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Short Note

Standardization of recipe for the preparation of instant dried wild pomegranate chutney

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Abstract

Wild pomegranate occurring naturally in drier and sub marginal lands of mid hill region of outer Himalaya, is too acidic which cannot be used for table purpose. Therefore, studies were conducted to standardize a recipe for the preparation of instant chutney mix from freshly dried as well as stored dried pomegranate arils using different ingredients. Pre-treated arils were dried in a cabinet drier till their constant weight in a mechanical cabinet drier (60±2°C) and converted into powder. Instant chutney mix prepared either from freshly dried arils or best quality six month stored dried arils using recipe (R_4) i.e. dried aril powder (26g), mint leave powder (2g), sugar powder (49g), common salt (12.5g), onion powder (4g), garlic powder (1g), ginger powder (1g), black pepper powder (1g), cumin powder (2g), cinnamon powder (1g), red chilli powder (2g), cardamom powder (2g), coriander leaves powder (2g) and clove powder (1g) were adjudged best on the basis of their physico-chemical and sensory qualities.

Key words: Wild pomegranate, dried arils, chutney, instant chutney mix, sensory evaluation.

Wild pomegranate (*Punica granatum* L.) is one of the important wild fruit containing good amount of organic acids and minerals like phosphorus, calcium, potassium and iron (Parmar and Kaushal, 1982). It is widely distributed in drier and sub marginal land of mid hill region of outer Himalaya at an elevation of 900 to 1800 m above mean sea level. In India, it grows in the hilly slopes of Jammu and Kashmir, Himachal Pradesh and Uttarakhand. However, it is found growing wild in some parts of Solan, Sirmour, Mandi, Shimla, Kullu and Chamba districts of Himachal Pradesh (Bhrot, 1998).

The fruit is laxative and its arils are used for curing vomiting, biliousness, sore throat, sore eye, brain diseases, spleen complaints, chest troubles, scabies, bronchitis, ear ache, liver and kidney disorders (Saxena *et al.*, 1987). Wild pomegranate occurring in nature is too acidic which cannot be used for table purpose but can be a good souring agent for use in chutneys, curries and other culinary preparations in dried form. Keeping the above observations in view, the present investigation was undertaken to standardize a recipe for preparation of palatable and acceptable instant wild pomegranate chutney.

Pre-treatment and drying of arils

The arils of wild pomegranate were extracted manually and arils were steam blanched for 30 sec. and further fumigated with 0.3% sulphur for 60 min in sulphur fumigation chamber as suggested by Bhat (2007). Pre-treated arils were dried in a cabinet drier till their constant weight in a mechanical cabinet drier (60±2°C) for further studies.

Preparation of instant chutney mix

Instant chutney mix was prepared from the freshly dried wild pomegranate arils by adding different ingredients. All the ingredients were dried and ground into powder form before mixing. A standard recipe was worked out from seven different combinations (Table 1) made by varying the amount of wild pomegranate arils powder and keeping the amount of other ingredients like powdered mint and coriander leaves, sugar, salt, onion, garlic, ginger, black pepper, cumin, cinnamon, red chilli, clove and cardamom as constant. The instant chutney mix was again prepared from the best quality six month stored arils, by following the same recipe. Dried chutney powder mix was reconstituted with lukewarm water in the ratio of 1:2 and allowed to stand for 10 min prior to serving.

Analysis

Random samples of fruits of wild pomegranate (15 No's) were selected and used to study the various parameters. The size of selected fruits was determined by measuring the length

Table 1. Composition of recipes of wild pomegranate instant chutney mix

Ingredients	Recipe						
	1	2	3	4	5	6	7
Wild pomegranate powder (g)	23	24	25	26	27	28	29
Mint leaves powder (g)	2	2	2	2	2	2	2
Sugar powder (g)	49	49	49	49	49	49	49
Common salt (g)	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Onion powder (g)	4	4	4	4	4	4	4
Garlic powder (g)	1	1	1	1	1	1	1
Ginger powder (g)	1	1	1	1	1	1	1
Black pepper powder (g)	1	1	1	1	1	1	1
Cumin powder (g)	2	2	2	2	2	2	2
Cinnamon powder (g)	1	1	1	1	1	1	1
Red chilli powder (g)	2	2	2	2	2	2	2
Cardamom powder (g)	2	2	2	2	2	2	2
Coriander leaves powder (g)	2	2	2	2	2	2	2
Clove powder (g)	1	1	1	1	1	1	1

and diameter, and the average size was expressed in millimeter. The arils from randomly selected fruits were counted individually and average number of arils per fruit was calculated. The aril: pomace ratio was calculated by dividing weight of aril by the rind and other inedible portion. Time taken to dry a given tray load was calculated by recording the time (h) required by the material in the tray to attain a constant weight after drying. Total Soluble Solid (TSS) contents of pomegranate fruit and dried arils were measured by hand refractometer. Sugars were estimated by Lane and Eynon method as given by Ranganna (1997). The moisture, total solids, titratable acidity (citric acid), pH, ascorbic acid, sugar-acid ratio, starch, total anthocyanins and ash content in pomegranate fruit and dried arils were estimated as per standard procedures described by Ranganna (1997).

The sensory evaluation of the products was conducted by a panel of 10 semi-trained judges on the basis of colour, consistancy, taste, aroma and overall acceptability, on a 9 point Hedonic scale according to the method of Ranganna (1997). Statistical analysis of data of various atributes including physico-chemical characteristics was carried out by completely randomised design (CRD) (Mahony 1985) and sensory analysis by randomised block design (RBD) (Cochran and Cox 1967).

Physico-chemical characteristics of wild pomegranate fruit, dried arils are presented in Table 2. Perusal of data revealed that wild pomegranate fruit as well as dried arils are rich source of citric acid (3.96%, 13.72%) and other bioactive substances like phenols (89.78, 110.70 mg/100g). All physico-chemical characteristics of the fruit and aril were within the ranges as described by various workers from time to time (Parmar and Kaushal 1982; Sharma and Sharma 1990; Chauhan *et al* 1994 and Kher 1999). The slight differences recorded might be due to the age of the plant, soil moisture conditions of the area from where the samples were procured.

Data presented in Table 3, depict the chemical and sensory characteristics of wild pomegranate-mint instant chutney mix recipes prepared from freshly dried arils. It is clear that maximum values of TSS (60.0J °B), titratable acidity (3.17 %) and rehydration ratio (2.18) were recorded in recipe R_7 which were significantly higher than rest of the recipes. Maximum reducing and total sugar content of 24.69 and 54.34 per cent were recorded in the recipes R_1 and R_7, respectively, whereas, recipes R_7 and R_1 recorded the minimum (22.98 and 51.16 %) values for the same characteristics, respectively. Maximum (19.60) and minimum (18.08) sugar: acid ratio was recorded in recipes R_1 and R_7, respectively.

It is also evident from the data presented in the same table that among different recipes prepared, a non-significant difference in colour was observed. However, maximum scores for

consistency (7.90), taste (8.50), aroma (8.00) and overall acceptability (7.92) were awarded to recipe R_4, whereas, recipes R_5, R_6 and R_7 were found at par with R_4 with respect to colour and consistency scores only.

Table 2. Physico-chemical characteristics of wild pomegranate fruit and dried arils

Characteristics	Wild pomegranate fruit (Mean ± S.E.)	Dried wild pomegranate arils
Size		
a) Length	58.94 ± 1.58	-
(mm)	46.40 ± 1.00	
b) Diameter		
(mm)		
Weight (g)	64.00 ± 3.20	-
Number of arils/fruit	225.20 ± 14.18	-
Weight of arils/fruit (g)	33.20 ± 2.50	-
Arils : pomace ratio	1.08 ± 0.08	-
Moisture (%)	72.31 ± 0.20	9.00
TSS (°B)	20.08 ± 0.081	39.6
Reducing sugars (%)	7.07 ± 0.17	21.20
Total sugars (%)	7.28 ± 0.16	24.20
Titratable acidity (% Citric acid)	3.96 ± 0.04	13.72
pH	2.55 ± 0.01	3.61
Ascorbic acid (mg/100g)	21.08 ± 0.38	12.10
Anthocyanins (mg/100g)	7.37 ± 0.10	33.08
Phenols (mg/100g)	89.78 ± 3.26	110.70
Ash (%)	0.91 ± 0.12	4.25

Thus, Instant chutney mix prepared from the freshly dried arils of wild pomegranate showed that out of seven recipes, recipe R_4 was adjudged as the best on the basis of maximum scores of consistency, taste, aroma and overall acceptability. This might be due to good sugar: acid blend of this recipe which leads to more acceptable taste and aroma and appropriate quantity of the dried fruit proportion which contributed for the good consistency and acceptability of the product. No significant difference in the scores of colour observed among different recipes might be due to the masking effect of the colour of this product by equal quantities of spices and mint. However, maximum values for TSS, titratable acidity, reducing and total sugars and sugar: acid ratio were not found in recipe R_4, but it might be due to the appropriate and desirable blend of these chemical constituents which contributed to its maximum acceptability. Similar observations were also observed by various workers viz. Chauhan *et al* (1994) and Guleria (2005) while preparing instant pomegranate chutney using different ingredients; Sharma (1996) in dehydrated apple powder based chutney mix.

Data appended in Table 4 regarding the chemical and sensory characteristics of wild pomegranate-mint instant chutney mix recipes prepared from the best quality 6 months stored arils reveal that the maximum values of 59.20 °B, 3.10 per cent and 2.11 for TSS, titratable acidity and rehydration ratio, respectively, were observed in recipe R_7 which were significantly higher than rest of the recipes, whereas, the minimum values for the same characteristics were recorded in R_1. Maximum reducing (24.90 %) and total (57.20 %) sugars were recorded in the recipes R_1 and R_7, whereas, minimum reducing (23.07 %) and total (51.01 %) sugars were observed in R_7 and R_1, respectively. Sugar: acid ratio varied from a maximum value of 20.45 in recipe R_2 to a minimum value of 18.45 in R_7.

Further, it is clear from the data in the same table that recipe R_4 was awarded significantly maximum scores for colour (6.90), consistency (7.20), taste (7.50), aroma (7.50) and overall acceptability (7.27). However, the recipes R_5, R_6 and R_7 were found at par with R_4 with respect to colour and consistency scores.

Among the different recipes of instant chutney mix prepared from the best quality 6 months stored arils (arils packed in aluminium laminated pouches under refrigerated conditions), recipe R_4 achieved maximum scores for colour, consistency, taste, aroma and overall acceptability, which might be due to the good sugar: acid blend maintained by this recipe which contributed to more acceptable taste and aroma and appropriate quantity of the dried fruit which contributed for the good consistency and acceptability of the product.

While comparing the chemical and sensory characteristics of instant chutney mix of recipe R_4 prepared from the freshly dried as well as 6 months stored arils (Table 5), non-significant differences in the TSS of chutney was observed, which might be due to insignificant changes in the

soluble solids of dried arils during storage. Significant differences with respect to titratable acidity, reducing and total sugars, sugar: acid ratio, rehydration ratio, colour, consistency, taste, aroma and overall acceptability might be attributed to the slight changes in chemical and sensory characteristics of dried arils during storage, the product was still acceptable which can be clearly seen from the negligible differences in all these characteristics from the respective tables.

It can be concluded from the present studies that R_4 was the best recipe for the preparation of dried instant chutney mix from the fresh as well as 6 months stored arils on the basis of some best physico-chemical and sensory characteristics of the chutney.

Table 3. Chemical and sensory characteristics of wild pomegranate instant chutney mix recipes prepared from the freshly dried arils

C / R	Chemical characteristics						Sensory characteristics				
	TSS (°B)	TA (%)	RS	TS	S : A ratio	Re-hydration ratio	Colour	Consistency	Aroma	Taste	Overall acceptability
R_1	54.00	2.61	24.69	51.16	19.60	1.90	7.10	7.40	7.20	7.10	7.20
R_2	55.00	2.65	24.10	52.28	19.73	1.94	7.20	7.40	7.50	7.10	7.30
R_3	56.00	2.87	23.86	53.67	18.70	1.98	7.20	7.40	7.50	7.30	7.35
R_4	57.00	2.97	23.52	54.94	18.49	2.04	7.30	7.90	8.00	8.50	7.92
R_5	58.00	3.01	23.37	55.18	18.33	2.10	7.30	7.90	7.10	8.00	7.57
R_6	59.00	3.12	23.10	56.72	18.17	2.14	7.30	7.90	7.10	7.60	7.47
R_7	60.00	3.17	22.98	57.34	18.08	2.18	7.30	7.90	6.70	7.50	7.35
CD (P= 0.05)	1.15	0.03	0.02	0.03	0.03	0.03	NS	0.10	0.09	0.09	0.02

R= Recipe, C= Characteristics, TSS= Total soluble solids, TA=Titratable acidity, TS= Total sugars, RS=Reducing sugars

Table 4. Chemical and sensory characteristics of wild pomegranate instant chutney mix recipes prepared from the stored arils

C / R	Chemical characteristics						Sensory characteristics				
	TSS (°B)	TA (%)	RS	TS	S : A ratio	Re-hydration ratio	Colour	Consistency	Aroma	Taste	Overall acceptability
R_1	53.60	2.52	24.90	51.01	20.24	1.86	6.50	7.00	6.70	6.60	6.70
R_2	54.20	2.55	24.25	52.15	20.45	1.91	6.60	7.00	7.00	6.70	6.82
R_3	55.40	2.75	23.97	53.50	19.45	1.94	6.70	7.00	7.00	6.80	6.87
R_4	56.60	2.80	23.70	54.78	19.56	1.97	6.90	7.20	7.50	7.50	7.27
R_5	57.40	2.92	23.48	55.00	18.83	2.04	6.90	7.20	6.50	7.00	6.90
R_6	58.40	3.00	23.20	56.55	18.78	2.08	6.90	7.20	6.50	6.80	6.85
R_7	59.20	3.10	23.07	57.20	18.45	2.11	6.90	7.20	6.00	6.80	6.72
CD (P= 0.05)	0.30	0.02	0.03	0.03	0.03	0.02	0.20	0.10	0.07	0.13	0.10

R= Recipe, C= Characteristics, TSS= Total soluble solids, TA=Titratable acidity, TS= Total sugars, RS=Reducing sugars

Table 5. Comparison of chemical and sensory characteristics of wild pomegranate instant chutney mix (R_4) prepared from freshly dried and stored arils

Characteristics	Freshly dried arils	Stored dried arils	t_{cal}
Chemical			
TSS (°B)	57.00	56.60	1.26
Titratable acidity (%)	2.97	2.80	24.04
Reducing sugars (%)	23.52	23.70	40.24
Total sugars (%)	54.94	54.78	17.88
Sugar: acid ratio	18.49	19.56	107.00
Rehydration ratio	2.04	1.97	9.89
Sensory			
Colour	7.30	6.90	5.65
Consistency	7.90	7.20	12.64
Taste	8.50	7.50	22.13
Aroma	8.00	7.50	22.36
Overall acceptability	7.92	7.27	20.45

t_{tab} = 2.31 [8df (at 5% level of significance)]

References

Bhat MM 2007. Standardization of drying technology of wild pomegranate (*Punica granatum* L.) for product development. M Sc Thesis, Dr YS Parmar UHF, Nauni, Solan (unpublished).

Bhrot NP 1998. Genetical analysis of wild pomegranate (*Punica granatum* L.) for some growth, ecological and quality characters. Ph D Thesis, Dr YS Parmar UHF, Nauni, Solan (unpublished).

Chauhan SK, Lal BB and Sharma R 1994. Development of instant dehydrated wild pomegranate chutney. J. Food Sci. Technol. **31**(1): 58-59.

Cochran WG and Cox CM 1967. Experimental Design, John Wiley and Sons, New York, pp 171-217.

Guleria SPS 2005. Advances in processing of fruits and vegetables. In: *Advances in postharvest management of agricultural produce*, BVC Mahajan, AS Dhatt, Gagan Deep Singh, KS Sandhu and Satish Kumar (eds), Punjab Agricultural University Campus, Ludhiana, pp 201-15.

Kher R 1999. Note on the physico-chemical characters of wild pomegranate (*Punica protopunica* L.). Annals Biol. **15**(2): 231-32.

Mahony MO 1985. Sensory evaluation of food: statistical methods and procedures. Marcel Dekker, New York. pp 168-169.

Parmar C and Kaushal MK 1982. Wild fruits of sub-Himalayan region, Kalyani Publishers, New Delhi, 74 p.

Ranganna S 1997. Handbook of analysis and quality control for fruit and vegetable products, Tata McGraw Hill, New Delhi, p 1112.

Saxena AK, Manan JK and Berry SK 1987. Pomegranates: postharvest technology, chemistry and processing. Indian Food Packer **41**: 43-60.

Sharma KD 1996. Osmo-processing studies in apple grown under different agroclimatic conditions of HP. Ph D Thesis, Indian Agricultural Research Institute, New Delhi ((unpublished).

Sharma SD and Sharma VK 1990. Variation of chemical characters in some promising strains of wild pomegranate (*Punica granatum*). Euphytica **49**: 131-33.