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Effect of different ratio of pineapple and apple pulp on quality and shelf life of blended cheese

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Abstract

The present investigation entitled "Effect of different ratio of pineapple and apple pulp on quality and shelf life of blended cheese" was carried out in Post-Harvest Lab, Department of Horticulture, Sam Higginbottom university of Agriculture Technology and Sciences, during the winter season of the year 2016-2017. The experiment was laid out in CRD (Completely Randomized Design) with 10 treatments and 3 replications for preparation of pineapple cheese. Physico-chemical parameters viz., TSS, acidity, ascorbic acid, non-reducing sugars, and total sugars as well as organoleptic attributes viz., colour, flavour, taste and overall acceptability of pineapple cheese were evaluated at an interval of 0 days up to 90 days of storage. An overall result of pineapple cheese was found better in the treatment T₃ (Pineapple 70% + Apple 30%) proved to be the best in terms of quality whereas T₆ (Pineapple 40 + Apple 60%) proved to be best in terms of sensory score economic return on value addition of pineapple cheese at room temperature.

Keywords: Pineapple, apple, pulp, TSS, bio-chemical parameters, storage

Introduction

The main objective of fruit processing is to supply wholesome safe, nutritious and acceptable food to consume throughout the year and main objectives of post-harvest studies are reduction of fruits losses. Imports of products and generation of Urban and Rural employment as well as source of income to the farmer and artisans.

Pineapple (*Ananas comosus* (L.) belongs to the Family: *Bromeliaceae* is one of the most important commercial fruit crops in the world. Pineapple is the third most important tropical fruit in the world after Banana and Citrus Pineapples are consumed or served fresh, cooked, juiced and can be preserved. This fruit is highly perishable and seasonal. Mature fruit contains 14% of sugar; a protein digesting enzyme, bromelin, and good amount of citric acid, malic acid, vitamin A and B. Pineapple juice's composition varies depending on geography, season, process and time of harvest. Its balance of sugar and acid contributes to the fruit's refreshing flavour. Thailand, Philippines, Brazil and China are the main pineapple producers in the world supplying nearly 50 % of the total output. Other important producers include India, Nigeria, Kenya, Indonesia, Mexico, Costa Rica and these countries provide most of the remaining fruit. FAO. (2004) ^[12]. Food and Agriculture Organization of United Nations.

Green pineapple is also used for making pickles. After extraction of its juice, the left over is used as livestock feed and also the tender leaves are used for the same purpose. Various food items like squash, syrup, jelly are produced from pineapple. Vinegar, alcohol, citric acid, calcium citrate etc. are also produced from pineapple. Pineapple is also recommended as medical diet for certain diseased persons. The U.S. National Library of Medicine lists *bromelain* as a proteolytic digestive enzyme. When taken with meals, bromelain aids in the digestion of proteins, working to break proteins down into amino acids.

The paper is an overview of different aspects of nutritional value and medicinal uses of pineapple in different areas of the world. 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 80⁰ Brix were required for a good gel set papaya cheese. For the blended fruit cheese, the ratio of papaya: pineapple was 2:1 with 2% pectin and processed to 77-80⁰ Brix. Sensory evaluation indicated a significant preference for the blended fruit cheese and significant changes in sensory attributes of the fruit cheeses stored for 10 weeks at 4-5 degrees C. Barbaste *et al.* 2000.

Fruit cheeses are pulps that are boiled until they have a final sugar content of 75-85%. When they cool, they set as a solid block and can be cut into bars or cubes to eat directly as confectionery, or they can be used in small pieces in bakery product. (United Nations Industrial Development Organization Vienna, 2004).

Material and methods

The details of the various materials used and methods adopted in laid out the experiment are presented below-

Experimental Site

The experiment work of "Effect of different ratio of pineapple and apple pulp on quality and shelf life of blended cheese" conducted at the post harvest lab Department of Horticulture, Sam Higginbottom University of Agriculture Technology & Sciences. Allahabad (U.P).

Experimental detail

Preparation of Value added Pineapple Cheese

Ingredient	Amount
Pineapple	1kg
Sugar	750g

Butter	70g
Citric acid	5g
Pectin powder	5g
Salt	2g

Method of Preparation

Removed the skin of pineapple. Then cut into thin slices. After that Boiled with equal quantity of water to soften the pulp. For making fine pulp removed the seeds and skin. Then added sugar, citric acid, pectin and apple pulp. Mixed thoroughly. After that cooked until they became thick Then added salt After that removed from fire, when the mass started to leaven the side of pan. Then spread hot cheese in 0.6 cm thick layer on tray smeared with butter. After that allowed to cool and set. When it became cool cut into small pieces of suitable size. After that wrapped the butter paper and packed in dry jar for storage.

Treatment combination

The value addition Pineapple cheese preparation is 9 treatments with 3 replications and stored for 90 days under ambient temperature.

Table 1

Treatments	Treatment Combination
T ₀	Pineapple Cheese (control)
T ₁	Pineapple 90% + Apple 10%
T ₂	Pineapple 80% + Apple 20%
T ₃	Pineapple 70% + Apple 30%
T ₄	Pineapple 60% + Apple 40%
T ₅	Pineapple 50% + Apple 50%
T ₆	Pineapple 40% + Apple 60%
T ₇	Pineapple 30% + Apple 70%
T ₈	Pineapple 20% + Apple 80%
T ₉	Pineapple 10% + Apple 90%

Results and discussion

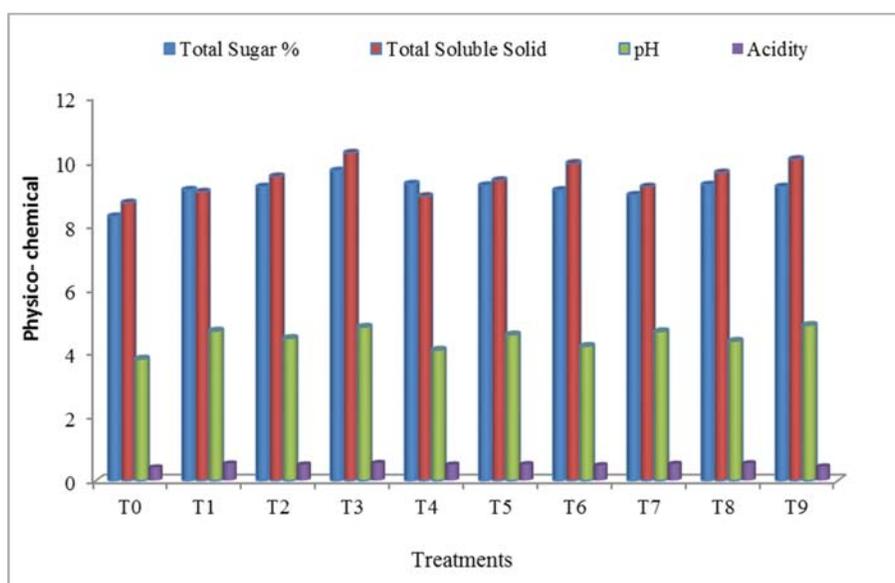
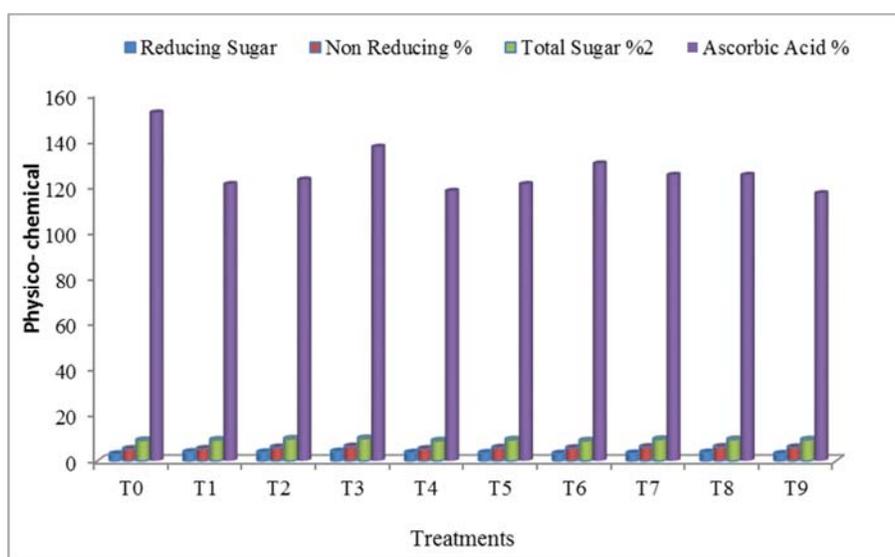
Physico- chemical changes was noticed during storage period at 90 days (mean value)

Perusal of table and fig. reveals the maximum total Sugar (9.71%) was recorded with T₃ (Pineapple 70% + Apple 30%) and minimum was (6.43) observed in T₀ Control. The result showed a progressive and increase in total sugar content through the storage period increase in total sugar might be due to hydrolysis of polysaccharides like starch, pectin etc, and there conversion into simple sugars. The similar findings reported by (Ahmad *et al.* 2004) [3] and (Deka *et al.*, 2004) [8] for lime-aonla blended RTS and (Bons *et al.*, 2013) [6] for RTS beverages prepared from guava-papaya. Whereas the Total Soluble Solid the maximum (10.25 %) and minimum was (8.71 %). An increase in total soluble solids content of guava cheese during storage may possibly be due to conversion of polysaccharides starch etc, in to sugars. Total soluble solids content of guava, Chen and Zhang (2001) [7] juice has also been reported to increase during storage. While the maximum pH was (4.80 %) and minimum (3.80 %), These were negligible changes in pH content during storage. Similar results were reported by Ehsan *et al.* (2003) [11] he observed that the decrease in pH may be due to formation of free acids and pectin hydrolysis in case of grapefruit apple marmalade and Ali *et al.*, (2008) [4] in apple jam. The maximum acidity (0.55%) and minimum was (0.41%). Similar finding have been reported by Ranganna. (2005) [20] in apple pomace and Sogi and Singh, (2001) [24] in Kinnow Jam

and Candy The increase in acidity during the storage may be due to formation of increase in acidity could have also occurred due to the hydrolysis of pectin are reported by Iftikhar *et al.*, (2007) [14] in Apple and Pear Mixed Fruit Jam. Whereas the reducing Sugar maximum (4.05%) and minimum was (2.92%). Similar results were reported by Riaz *et al.* (1999) [21] who observed increasing trend in reducing sugars in Ali *et al.*, (2008) [4] in diet apple jam, Ehsan *et al.*, (2003) [11] in grape fruit apple marmalade and Priyadarshini (2013) [18] in apple candy. In case of non Reducing the maximum (6.25%) and minimum was (5.13%). Decrease in non reducing sugar may be due to the conversion of non reducing sugar to reducing sugar. Similar results were reported by Riaz *et al.*, (1999) [21] in strawberry jam and Ehsan *et al.* (2003) [11] in grape fruit apple marmalade, Iftikhar *et al.*, (2007) [14] in apple and pear mixed jam and Ali *et al.*, (2008) [4] in diet jam from apple. The highest total Sugar was (9.75%) and minimum (8.95%). The total sugar decreases due to the sucrose ones. This happened because, during the cooking process for the jam manufacturing, the sucrose underwent an inversion process, due to the acid medium, being partly or completely converted into glucose and fructose (invert sugar). This inversion is necessary to prevent crystallization during the process Lopes (1985). Similar results were reported by Riaz *et al.*, (1999) [21], Ehsan *et al.*, (2003) [11] and Ali *et al.*, (2008) [4]. Maximum ascorbic Acid was (152%) and minimum was noticed (117%) respectively.

Table 2: Effect of different treatments of value addition of Pineapple cheese on physico- chemical changes during different storage period.

Treatments	Total Sugar %	Total Soluble Solid	pH	Acidity	Reducing Sugar	Non Reducing %	Total Sugar %	Ascorbic Acid %
T ₀	8.28	8.71	3.80	0.41	2.92	5.13	8.95	152
T ₁	9.11	9.05	4.68	0.53	3.82	5.23	9.12	121
T ₂	9.21	9.53	4.45	0.50	3.71	5.85	9.57	123
T ₃	9.71	10.25	4.8	0.55	4.05	6.25	9.75	137
T ₄	9.30	8.91	4.08	0.50	3.51	5.17	8.74	118
T ₅	9.25	9.41	4.56	0.51	3.45	5.73	9.20	121
T ₆	9.10	9.93	4.20	0.48	3.15	5.57	8.75	130
T ₇	8.95	9.21	4.66	0.52	3.26	6.02	9.40	125
T ₈	9.27	9.65	4.36	0.54	3.65	6.05	9.30	125
T ₉	9.21	10.05	4.86	0.44	3.03	5.91	9.21	117
Mean	9.14	9.47	4.45	0.50	3.46	5.69	9.2	126.9
Result	S	S	S	S	S	S	S	S
S. Ed. (±)	0.072	0.327	0.072	0.008	0.323	0.294	0.162	0.831
C.D. at 5%	0.152	0.692	0.152	0.017	0.685	0.623	0.343	1.761

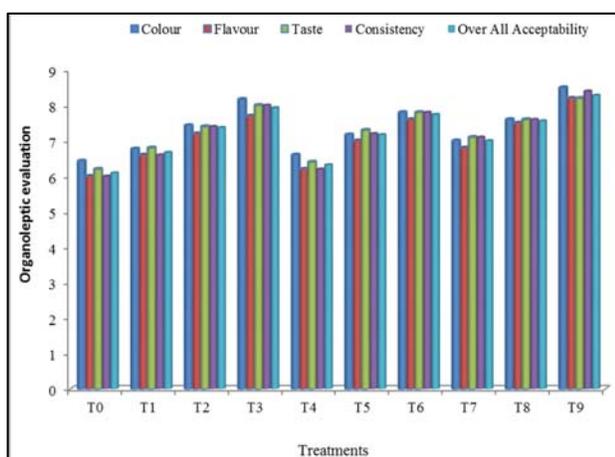
**Fig 1:** Effect of different treatments of value addition of Pineapple cheese on physico- chemical changes during different storage period.**Fig 2:** Organoleptic evaluation was noticed during storage period

Perusal of table and fig. reveals the maximum Colour (8.50) was recorded with T₈ (Pineapple 70% + Apple 30%) and minimum was (8.28%) observed in T₀ Control. Whereas the Flavour the maximum (8.20) and minimum was (6.00), while

the maximum taste was (8.20) and minimum (6.20), the maximum Consistency was (8.40) and minimum (6.00), in case of Over All Acceptability the maximum (8.28) and minimum was (6.09) respectively.

Table 3: Effect of different treatments of value addition of Pineapple cheese on Organoleptic evaluation during different storage period.

Treatments	Colour	Flavour	Taste	Consistency	Over All Acceptability
T ₀	6.43	6.00	6.20	6.00	6.09
T ₁	6.77	6.60	6.80	6.60	6.67
T ₂	7.43	7.20	7.40	7.40	7.37
T ₃	8.17	7.70	8.00	8.00	7.93
T ₄	6.60	6.20	6.40	6.20	6.32
T ₅	7.17	7.00	7.30	7.20	7.17
T ₆	7.80	7.60	7.80	7.80	7.74
T ₇	7.00	6.80	7.10	7.10	7.00
T ₈	7.60	7.50	7.60	7.60	7.56
T ₉	8.50	8.20	8.20	8.40	8.28
Mean	7.35	7.08	7.28	7.23	7.21
Result	S	S	S	S	S
S. Ed. (±)	0.298	0.544	0.593	0.593	0.554
C.D. at 5%	0.631	1.153	1.257	1.257	1.174

**Fig 3:** Effect of different treatments of value addition of Pineapple cheese on Organoleptic evaluation during different storage period.

Conclusion

Value added pineapple cheese, mostly showed acceptable results. It was observed that control showed minimum loss in physiological weight of storage, minimum pH, TSS, high reducing and total sugar percentage. T₃ (pineapple 70% + apple 30%) showed a higher ascorbic acid during the storage period. T₃ have all the desirable qualities and having most overall acceptability throughout the storage period. The best value added product is T₃ (pineapple 70% + apple 30%), according to the physio-chemical properties and organoleptic evaluation.

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