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DEVELOPMENT OF PLUM LEATHER FORTIFIED WITH HONEY

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Abstract

Fruit leather is a high-nutrient, dehydrated fruit product made with plum puree and other preservatives like pectin and honey that is eaten as a snack. Plums are a great way to get nutrition. The goal of the current study was to create plum leather by using pectin and honey.

Plum puree and honey were combined in different amounts to make plum leather. 99%, 89%, 79%, and 68% of the plum puree was incorporated. A total of three samples (T1, T2, and T3) were prepared. T3 was the most acceptable and best-treated of the three samples. The T3 sample was made with 30% honey and 68% plum puree. The highest acceptability score for the best sample is 7.9. The T3 plum leather sample can be stored at room temperature for 180 days.

Key Words:

Plum, Leather, Puree, Honey

Introduction

Plum (*Prunus domestica L*), or European plum, is a member of the *Rosaceae* family of the genus Prunus and the subfamily *Amygdaloideae* Blazek, (2004)

India's states that produce the most plums include Punjab, Haryana, Uttarakhand, Jammu & Kashmir, Himachal Pradesh, and Uttar Pradesh. The largest producer of plums in the country, Uttarakhand, contributes 44.04% of the total, with Plum HP coming in second with 25% and J&K with 9.93%. In Ganderbal and Poonch districts of J&K state, plum is extensively grown for commercial purposes. There are 262 and 1397 hectares of plum land under cultivation, respectively, yielding a total of 1611 and 1750 MT of plum per year. From an area of 4038 hectares, the state of J&K produced 10112 MT of plums overall in the 2016–2017 year. (National Horticulture Board). Prunes and fruit drinks (cocktail and brandy) are made from *Prunus domestica*. Prunes have the largest amount of sorbitol (15 g) of any fruit product. Because of its relatively high pectin content, *Prunus insititia* is used specifically to manufacture jams and jellies, while *Prunus salicina* is primarily consumed fresh. Plum fruit is often utilized in meat dishes and bread goods. Somogai *et al.*, (2005)

Due to their concentrated content of vitamins, minerals, and phytochemicals, plums are low in calories. Plums' mineral content rises as the fruits ripen. Birwal *et al.*, (2017)

In Ayurvedic and Unani medicine, plums are a staple ingredient in natural remedies that are widely used to treat miscarriage, irregular menstruation, and leucorrhoea. Plums are a dietary component that has been shown in numerous studies to promote health. Igwe & Charlton, *et al.*, (2016) Consuming fruits such as prunes and plums is linked to a decreased risk of type 2 diabetes. Low-GI (glycaemic index) foods assist regulate the rise and fall of blood insulin levels after meals. People with diabetes are therefore advised to eat low-GI foods. Eating dried plums during a fast could help lower insulin and plasma glucose levels, according to a human study. People with diabetes may benefit from eating





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plums, but you should always speak with your doctor before utilizing any fruits or vegetables, especially for serious diseases like diabetes. Stacewicz *et al.*, (2013)

Plum fruits are often used to make mixed fruit jams and jellies. Late variants have a higher dry matter content and a better acid-sugar balance. They are therefore more appropriate for the use than early ripening. Rein *et al.*, (1988)

Fruit leathers are fruit products that have been dried and are used as desserts or snacks. These are flexible sheets with a strong fruit flavor and some nutritional benefits. The majority of fruit leathers are made by combining fruit puree with additional ingredients such as sugar, pectin, acid, glucose syrup, colour, and potassium metabisulphite, and then drying them in a certain different way. Diamante *et al.*, (2014)

California and the Pacific Northwest produce almost 75% of the dried prunes used worldwide. While sun-drying was popular in the past, they are now primarily dehydrated to avoid spoiling in the rain. The majority of the French prune and Imperial sugar cultivars are chosen to be dehydrated. Prunes and plums that have been dried are cleaned with air blast and water sprays, dipped in cold or hot water, and then spread out in a single layer on trays before being dried in a forced-air dryer until they contain just 18% moisture. Salunkhe, D. K *et al.*, (1995)

The only naturally occurring substance created from insects, honey has uses in industry, cosmetics, medicine, and nutrition.Bansal V *et al.*, (2005)

India is predominantly an agricultural nation, with over 74% of its people employed in this sector. Tribal people that rely on forest resources for their livelihood in hills and forests focus on beekeeping as a means of producing honey. The sweetest and healthiest natural food is honey, which has long been in high demand. A product of agro horticulture is honey. Beula & Anandhy *et al.*, (2020)

Honey, glucose, and sucrose readings are comparable in those with type 2 diabetes. When compared to dextran, honey can dramatically lower plasma glucose levels in diabetic patients. Samanta *et al.*, (1985)

Materials and Methods

The present study entitled "Development of plum leather fortified with honey" was carried out in the Department of Food Technology at D.Y Patil Agriculture and Technical University, Talsande, Kolhapur, in 2024.

Material

Procurement of raw material

All ingredients required for Plum leather preparation i.e. Plum, honey, pectin were procured from the local market of Kolhapur.

Utensils and equipment.

All utensils and equipments required for plum leather preparation i.e stainless steel container, stirrer, grinder, weighing balance, tray drier, glasswares like petri plates, beaker, conical flask, stirrer, pH meter, autoclave, hot air oven, etc, were used and procured from Department of Food Technology, D.Y Patil Agriculture and Technical University, Talsande, Kolhapur.

Methodology Process Optimization

Plum puree Maintain TSS (17°B) Addition of pectin Maintain TSS (19°B)



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Addition of honey Pouring in plates Tray drying (70°C) Cutting of leather Storing in air tight container

Fig: Flow diagram of Preparation of Plum Leather

The flowing tap water was used to wash the fully ripened fruits. After removing the seeds, the fruits were steam-blanched for ten minutes at 75-80°C. After allowing the plums to cool slightly, they were mixed into a fine paste using a food processor. The mixture was then transferred into a big bowl. After blending the plum puree, the TSS was maintained throughout the process of adding pectin and then adding honey again. The completed sample was poured into trays to dry, the leather was tray dried at 70°C until it reached the required temperature. The leather was cut into the appropriate shapes before being stored in an air tight container.

Sample	Plum Puree	Honey	Pectin
T ₀	99.5%	0%	0.5%
T1	89.3%	10%	0.7%
T ₂	79%	20%	1%
T ₃	68.5%	30%	1.5%

Table 1: Formulation of plum leather.

Prunus Domestica L. Variety of plum was used for preparation of plum leather. Plum puree was optimized and was incorporated in honey and pectin. The treatments are shown in table 1 and explained below.

 T_0 sample will be kept as a control sample where 99.5% plum puree was incorporated with 0.5% pectin without addition of honey.

 T_1 sample contains 89.3% plum puree and incorporated in 10% honey and 0.7% pectin. T_2 sample contains 79% plum puree and incorporated in 20% honey and 1% pectin. T_3 sample contains 68.5% plum puree and 30% honey and 1.5% pectin.

Sensory Evaluation:

Sensory evaluation of plume leather was carried out by Semi trained judges from the Department of Food Technology, D.Y Patil Agriculture and Technical University, Talsande, Kolhapur. By using a 9 point hedonic scale as per standard procedure reported by Stone and Sidel (2004).

Physicochemical Analysis:

Total solids, ash, fat, protein, titratable acidity, Vit C, Moisture, Protein were analyzed by the following standard methods as explained in A.OA.C (2001).

Statistical analysis:

Randomized Block Design (RBD) was utilized to analyse the sensory evaluation data and demonstrated by Mahony (1985). and the mean value of the sample's physicochemical analysis from



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three replications was used for statistical analysis based on analysis variance (ANOVA) and standard deviation (SD) computation Mahony (1985).

Results & Discussion

The results obtained during study are presented in following headings:

Chemical Characteristics of fresh plum fruit

Table 2: Plum Chemical Compositions			
Nutrients	Value		
Moisture	84.5 ±0.29%		
Ash	8.68±0.023%		
Protein	$0.61 \pm 0.005\%$		
Fat	8.11±0.055%		
рН	3.81±0.01%		
Vit C	0.88±0.01%		
Acidity	0.62±0.01%		

*Each value is the average of three replicas.

Table 2 presents the chemical composition of plum fruit, which includes 3.81 ± 0.01 pH, $0.62\pm0.01\%$ acidity, $0.61\pm0.005\%$ protein, $8.11\pm0.055\%$ fat, and $84.51\pm0.291\%$ moisture. Comparable outcomes were noted by Singh *et al.*, (2019) and Celik *et al.*, (2017).

Sensory Evaluation:

Sensor analysis was done by semi trained judges of Department of Food Technology, D.Y Patil Agriculture and Technical University, Talsande, Kolhapur.

Sensory analysis of best treatment and control sample was described in Table 3.

Table 3: Sensory analysis of Plum leather

	Control (T ₀)	(T ₃)
Appearance	7.17	7.85
Flavor	6.57	7.71
Texture	6.54	7.50
Mouthfeel	6.46	7.78
Overall Acceptance	6.8	7.9

Table 3 presents the results of the sensory analysis of plum leather. The sample T_3 , which contained 68.5% plum puree, 30% honey, and 1.5% pectin, was rated as best out of the four samples. The sample T_0 , which contained 99% plum puree and 0.5% pectin, received the lowest ratings. The T_3 sample received ratings of 7.85 for appearance, 7.71 for flavour, 7.50 for texture, 7.78 for mouthfeel, and an overall acceptability of 7.9 due to the increase in honey percent. The sample was selected as best because of the increase in honey percent, as all judges were impressed by its appearance, taste, and texture. The sample T_0 received the lowest ratings because it contained no honey and the judges disliked the somewhat sour taste of the fruit. It received ratings of 7.17 for appearance, 6.57 for flavour, 6.75 for texture, 6.46 for mouthfeel, and 6.8 for overall acceptance.

Physico Chemical analysis of plum leather

Table 4: Physico Chemical analysis of leather

Nutrients	(T ₀) control	Τ3
Protein	2.83±0.005	3.15±0.011
Moisture	9.85±0.041	6.97±0.01
Total Soluble Solids	19±0	35±1
Ash	3.75±0.005	1.31±0.005
Fat	7.81±0.005	9.42±0.001





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рН	3.51±0.01	3.61±0.01
Titratable acidity	3.13±0.02	2.24 ± 0.03
Vit C	0.520±0.0006	0.591±0.0006

*Each value is the average of three replicas.

The physico chemical characteristics of plum leather for the final sample (T₃) and the control sample (T₀) are shown in table 4. As honey was added to the final sample, its protein content increased. As the product was exposed to heat, the moisture level dropped, extending the leather's shelf life. The product's moisture content may have contributed to the rise in total soluble solids (TSS), hence the amount of TSS was raised. There was a decrease in ash and titratable acidity. When the leather was being prepared, there was an increase in the pH and vitamin C concentration. Because plum puree and honey were added, it was found that the final sample (T₃) had greater nutritional additions.

Similar results were seen in Mir and Nirankarnath et al., (1993), Singh et al (2019), Chavan (2015)

Conclusion

The current study entitled "Development of plum leather fortified with honey" was evaluated by varying honey concentrations in plum leather. It was observed increase in fat, protein, pH, total soluble solids, and vitamin C whereas Moisture, Ash, and Titratable Acidity had decreased. For a duration of six months, plum fruit leather can be stored at room temperature without experiencing any degradation. When it comes to its sensory properties, plum leather with 68% plum puree and 30% honey was the ideal blend for producing premium plum leather.

Conflict of interest.

The authors state they have no competing interests or conflicts of interest.

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