Quality Evaluation and Preparation of Apple and Olive Fruit Blended Jam

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Abstract

The present research work was carried out to investigate the effect of storage and treatment on overall quality of the apple olive blended jam, and to develop a suitable combination of olive and apple fruits pulps for jam preparation. Jam prepared from various blends of apple and olive were studied for physico chemical properties such as,

Index terms— olive fruit, apple fruit, jam evaluation.

1 I. Introduction

am is semi-solid mass, which attained from the cooking fruit pulp and sugar followed by acid, pectin, flavors and coloring substances. Jams contain about 68.5% total soluble substances and 45% at least fruit pulp, while the (7) revealed that jam should contain more than 65% total soluble solids in finished product (5). Jam, jellies and marmalade is one simple fruit product prepared from fruit individually or combination of different fruit (15).Olive (OleaeuropaeaL.) is a small tree fruit mostly grown in temperate zones. Olive is an egg shaped fruit, with sizes varying from 2 to 3 cm and flesh to stone ratio of 3 to 6.5. Olive is famous for its nutritious edible oil with a lot of health benefits. Other constituents are water, sugar, protein, oleouropein and anthocyanins. Oleouropein cause bitterness must be removed (10). Composition of olive fruit, moisture 65 to 75%, lipids 10-15%, reducing sugar 3-6%, non reducing sugar $<$ 0.3%, fiber 1-4% and protein 1-2 % (9).Olive fruit also contain1-3% phenolic compounds, 1.5% inorganic matters and 5.8% cellulose organic acid, pectin and pigments in small amount (6).Jam Apple (MalusSylvestris) is a member of rosaceae family and sub family pomoidae. Apple is the chief tree fruit of the globe. It was originated from the south western Asia. Nutrition facts include 84.7% water, 13.9 gcarbohydrates, 0.3g lipids, 0.4g protein and vit.C 8mg per 100 from of edible fruit. Apples are rich source of antioxidants including flavonoids and polyphenols mainly occurs in its skin. Thus eating whole apple is recommended to obtained full health benefits (11). Nonetheless, the future of olives production and processing might be very much bright in our country in general and Khyber Pakhtunkhwa in particular because this fruit fetches maximum economic returns for the farmer. To promote the olive fruit production and processing, this research work was designed to prepare a value added product from olive fruit i.ejam, which will be available throughout the year in a market. The farmers will be benefitted while getting proper return for their produce.

2 II. Materials and Methods

Good quality, fresh, mature and healthy olive & apple fruits was selected for the research work and was brought from the Sungbatti Olive Research Farm Swabi and apple was purchased from the local market. The selected fruit were washed with water in order to remove dust, and any other foreign material. Olive has a bitter taste, which is due to a natural glucoside called oleuropein Olive fruit were first dipped in 2% Sodium Hydroxide (Lye solution) for 36 hours in order to remove the bitterness. The removal of oleuropein is tested with 1% phenolphthalein indicator which gives red color. The lye is leached out from the olive fruit by washing in running water for 24 hours, The removal of lye is again test with 1% phenolphthalein giving no color indicating that lye is completely removed from the olive fruit. (13) After removal of bitterness from the olive fruit the pulp was obtained through pulper machine. Similarly apple fruit was washed, peeled, trimmed, cut and dipped in 1% citric acid solution to

prevent oxidation. Then the fruit was blended in order to get the pulp. Treatments with different combination of olive and apple pulp were made. All the treatments were replicated three times.

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4 c) Physiochemical analysis

Physiochemically all of the samples were analyzed for pH, titratable acidity, total soluble solids (TSS), reducing sugar and non-reducing sugar by (1).

5 d) Organoleptic Evaluation

The apple olive blended jam samples were sensory evaluated for color, texture, flavor and overall acceptability by 10 trained judge's panel. Organoleptic study was carried out at each 15 days interval for 3 month storage. The evaluation was conceded out by using 9 points hedonic scale of (14). The results are of scoring rate 1-9 awarded by judges of panel

6 e) Statistical Analysis

All the data concerning treatments and storage interval were statistically analyzed using factorial experiment in completely randomized design and the means were separated by applying least significant difference (LSD) Test at 5% possibility level as defined by (16). A statistical softwere STATISTIX 8.1 were used for the analysis of the data III. Result and Discussion a) Chemical Analysis i. pH pH of all the samples of apple olive blended jam were reduced during the total period of storage. The mean values of all the treatments showed considerable decreased from AO o to AO 5 3.53, 3.56, 3.48, 3.55, 3.48 and 3.55 respectively. The least mean value was noted for AO2 and AO4 (3.48) followed by AOo (3.53) and highest mean value was noted for AO1 (3.56) followed by AO3 (3.55) as shown (Table 1).Statistical analysis shows that treatment and storage has considerable effect ($P<$ 0.05) on all the samples. The largest percent decline was examined in AO0 (5.33%) followed by AO1 (4.93%), while smallest decline was examined in AO5 (3.59%) followed by AO 2 (4.49%) (Table 1).Decreasing trend in pH might be due the hydrolysis of pectic bodies and formation of acidic compound during degradation of sugar contents. The gradual decrease in mean value of the pH may partly due to their varying composition, observed in mixed fruit jam prepared form water melon flesh part and lemon (8) who reported decrease in trend in pH of all treatments of mixed jam prepared from watermelon and during storagethe change in pH might be due to the change and formation acidic compound during storage of the jam Acidity of all the samples of apple olive blended jam was greater than that observed before storage. The mean values of all the treatments significantly decreased from AOo to AO5 0.68, 0.70, 0.69, 0.71, 0.72 and 0.73successively. The least amount mean value was noted for AOo (0.68) followed by AO2 (0.69) and highest mean value was noted for AO5 (0.73) followed by AO4 (0.72). Maximum increased was obtained in AOo (20.00) followed by AO1 (20.51) least amount increased was observed in AO5 (15.19) followed by AO4 **??**15.38). Results are shown in table 2. The increased in acidity of the apple olive blended jam might be due to the break down of pectic bodies to pectenic acid. The reason for increasing trend of acidity was due to the formation different organic acid during carbohydrates degradation and hydrolysis at storageThese results are in agreement with (4) who reported increasing trend in acidity of all treatments observed 0.65 to 0.70% after in 60 days storage interval of apricot jam (Table 2). Increase in acidity was due to the formation of acids by degradation of polysaccharides and oxidation of reducing sugar or by break down pectic substance and uronic acid reported by (12). iii. Reducing sugar Mean of Reducing sugar significantly difference from AO0 to AO5 27.08, 23.44, 24.10, 23.30, 23.20 and 22.80 respectively. The minimum mean value was noted for AO5 (22.80) followed by AO4 (23.20) and maximum mean value was noted for AO0 (27.08) followed by AO2 (24.10). Maximum increased was observed in AO0 (48.72 %) followed by AO1 (46.35%) minimum increased was observed in AO5 (42.59%) followed by AO4 (44.39%).The reason for increasing the reducing sugar might be due to the presence of invertase enzymes but invertase enzymes works properly at 4.6 pH and 50 0 C temperature And since the temperature was ambient in this condition, thus making it inadequate for activity of invertase enzyme. The increase in reducing sugar might be due to the inversion of non reducing sugar to during storage. The inversion of non reducing sugar was due to the presence of acid along with high temperature speed up the inversion process. Results are presented in table 3. These results are in agreement with (2) reported increased trend in reducing sugars of strawberry jam during 90 days storage. Similarly, increase in reducing sugar of apricot jam during storage was also observed by (4) Maximum increased was observed in AO 1 (1.82%) followed by AO4 (1.58%) minimum increased was observed in AO3 (1.41%) followed by AO5 (1.43%). The increasing in total soluble solid of the apple olive jam might be due to the degradation of polysaccharides in the presence of acid.Results are presented in table 5.Increased in TSS of watermelon lemon jam from 68.62 up to 68.90 and during 60 days of storage in grapes fruit marmalade from 70 to 70.8 0 brix by (**??**) The mean values of all the treatments showed significant difference from AO0 to AO5 9.77, 7.64, 7.87, 8.00, 7.93 and 8.23 respectively. The minimum mean value was noted for AO1 (7.64) followed by AO2 (7.87) and maximum mean value was noted for AO0 (9.77) followed by AO5 (8.23). Maximum decreased was observed in AO0 (27.38%) followed by AO1 (21.84%) minimum increased was observed in AO5 (15.73%) followed by AO3 (16.09%). Changes in color

might be attributed to Millard reaction, enzymatic browning ascorbic acid degradation and polymerization of color pigments (carotenoids and anthocyanin's) with other phenolic compound. Results are presented in table 6. The effect of low storage temperature and freezing techniques on ascorbic acid content and additional qualitative characteristics of Iranian strawberries and affirmed that the storage temperature of 18 and 24 0c were mostly excellent for preserving the qualitative individually (flavor, texture color and entirety) of the strawberries (3). ii. Taste Taste of all the apple olive blended jam samples was decreased during 90 days storage interval. The mean values of all the treatments showed significant difference from AO0 to AO5 10.54, 7.77, 8.21, 8.29, 8.29 and 8.37 respectively. The minimum mean value was noted for AO1 (7.77) followed by AO2 (8.21) and maximum mean value was noted for AO0 (10.54) followed by AO5 (8.37). Maximum decreased was observed in AO0 (34.12%) followed by AO1 (20.69%) minimum increased was observed in AO5 (14.44%) followed by AO2 (15.73%). Results are presented in table 7. Organic acid and sugar ratio primarily creates a sense of taste which is perceived by specialized taste buds on the tongue. Decrease in taste score might be due to the fluctuation in acids, pH and sugar/acid ratio.These results are in accordance with (8) reported decreasing trend from 6.2 to 4 during initial and 150 days during storage of watermelon and lemon jam. iii. Texture Texture of all the apple olive blended jam samples was decreased during 90 days storage interval. The mean values of all the treatments showed significant difference from AO0 to AO5 5.9, 6.5, 6.7, 6.5, 6.7 and 7.1 respectively. The minimum mean value was noted for AO0 (5.9) followed by AO1 and AO3 respectively (6.5) and maximum mean value was noted for AO5 (7.1) followed by AO2 and AO4 (6.7). Maximum decreased was observed in AO0 (34.7%) followed by AO1 (28.9%) minimum decreased was observed in AO5 (16.9%) followed by AO2 (23.7%). The textual properties of the jam are usually attributed pectic bodies composition. The pecticbodies in olive fruit are very low as compared to apple fruit. The decrease in pecticsubsatance with storage significantly affect the texture score of the apple olive blended jam; Results are presented in table 8. These results are in accordance with (17) studied the structural changes in strawberry tissue during glacial and stated that the textural attributes in particular were statistically significantly different among the strawberry jams. iv. Overall Acceptibility Over all acceptability of all the apple olive blended jam samples was decreased during 90 days storage interval. The mean values of all the treatments showed significant difference from AO0 to AO5 6.91, 7.42, 7.68, 7.70, 7.73 and 7.72 respectively. The minimum mean value was noted for AO0 (6.91) followed by AO1 (7.42) and maximum mean value was noted for AO4 (7.73) followed by AO5 (7.72). Maximum decreased was observed in AO0 (31.84%) followed by AO1 (22.92%) minimum decreased was observed in AO5 (17.43%) followed by AO2 (18.18%). The apple olive blended jam remains acceptable after 90 days of storage period. Sensory traits are non-generally inter related and contributes independently towards the overall sensory perception.Results are presented in table 8. These results are in accordance with (8) reported decreasing trend from 8.80 to 7.96 in apple marmalade. IV. Conclusion

Apple olive blended jam was prepared from apple and olive pulp and was examined during time interval of 90 days. Statistically it is concluded that storage and treatment has significant effect on the quality and stability of the apple olive blended jam. Results investigated that good quality jam with equal amount of apple and olive pulp could be prepared and storage with minimum damages among the other treatment both physiochemically and organoleptically even after 90 days of storage interval. [1]

Figure 1: v.

1 

Figure 2: Figure 1 :

Figure 3: Quality

Figure 4:

2

Figure 5: Figure 2 :

Treatments	3 Apple pulp
Apple olive (AO?)	1000 g
Apple olive (AO 1)	900 g
Apple olive (AO 2)	800 g
Apple olive (AO 3)	700 g
Apple olive (AO 4)	600 g
Apple olive (AO 5)	500 g

b) Chemical Used
Sodium Benzoate (Analytical grade-Merck Germany), Potassium sorbate (Analytical grade-Merck), Sodium

(Analytical Grade-Sigma), Potassium hydroxide
(Analytical Grade-Sigma), Methylene Blue (Sigma),
Phenolphthalein (Analytical Grade-Merk). Sodium
Potassium tartrate (ChemPol England).

Figure 6:

1

Treatments	Storage intervals

[Note: Values having different alphabetical letters are significantly different (P<0.05) L Volume XV Issue 1 Version I © 2015 Global Journals Inc. (US) a) Research Plan ii. Titratable Acidity (%)]

Figure 7: Table 1 :

2

Treatments	Storage intervals

Figure 8: Table 2 :

3

Treatments	Storage intervals

Figure 9: Table 3 :

4

Treatments Storage intervals

Figure 10: Table 4 :

5

Treatments Storage intervals

[Note: Values having different alphabetical letters are significantly different (P<0.05) L Volume XV Issue 1 Version I]

Figure 11: Table 5 :

6

Treatments Storage intervals

Figure 12: Table 6 :

7

Treatments Storage intervals

Figure 13: Table 7 :

8

Treatments Storage intervals

Figure 14: Table 8 :

9

Treatments Storage intervals

Figure 15: Table 9 :

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