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Mithun Tarafdar
Department of Horticulture,
SHUATS, Allahabad, U.P.,
India.

S Saravanan
Department of Horticulture,
SHUATS, Allahabad, U.P.,
India.

Damodaram Navitha
Department of Horticulture,
SHUATS, Allahabad, U.P.,
India.

Standardization of blended fruit jam of wood apple and date

Mithun Tarafdar, S Saravanan and Damodaram Navitha

Abstract

The study was conducted to Standardization of blended fruit jam of wood apple (*Feronia limonia* L.) and dates (*Phoenix dactylifera* L.). In Post-Harvest Laboratory of Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad. For preparation of fruit jam, additives like sugar and butter were added to the pulp in different proportions and the mixture and the product stored under well ventilated room than that under normal temperature. Further, the products were stable up to 3 months during storage under ambient condition.

Keywords: Wood apple, Dates, jam, TSS

Introduction

Wood apple is useful in preventing and curing scurvy and in relieving flatulence. Mashed seedless pulp of the raw fruit is beneficial in the treatment of dysentery, diarrhoea and piles. wood apple is a nutritious fruit and is consumed as a juice during the harvesting season for their low cost and thirst quenching beverage. It is also used as homemade drinks popularly known as 'Sarbat'. According to Gopalan *et al.* (1971), it contains 61.5 g water, 1.89 g protein, 0.39mg fat, 1.79 mg minerals, 31.8 g carbohydrate, 55 g carotenes, 0.13 mg thiamine, 1.19 mg riboflavin, 1.1 mg niacin and 8 mg vitamin-C/100 g of edible portion. It has high religious, cultural, nutritional and medicinal value.

Dates they are the fruits grow on the palm tree belonging to the family of Arecaceae in the genus: Phoenix and scientifically named as (*Phoenix dactylifera* L.) The benefits of dates include relief from constipation, intestinal disorders, heart problems, anaemia, sexual dysfunction, diarrhoea, abdominal cancer, and many other conditions. First and foremost, they're easily digested, allowing body to make full use of their goodness. These delicious fruits contain oil, calcium, sulphur, iron, potassium, phosphorous, manganese, copper and magnesium which are all beneficial for health.

Material and methods

Experimental detail

Processed product	: Mixed fruit jam (Wood apple and Dates)
Crop	: Wood apple (<i>Feronialimonia</i> L.) : Dates (<i>Phoenix dactylifera</i> L.)
Design	: simple completely randomized design
Treatment	: Factor A – 3 levels of fruit pulp ratio : Factor B – 4 levels of sugar concentration
Total No. of treatments	: 12
No. of replications	: 3

Treatment details

The experiment comprised of 12 treatment combinations of 3 levels of fruit pulp ratio and 4 levels of sugar concentration as follow:

Process

- Extraction of wood apple and dates pulp
- Processing wood apple and dates
- Preparation of wood apple and dates—jam forms.

Correspondence
Mithun Tarafdar
Department of Horticulture,
SHUATS, Allahabad, U.P.,
India.

Notation	Treatments
	Factor A (Pulp Ratio) and Factor B (Sugar Ratio)
T ₀	Control
T ₁	65% Wood apple + 35% Dates +100gm sugar
T ₂	50% Wood apple + 50% Dates+100gm sugar
T ₃	35% Wood apple + 65% Dates+100gm sugar
T ₄	65% Wood apple + 35% Dates +150gm sugar
T ₅	50% Wood apple + 50% Dates+150gm sugar
T ₆	35% Wood apple + 65% Dates+150gm sugar
T ₇	65% Wood apple + 35% Dates +200gm sugar
T ₈	50% Wood apple + 50% Dates+200gm sugar
T ₉	30% Wood apple + 65% Dates+200gm sugar
T ₁₀	65% Wood apple + 35% Dates + 250 gm sugar
T ₁₁	50% Wood apple + 50% Dates+200gm sugar

Details of treatment combinations

Result and discussion

Notation (T ₀)	Treatment (P ₀ S ₀)	Wood apple pulp (gm)	Date pulp (gm)	Sugar (gm/100 gm of pulp)
T ₀	P ₀ S ₀	500	500	100
T ₁	P ₁ S ₁	650	350	100
T ₂	P ₂ S ₁	500	500	100
T ₃	P ₃ S ₁	350	650	100
T ₄	P ₁ S ₂	650	350	150
T ₅	P ₂ S ₂	500	500	150
T ₆	P ₃ S ₂	350	650	150
T ₇	P ₁ S ₃	650	350	200
T ₈	P ₂ S ₃	500	500	200
T ₉	P ₃ S ₃	300	650	200
T ₁₀	P ₁ S ₄	650	350	250
T ₁₁	P ₂ S ₄	500	500	250

- The present investigation entitled “Standardization of blended fruit jam of wood apple (*Feronialimonia* L.) and dates (*Phoenix dactylifera* L.)” was carried out in the horticulture post harvest laboratory in the department of Horticulture, SHUATS during 2017-2018.
- The main objectives of the present investigation were to standardize the blend ratio of wood apple and dates pulp

- for preparation of better quality mixed fruit jam and to find out its acceptability during storage.
- The investigation was carried out with ten (12) treatments combinations consisting of three (3) different ratio of wood apple and dates pulp (P₁, P₂, and P₃) with three (4) different ratio of sugar S₁, S₂, S₃ and S₄ replicated three times in a simple completely randomized design (simple CRD). The mixed fruit jam was prepared as per the treatment combination and stored at room temperature for 90 days.
- The organoleptic parameters based on colour, flavour, texture, taste and overall acceptability of mixed fruit jam was evaluated by panel of 10 judges on a 9 point Hedonic scale. The marks were given in the scale of 1 to 9 ranging from extremely dislike to extremely liked. The chemical parameters (TSS and pH) were also evaluated from initial (0) day of storage up to 90 days.
- The TSS content of mixed fruit jam was estimated by hand refractometer, the pH was measured using an elementary pH meter, and the percent titrable acidity was estimated by simple acid / alkaline titration method as described in A.O.C.C (1984). The data were analyzed statistically and reported at 5% level of significance. The prepared mixed fruit jam was stored up to 90 days at room temperature to study the physico - chemical character during storage. It was noted that pulp ratio T₆ (35% wood apple+ 65% Dates) was found the best based on overall acceptability.
- The colour rating was found maximum in T₆ (35% wood apple + 65% Dates) and for flavour T₆ (35% wood apple + 65% Dates) and moisture content fruit pulp ratio and acidity T₂ (50% wood apple + 50% Dates) and T₅ (50% wood apple + 50% Dates) while for taste T₆ (35% wood apple + 65% Dates) was found the best.
- The organoleptic rating of mixed fruit jam showed the different trend on increasing the quantity of sugar in the ratio of fruit pulp. It was found that the values for flavour decrease while for colour, texture and overall acceptability increase with increase in sugar content.

Table 4.1: Effect of different recipes on colour, flavour, and texture of blended fruit jam during storage

Treatments No.	Treatments combination	Colour (wood apple and dates jam)				Flavour (wood apple and dates jam)				Texture (wood apple and dates jam)			
		initial	30days	60days	90days	initial	30days	60days	90days	initial	30days	60days	90days
T ₀	control	6.720	6.610	6.490	6.380	6.750	6.680	6.600	6.520	6.480	6.409	6.350	6.280
T ₁	65% Wood apple + 35% Dates +100gm sugar	6.460	6.380	6.240	6.150	6.430	6.350	6.270	6.210	6.360	6.220	6.220	6.160
T ₂	50% Wood apple+ 50% Dates +100gm sugar	5.690	5.610	5.520	5.410	6.200	6.140	6.050	6.000	6.759	6.630	6.660	6.600
T ₃	35% Wood apple +65% Dates +100gm sugar	6.662	6.550	6.430	6.340	6.940	6.860	6.700	6.570	6.680	6.540	6.570	6.510
T ₄	65% Wood apple +35% Dates +150gm sugar	7.450	7.360	7.210	7.100	7.340	7.260	7.170	7.100	7.100	7.140	7.060	7.020
T ₅	50% Wood apple +50% Dates +150gm sugar	9.510	9.330	9.240	9.130	9.740	9.660	9.570	9.510	9.590	9.450	9.510	9.430
T ₆	35% Wood apple +65% Dates +150gm sugar	7.020	6.960	6.870	6.760	6.980	6.910	6.830	6.750	6.880	6.810	6.780	6.720
T ₇	65% Wood apple +35% Dates +200gm sugar	9.072	9.010	8.920	8.830	9.081	9.021	8.971	8.900	9.010	8.900	8.890	8.840
T ₈	50% Wood apple +50% Dates +200gm sugar	8.740	8.660	8.540	8.450	8.910	8.830	8.760	8.660	8.750	8.660	8.620	8.645
T ₉	30% Wood apple +65% Dates +200gm sugar	8.230	8.180	8.050	7.960	8.020	7.930	7.851	7.769	7.810	7.710	7.680	7.600
T ₁₀	65% Wood apple +35% Dates + 250 gm sugar	7.669	7.570	7.420	7.280	7.650	7.580	7.490	7.410	7.510	7.440	7.440	7.370

T ₁₁	50% Wood apple+50% Dates +200gm sugar	7.620	7.500	7.340	7.240	7.550	7.490	7.410	7.330	7.430	7.350	7.340	7.230
	F-test	S	S	S	S	S	S	S	S	S	S	S	S
	S.Ed±	0.133	0.138	0.154	0.169	0.093	0.103	0.102	0.119	0.129	0.128	0.137	0.045
	C.D. at 5%	0.250	0.273	0.303	0.330	0.187	0.189	0.217	0.234	0.253	0.252	0.264	0.286

Table 4.2: Effect of different recipes on taste, overall acceptability, and T.S.S. of blended fruit jam during storage

Treatments No.	Treatments combination	Taste (wood apple and dates jam)				Overall acceptability (wood apple and dates jam)				T.S.S.(wood apple and dates jam)			
		initial	30days	60days	90days	initial	30days	60days	90days	initial	30days	60days	90days
T ₀	control	7.141	6.991	6.930	6.870	7.090	7.040	6.970	6.900	67.076	67.133	67.363	67.453
T ₁	65% Wood apple + 35% Dates +100gm sugar	6.260	6.120	6.030	5.980	6.230	6.170	6.090	6.040	65.140	65.333	65.503	65.693
T ₂	50% Wood apple+ 50% Dates +100gm sugar	6.690	6.550	6.450	6.350	6.480	6.420	6.350	6.260	66.883	66.930	67.003	68.280
T ₃	35% Wood apple +65% Dates +100gm sugar	6.600	6.430	6.340	6.270	6.590	6.540	6.470	6.380	66.969	67.053	67.253	67.486
T ₄	65% Wood apple +35% Dates +150gm sugar	7.050	6.920	6.860	6.750	7.200	7.140	7.070	6.990	67.940	68.020	68.166	68.283
T ₅	50% Wood apple +50% Dates +150gm sugar	9.460	9.340	9.240	9.180	9.690	9.640	9.550	9.500	68.833	68.933	69.186	69.616
T ₆	35% Wood apple +65% Dates +150gm sugar	6.820	6.670	6.600	6.540	6.940	6.870	6.790	6.710	68.696	68.886	68.973	69.093
T ₇	65% Wood apple +35% Dates +200gm sugar	8.950	8.810	8.730	8.670	9.031	8.971	8.921	8.851	68.996	69.330	69.650	69.733
T ₈	50% Wood apple +50% Dates +200gm sugar	8.600	8.440	8.380	8.320	8.620	8.560	8.480	8.400	68.663	68.810	69.013	69.180
T ₉	30% Wood apple +65% Dates +200gm sugar	7.700	7.540	7.450	7.370	7.520	7.450	7.360	7.280	68.660	68.790	69.046	69.150
T ₁₀	65% Wood apple +35% Dates + 250 gm sugar	7.470	7.290	7.201	7.130	7.530	7.450	7.350	7.280	67.783	68.163	68.280	68.453
T ₁₁	50% Wood apple+50% Dates +200gm sugar	7.340	7.160	7.050	7.030	7.440	7.370	7.300	7.220	68.450	68.783	69.020	69.356
	F-test	S	S	S	S	S	S	S	S	S	S	S	S
	S.Ed±	0.133	0.148	0.156	0.173	0.050	0.070	0.006	0.009	0.129	0.263	0.334	0.391
	C.D. at 5%	0.250	0.292	0.315	0.333	0.128	0.134	0.151	0.182	0.26	0.555	0.667	0.795

Table 4.3: Effect of different recipes on Acidity, pH and Moisture of blended fruit jam during storage

Treatments No.	Treatments combination	Acidity (wood apple and dates jam)				pH (wood apple and dates jam)				Moisture (wood apple and dates jam)			
		initial	30days	60days	90days	initial	30days	60days	90days	initial	30days	60days	90days
T ₀	control	2.346	2.133	1.920	1.280	3.793	3.863	3.916	3.970	27.230	27.133	27.013	26.870
T ₁	65% Wood apple + 35% Dates +100gm sugar	3.200	2.773	2.560	1.706	3.916	4.016	4.060	4.130	26.253	26.156	26.030	25.946
T ₂	50% Wood apple+ 50% Dates +100gm sugar	2.986	2.346	2.133	1.496	3.730	3.806	3.846	3.920	26.496	26.366	26.286	26.160
T ₃	35% Wood apple +65% Dates +100gm sugar	2.986	2.133	1.920	1.280	3.896	3.956	3.993	4.070	26.763	26.530	26.466	26.383
T ₄	65% Wood apple +35% Dates +150gm sugar	2.986	2.560	2.133	1.493	4.043	4.106	4.166	4.243	27.060	26.980	26.916	26.803
T ₅	50% Wood apple +50% Dates +150gm sugar	2.133	1.920	1.706	1.066	3.716	3.816	3.880	3.916	26.850	26.606	26.506	26.166
T ₆	35% Wood apple +65% Dates +150gm sugar	3.200	2.773	2.346	1.920	3.816	3.850	3.900	3.963	26.386	26.260	26.210	26.950
T ₇	65% Wood apple +35% Dates +200gm sugar	1.706	1.280	1.280	1.066	3.613	3.673	3.730	3.793	26.473	26.233	26.190	26.113
T ₈	50% Wood apple +50% Dates +200gm sugar	2.560	2.133	1.920	1.493	3.863	3.880	3.926	4.003	26.550	26.440	26.346	26.200
T ₉	30% Wood apple +65% Dates +200gm sugar	2.773	2.133	1.493	1.066	3.786	3.896	3.920	4.020	26.220	26.116	26.056	26.996
T ₁₀	65% Wood apple +35% Dates + 250 gm sugar	1.920	1.280	1.066	0.853	3.720	3.786	3.843	3.916	26.353	26.176	26.036	25.990
T ₁₁	50% Wood apple+50% Dates +200gm sugar	1.493	1.280	1.066	0.640	3.750	3.770	3.803	3.876	26.573	26.400	26.290	26.110
	F-test	S	S	S	S	S	S	S	S	S	S	S	S
	S.Ed±	0.100	0.100	0.085	0.126	0.100	0.100	0.085	0.126	0.167	0.200	0.252	0.263
	C.D. at 5%	0.591	0.564	0.564	0.591	0.185	0.187	0.206	N.S	0.364	0.426	0.514	0.556

Conclusion

The mixing of wood apple and dates pulp in ratio of T₆ (35% wood apple + 65% Dates) with (150gm sugar) was found the best during storage period of 90 days. Hence, it is clear that both the fruits are suitable for the preparation of mixed fruit jam with good quality and high nutritive value. The cost involved was also low. So, this recipe can be recommended for making of quality wood apple and dates mixed fruit jam.

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