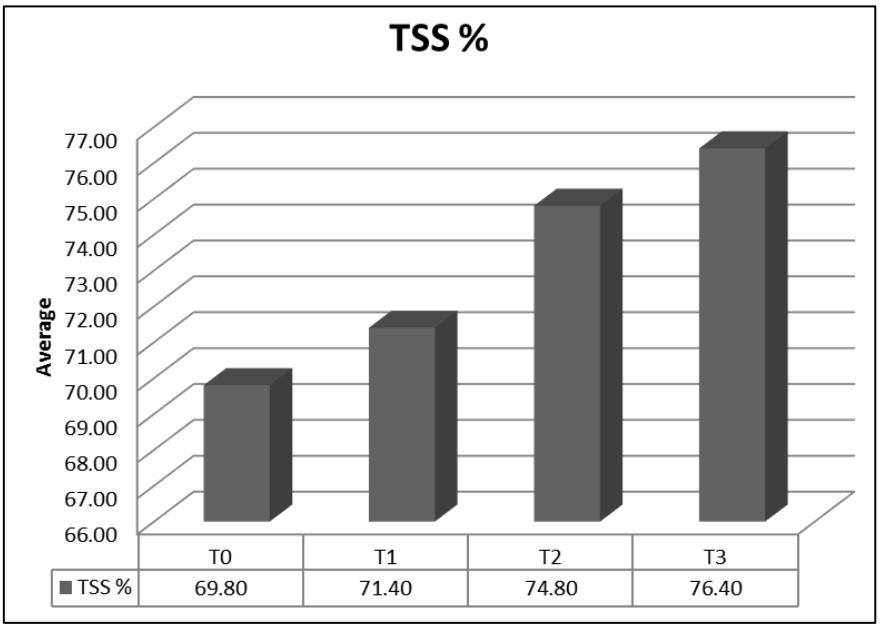

Fig 3: Percentage of TSS in sample of control & experimental fruit cheese of different treatments

There: T_0 – Guava 100%, T_1 – Guava 90% and 10% Papaya, T_2 – Guava 80% and 20% Papaya, T_3 – Guava 70% and 30% Papaya.

3.1.3 Total Sugar (%)

The data regarding Total sugar percentage in fruit cheese sample of different treatments are presented in table 7 and figure 4.

Table 7: Percentage Total sugar in sample of control and experimental Fruit Cheese

Replication		Treatments			
		T_0	**T_1**	**T_2**	**T_3**
R_1		5.47	4.36	3.43	3.14
R_2		4.40	4.17	3.23	3.26
R_3		3.83	3.64	2.83	2.77
R_4		3.14	4.05	3.23	2.71
R_5		4.79	4.17	3.29	2.96
	Mean	**4.53**	**4.08**	**3.20**	**2.97**
Range	Minimum	3.14	3.64	2.83	2.71
	Maximum	5.47	4.36	3.43	3.26
F- test		S			
S. Ed. (±)		0.16			
C. D. (p = 0.05)		0.35			

1. From the perusal of data on total sugar percentage in fruit cheese samples of different treatments and control the highest mean total sugar percentage was recorded in the fruit cheese sample of T_0 (4.53) followed by T_1 (4.36), T_2 (3.20) T_3 (2.97).

Table 8: ANOVA for percentage of Total sugar in samples of control and experimental Fruit Cheese

Source	d. f.	S.S.	M.S.S.	F. Cal.	F. Tab. 5%	Result
Replication	4	1.55	0.38	6.14	3.25	**S**
Treatment	3	8.04	2.68	42.28	3.49	**S**
Error	12	0.76	0.06	-	-	-
Total	19	10.35	-			-

* Significant

2. As evident from the result of ANOVA given in Table 8, the F (Cal) value (42.28) was greater than the table value of F (3.49) at 5% level of significance. Therefore; the difference was significant, indicating significant effect of treatments on total sugar percentage.
3. The significant difference thus obtained was further analyzed statistically to find out the C.D between and within the different treatment combinations. Results of C.D are presented in Table 9.

Table 9: Critical difference in percentage of Total sugar in samples of control and experimental Fruit Cheese

Treatments		Average	T_0	T_1	T_2	T_3
			4.53	4.08	3.20	2.97
T_0		4.53		0.45	1.33	1.56
T_1		4.08			0.88	1.11
T_2		3.20				0.23
T_3		2.97				
C.D.=	0.35					

The following observations were made

The difference between the mean values of T_0-T_1 (0.45) was greater than the C.D. value, 0.35.Therefore, the difference was significant.

The difference between the mean values of T_0-T_2 (1.33) was greater than the C.D. value, 0.35.Therefore, the difference was significant.

The difference between the mean values of T_0-T_3 (1.53) was greater than the C.D. value, 0.35.Therefore, the difference was significant.

The difference between the mean values of T_1-T_2 (0.88) was greater than the C.D. value, 0.35.Therefore, the difference was significant.

The difference between the mean values of T_1-T_3 (1.11) was less than the C.D. value, 0.35.Therefore, the difference was non-significant.

The difference between the mean values of T_2-T_3 (0.23) was greater than the C.D. value, 0.35.Therefore, the difference was significant.

It is therefore concluded that there was non- significant difference b/w the average total sugar percentage of T_2-T_3 and there was significant difference b/w the all other treatments which may be ascribed to addition of different level of papaya and guava in the experimental treatments of fruit cheese.

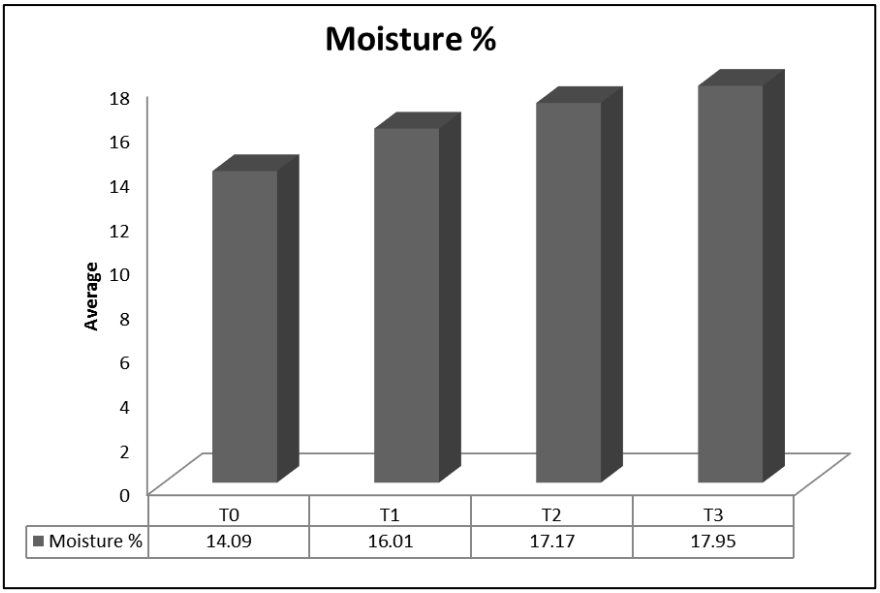

Fig 4: Percentage of Total sugar in samples of control and experimental fruit cheese of different treatments

There: T_0 – Guava 100%, T_1 – Guava 90% and 10% Papaya, T_2 – Guava 80% and 20% Papaya & T_3 – Guava 70% and 30% Papaya.

3.1.4 Acidity

The data regarding Acidity percentage in fruit cheese sample of different treatments are presented in table 10 and figure 5.

Table 10: Percentage Acidity in control and experimental Fruit Cheese

Replication		Treatments			
		T_0	**T_1**	**T_2**	**T_3**
R_1		0.512	0.640	0.704	0.768
R_2		0.576	0.640	0.704	0.768
R_3		0.512	0.704	0.768	0.832
R_4		0.576	0.640	0.832	0.960
R_5		0.576	0.640	0.768	0.832
	Mean	0.55	0.65	0.76	0.83
Range	Minimum	0.512	0.640	0.704	0.768
	Maximum	0.576	0.704	0.832	0.960
F- test		S			
S. Ed. (±)		0.03			
C. D. (p = 0.05)		0.06			

1. From the perusal of data on acidity percentage in fruit cheese samples of different treatments and control the highest mean acidity percentage was recorded in the fruit cheese sample of T_3 (0.83) followed by T_2 (0.76), T_1 (0.65) T_0 (0.55).

Table 11: ANOVA for percentage of Acidity in samples of control and experimental fruit cheese

Source	d. f.	S.S.	M.S.S.	F. Cal.	F. Tab. 5%	Result
Replication	4	0.021	0.005	2.89	3.25	**NS**
Treatment	3	0.23	0.08	39.91	3.49	**S**
Error	12	0.02	0.00	-	-	-
TOTAL	19	0.271	-			-

** Significant

1. As evident from the result of ANOVA given in Table 11 the F (Cal) value (39.91) was greater than the table value of F (3.49) at 5% level of significance. Therefore; the difference was significant, indicating significant effect of treatments on acidity percentage.
2. The significant difference thus obtained was further analyzed statistically to find out the C.D between and within the different treatment combinations. Results of C.D are presented in Table 12.

Table 12: Critical difference in percentage of Acidity in samples of control and experimental Fruit Cheese

Treatments		Average	T_0	T_1	T_2	T_3
			0.55	0.65	0.76	0.83
T_0		0.55		-0.10	-0.21	-0.28
T_1		0.65			-0.11	-0.18
T_2		0.76				-0.07
T_3		0.83				
C.D.=	0.06					

The following observations were made

The difference between the mean values of T_0-T_1 (0.10) was greater than the C.D. value, 0.06.Therefore, the difference was significant.

The difference between the mean values of T_0-T_2 (0.21) was greater than the C.D. value, 0.06.Therefore, the difference was significant.

The difference between the mean values of T_0-T_3 (0.28) was greater than the C.D. value, 0.06.Therefore, the difference was significant.

The difference between the mean values of T_1-T_2 (0.11) was greater than the C.D. value, 0.06.Therefore, the difference was non-significant.

The difference between the mean values of T_1-T_3 (0.18) was greater than the C.D. value, 0.06.Therefore, the difference was significant.

The difference between the mean values of T_2-T_3 (0.07) was greater than the C.D. value, 0.06.Therefore, the difference was significant.

It is therefore concluded that there was no non- significant difference b/w the average acidity percentage and there was significant difference b/w the all other treatments which may be ascribed to addition of different level of papaya and guava in the experimental treatments of fruit cheese.

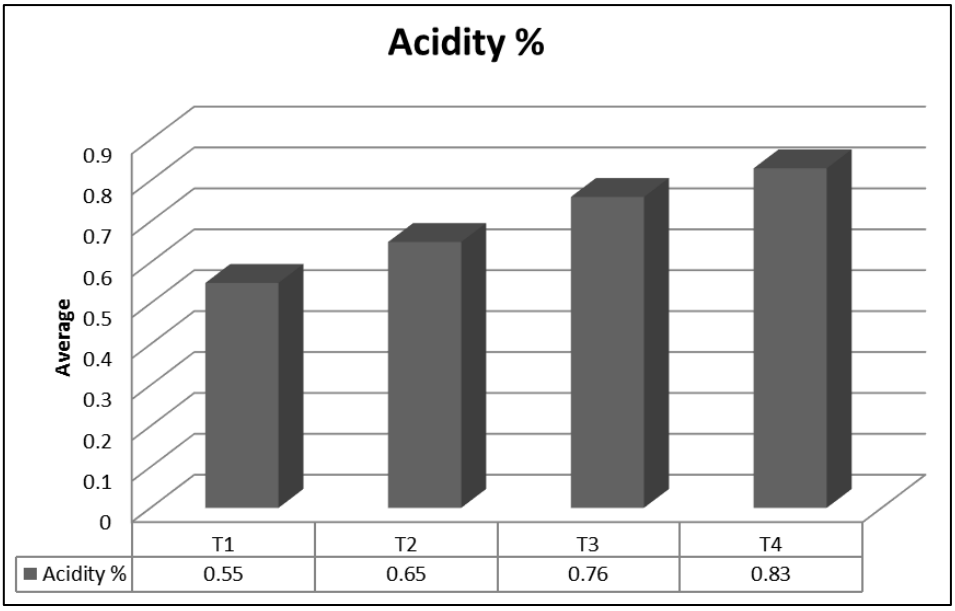

Fig 5: Percentage of Acidify in samples of control and experimental fruit cheese of different treatments

There: T_0 – Guava 100%, T_1 – Guava 90% and 10% Papaya, T_2 – Guava 80% and 20% Papaya & T_3 – Guava 70% and 30% Papaya.

3.1.5 pH percentage in Fruit Cheese

The data regarding pH percentage in fruit cheese sample of different treatments are presented in table 13 and figure 6.

Table 13: pH Percentage in samples of control and experimental fruit cheese of different treatments

Replication		Treatments			
		T_0	T_1	T_2	T_3
R_1		4.12	3.82	3.79	3.60
R_2		4.10	3.89	3.79	3.65
R_3		4.11	3.86	3.77	3.63
R_4		4.09	3.92	3.80	3.59
R_5		4.14	3.83	3.77	3.63
	Mean	4.11	3.86	3.78	3.62
Range	Minimum	4.09	3.82	3.77	3.60
	Maximum	4.14	3.92	3.80	3.65
F- test		S			
S. Ed. (±)		0.02			
C. D. (p = 0.05)		0.19			

1. From the perusal of data of pH percentage in fruit cheese samples of different treatments and control furnished the highest mean pH percentage was recorded in the fruit cheese sample of T_0, (4.14), T_1, (3.86), followed by T_2(3.78), and T_3(3.62).

Table 14: ANOVA for pH percentage samples of control and experimental fruit cheese

Source	d. f.	S.S.	M.S.S.	F. Cal.	F. Tab. 5%	Result
Replication	4	0.0014	0.0003	0.415	3.25	**NS**
Treatment	3	0.63	0.21	249.00	3.49	**S**
Error	12	0.01	0.00083	-	-	-
TOTAL	19	0.641	-			-

1. As evident from the result of ANOVA given in Table 14. the F (Cal) value (249.00) was greater than the table value of F (3.49) at 5% level of significance. Therefore; the difference was significant, indicating significant effect of treatments on pH percentage.

2. The significant difference thus obtained was further analyzed statistically to find out the C.D between and within the different treatment combinations. Result of C.D is presented in Table 15.

Table 15: Critical difference in pH percentage in samples of control and experimental fruit cheese

Treatments		Average	T_0	T_1	T_2	T_3
			4.11	3.86	3.78	3.62
T_0		4.11		0.25	0.33	0.49
T_1		3.86			0.08	0.24
T_2		3.78				0.16
T_3		3.62				
C.D.=	0.19					

The following observations were made

The difference between the mean values of T_0-T_1 (0.25) greater than C.D. value, 0.19 therefore difference was significant.

The difference between the mean values of T_0-T_2 (0.33) was greater than the C.D. value, 0.19 therefore, the difference was significant.

The difference between the mean values of T_0-T_3 (0.49) was greater than the C.D. value, 0.19.Therefore, the difference was significant.

The difference between the mean values of T_1-T_2 (0.08) was less than the C.D. value, 0.19.Therefore, the difference was non-significant.

The difference between the mean values of T_1-T_3 (0.24) was greater than the C.D. value, 0.19.Therefore, the difference was significant.

The difference between the mean values of T_2-T_3 (0.16) was less than the C.D. value, 0.19. Therefore, the difference was non-significant.

It is therefore concluded that there was non-significant difference b/w the, T_1-T_2, T_2-T_3 and there was significant difference b/w the all other treatments which may be ascribed to addition of different level of papaya and guava in the experimental treatments of fruit cheese.

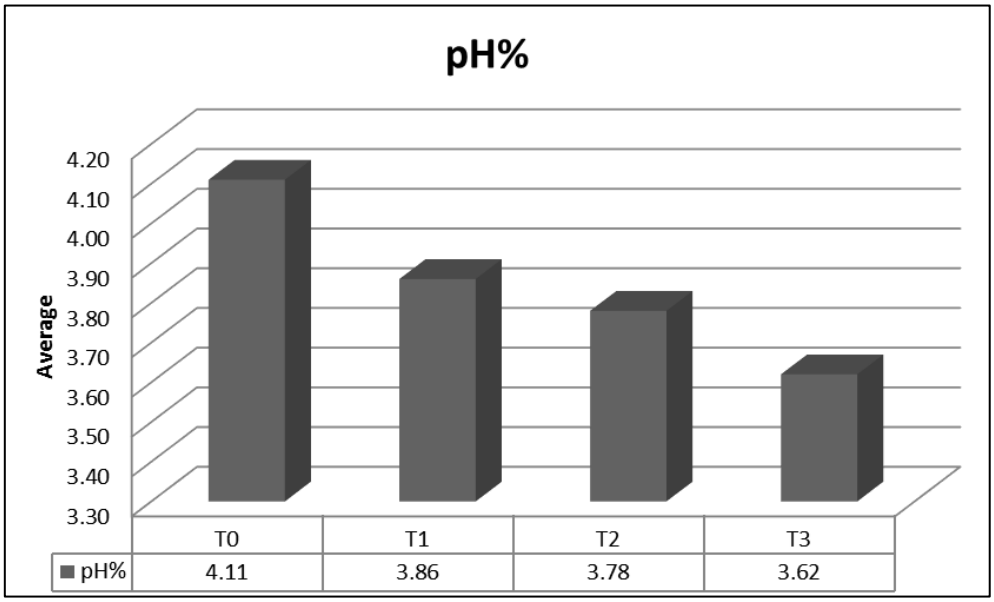

Fig 6: Percentage of pH in samples of control and experimental fruit cheese of different treatments

There: T_0 – Guava 100%, T_1 – Guava 90% and 10% Papaya, T_2 – Guava 80% and 20% Papaya & T_3 – Guava 70% and 30% Papaya.

3.2 Microbial analysis

On the basis of physico-chemical analysis and sensory evaluation found that the treatment (T_2,T_0) was best than the other treatment (T_1, T_3). So treatment T_2 and T_0 was used for microbial analysis.

Table 16: Microbial count in guava based papaya fruit cheese

Day	Treatment	Storage temp.	TPC (CFU/g)	Coli form	Yeast & mold
0	T_0	10 ^{0}C	0.21x10^2	Nil	2
		25 ^{0}C	0.21x10^2	Nil	2
	T_2	10 ^{0}C	0.23x10^2	Nil	3
		25 ^{0}C	0.25x10^2	Nil	4
7	T_0	10 ^{0}C	0.25x10^2	Nil	4
		25 ^{0}C	0.27x10^2	Nil	5
	T_2	10 ^{0}C	0.25x10^2	Nil	7
		25 ^{0}C	0.28x10^2	Nil	8
14	T_0	10 ^{0}C	0.28x10^2	Nil	7
		25 ^{0}C	0.30x10^2	Nil	9
	T_2	10 ^{0}C	0.29x10^2	Nil	10
		25 ^{0}C	0.31x10^2	Nil	11
21	T_0	10 ^{0}C	0.32x10^2	Nil	10
		25 ^{0}C	0.34x10^2	Nil	13
	T_2	10 ^{0}C	0.33x10^2	Nil	14
		25 ^{0}C	0.35x10^2	Nil	15
28	T_0	10 ^{0}C	0.35x10^2	Nil	13
		25 ^{0}C	0.37x10^2	Nil	17
	T_2	10 ^{0}C	0.36x10^2	Nil	19
		25 ^{0}C	0.43x10^2	Nil	20

4. Conclusion

In this physico-chemical study, we take five parameters i.e. Moisture, TSS, Total sugar (%), Acidity & pH and treatments were T_0, T_2, T_3 & T_4 resulting F(Cal) is greater than F(Tab), So, result were more significant at 5% level of significance. We observed that the chemical characterization included the determination of all parameters showed more acceptability. Total coli forms, yeasts and molds counting were the microbiological analyses conducted. Vitamin A found in the guava fruit helps to boost night vision and reduce the risk of cataracts, according to some studies. Guava is a sweet and tasty alternative to carrots for protecting vision. All results were found more significant ($p<0.05$) as represent in ANOVA.

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