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## RESEARCH ARTICLE

### STANDARDIZATION AND PREPARATION OF VALUE ADDED PRODUCTS FROM POMEGRANATE FRUITS (ANARDANA AND MOUTHFRESHNER)

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#### ABSTRACT

The present investigation was carried out to standardize the recipe for preparation of pomegranate anardana powder by using selected processing techniques and explore the prepared anardana powder with spices in mouth freshner. Further mouth freshner was evaluated for nutritional, organoleptic quality and Techno-economic feasibility. Study revealed that the ascorbic acid, protein and fat content of anardana prepared from Ganesh and Arakta variety were 6.7mg/100g and 7 mg/100g, 1.3 percent and 1.4 percent and 0.91 and 0.92 percent respectively. The mouth freshner was prepared by sun drying and cabinet drying. For acidity, sample of Ganesh and Arakta prepared by sun drying had highest acidity i.e. 1.4% and 1.6% respectively. For cabinet dried sample of Ganesh and Arakta cultivars 1.3% and 1.5% respectively. Ascorbic acid content was higher in cabinet dried sample (6.7 mg/100g and 7 mg/100g) for both cultivars. Whereas in sun dried samples of Ganesh and Arakta varieties ascorbic acid content was 6 mg/100g and 6.5 mg/100g respectively. In organoleptic evaluation of pomegranate mouth freshner of Ganesh variety prepared by cabinet drying scored highest score for overall acceptability than others. The effect of storage (ambient) temperature on quality of mouth freshner of Ganesh variety dried by cabinet drying was studied and found acidity and ascorbic acid were decreased during storage period. The cost of 100g pomegranate mouth freshner was Rs. 55/-, with energy value 134.19 Kcal/100g. Hence this product could be recommended for commercial exploitation.

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#### INTRODUCTION

Pomegranate is an important crop for dry land areas in India. The two varieties i.e. Ganesh and Arakta were used for the present study. Kandhari/ Arakta which is large sized with deep red rind, arils dark blood red, hard seeds and slightly bitter juice. And Ganesh variety with Medium sized; soft seeds; pinkish flesh and juice with agreeable taste. Generally these fruits are used for table purpose; however they are also processed into varieties of products like juice, squash, syrup, wine, anar-rub and anardana (La Rae, 1969). The special structure of fruit is one of main factors which limit its industrial processing. The fruits can be preserved and processed into different products like juice, squash, syrup, jelly, wine, anardana and canned beverages. In Northern India a major use of the wild fruits is for the preparation of 'anardana'-the juice sacs being dried in the sun for 10-15 days and then sold as a spice (Kingsly *et al.*, 2006). Since last few years, many types of gutka have been introduced in the market and they have become very popular. Many varieties of paan or gutka are available in the market with many ingredients including chewing tobacco. Excessive consumption of tobacco is dangerous as it may cause cancer. Even non-tobacco varieties are harmful in the long run with many side effects. Any mouth freshner is a mixture of nuts, seeds, herbs, and spices which is served after meals in India. The ingredients in mouth freshner or pan masala vary widely, depending on personal taste and region. When chewed, the ingredients in the mouth freshner or pan masala help to fresh the breath, and they are also said to aid digestion, which can be very useful after eating ferociously spicy food which might upset the stomach. The tradition of chewing breath fresheners after meals is ancient, and it has a very long history in

India in particular. Some mouth freshner or pan masala mixtures even have herbs and spices with antibacterial properties, mouth freshner or pan masala also sometimes includes stimulant herbs to give people energy after eating. Commercialization of process technology and pomegranates products in market is very important to improve economy. Knowing the importance of health benefits of pomegranate and all related aspects, the present investigation entitled "Studies on utilization of pomegranate fruits for preparation of Value Added Products (Anardana and mouthfreshner)" was carried out to standardize the recipe for preparation of pomegranate anardana powder by using selected processing techniques and explore the prepared anardana powder with spices in mouth freshner. Further efforts were made to evaluate the quality of prepared mouth freshner enriched with spices for their nutritional and organoleptic quality. Techno-economic feasibility of mouth freshner was also assessed.

#### MATERIALS AND METHODS

Pomegranate fruits of cultivars Ganesh and Arakta were selected from local market. The fruits of uniform size, colour and maturity were selected by visual observation and used as experimental material. Spices like cardamom, clove, fennel and other material required for preparation of different products were procured from local market.

- Proximate Analysis of anardana and mouth freshner: Prepared anardana and mouth freshner were analyzed for its chemical quality by standard methods (AOAC, 1990).
- Sensorial Analysis: Sensory analysis of prepared products was performed by using standard method (Amerine *et al.*, 1987).
- Statistical analysis: The analysis of variance of the data obtained was done by using Completely Randomized Design (CRD) for different treatments as per the methods given by Panse and Sukhatme (1967). The analysis of variance revealed

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at significance of P < 0.05 level, S.E. and C.D. at 5 % level is mentioned wherever required.

**Product development**

**Preparation of Anardana Powder**

For preparation of the dried pomegranate anardana, arils from fruit were separated manually and dried by using two drying methods viz., Sun drying (SD) and cabinet drying (CD) until constant weight and further milled in domestic mixer to get anardana powder.

**Preparation of Pomegranate Mouth Freshner: Recipe**

Ingredients	Quantity (g)
Anardana powder	= 100
Cardamom powder	= 5
Clove powder	= 3
Fennel powder	= 4
Black salt	= 1
Mint powder	= 0.1

After standardizing the levels of desired spices, like cardamom, clove, fennel and black salt were added to anardana powder at 5 percent, 3 percent, 4 percent and 1 percent respectively and mixed properly. Levels of spices were selected on the basis of organoleptic evaluation. Then by weighing specific i.e. 0.5gm of powder, pomegranate mouth freshner was prepared which look like flavored balls/tablets by pressing between thumb and finger followed by rolling over palm of hand. Standardized recipe for preparation of pomegranate mouth freshner is given as follows

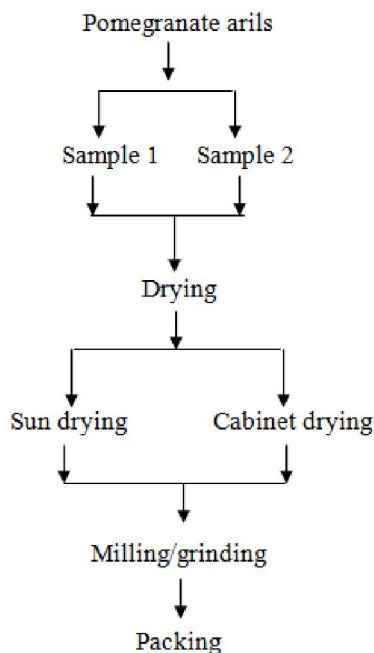


Fig 1.Flow sheet for Anardana Powder (AP)

**Storage Studies of Pomegranate Juice and Pomegranate Mouth Freshner**

Pomegranate mouth freshner was analyzed for various attributes on every 15<sup>th</sup>, 30<sup>th</sup>, 45<sup>th</sup>, 60<sup>th</sup> day and shelf life studies were carried out for a period of 2 months.

**Assessment of Energy Value of value added products**

Theoretical energy value of the product was calculated on the basis of proximate chemical composition.

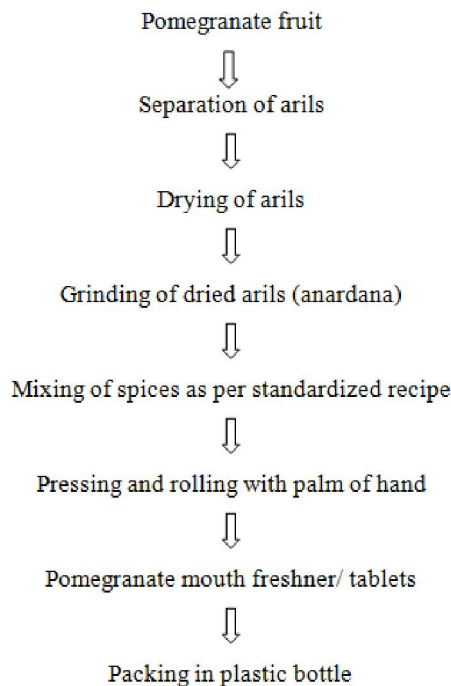


Fig 1.Flow sheet for Anardana Powder (AP)

**Assessment of Techno-Economical Feasibility**

The production cost of value added products prepared from pomegranate was calculated by considering the cost of raw material, processing and packaging cost.

**RESULTS AND DISCUSSION**

The data in Table 1 reveals that the moisture content of anardana prepared from cabinet drying of pomegranate arils of cultivar Ganesh was 10.20% and Arakta was 10.50%. While Acidity of anardana of Ganesh variety was 1.3% and 1.5% for Arakta variety. The ascorbic acid content was 6.70mg/100g for Ganesh cultivar and 7 mg/100g for Arakta cultivar. Total sugars evaluated for Ganesh and Arakta Cultivar were 30.20% and 30.50% respectively. Reducing sugar content for Ganesh cultivar was 29% and 29.52% for Arakta variety. Non-reducing sugar content for Ganesh cultivar was 1.20% and 0.98% for Arakta variety. It is observed that protein content in Ganesh and Arakta cultivar was 1.3 percent and 1.4 percent respectively. While fat content for both Ganesh and Arakta cultivar was 0.91 and 0.92 percent respectively. Similar results were reported by Garande *et al.*, (2004). It is seen from Table 2 that the pomegranate mouth freshner prepared from Ganesh and Arakta cultivar by using sun drying (SD) and cabinet drying (CD) contain moisture 14.20%, 10.20%, 15.00% and 10.50% respectively. The moisture content was higher in sun dried sample for both cultivars used. For acidity, sample of Ganesh and Arakta prepared by sun drying had highest acidity (1.4% and 1.6% respectively). While cabinet dried samples had acidity 1.3% and 1.5% for Ganesh and Arakta cultivar. Ascorbic acid content was higher in cabinet dried sample (6.7 mg/100g and 7 mg/100g) for both cultivars. Whereas in sun dried samples of both Ganesh and Arakta varieties ascorbic acid content was 6 mg/100g and 6.5 mg/100g respectively. Total sugar found in sample like G-SD, G-CD, A-SD and A-CD was 30 %, 30.20%, 30.25% and 30.50% respectively. The results of present investigation are well comparable with the results reported by Singh *et al.* (2009). It is observed from Table 3 that sample G-CD scored highest score for overall acceptability was 8.5 than A-SD, A-CD and G-SD 7, 8, and 7.5 respectively. The sample G-CD scored higher 8.5 for overall acceptability (OAA) among other samples may be due to colour of anardana of Ganesh Cultivar compared to Arakta cultivar.

**Table 1. Proximate composition of Anardana**

Variety	Parameter							
	Moisture (%)	Acidity (%)	Ascorbic acid (mg/100g)	Total sugars (%)	Reducing sugars (%)	Non-reducing sugars (%)	Protein (%)	Fat (%)
Ganesh	10.20	1.3	6.7	30.20	29.0	1.20	1.30	0.91
Arakta	10.50	1.5	7.0	30.50	29.52	0.98	1.40	0.92
S.E.	0.17	0.14	0.35	0.23	0.29	0.87	0.11	0.18
C.D.	0.68	0.57	0.13	0.90	0.11	0.34	0.45	0.71

**Table 2. Proximate Composition of Mouth Freshner**

Variety	Parameter					
	Moisture (%)	Acidity (%)	Ascorbic acid (mg/100g)	Total sugars (%)	Reducing sugars (%)	Non-reducing sugars (%)
Ganesh SD	14.20	1.40	6.0	30.0	28.50	1.5
Arakta CD	10.20	1.30	6.7	30.20	29.0	1.2
Ganesh SD	15.0	1.60	6.5	30.25	29.0	1.2
Arakta CD	10.50	1.50	7.0	30.50	29.52	0.98
S.E.	0.301	0.153	0.219	0.179	0.250	0.080
C.D.	0.981	0.499	0.715	0.583	0.814	0.260

SD:Sun drying CD:Cabinet drying

**Table 3. Sensory evaluation of pomegranate mouth freshner**

Sample Code	Sensory Attributes				
	Colour	Taste	Texture	Mouthfeel	Overall Acceptability
A-SD	6	7	7	7	7
A-CD	8	8	8.5	8	8
G-SD	7.5	7	7	7	7.5
G-CD	8.5	8	8.5	8	8.5
S.E.	0.52	0.38	0.28	0.28	0.37
C.D.	1.69	1.24	0.93	0.93	0.316

A-SD= Arakta- Sun Drying G-SD=Ganesh-Sun Drying A-CD=Arakta-Cabinet Drying G-CD=Ganesh-Cabinet Drying

**Table 4. Effect of storage (ambient) temperature on quality of mouth freshner**

Storage Period in Days	Parameter					
	Moisture (%)	Acidity (%)	Ascorbic acid (mg/100g)	Total sugars (%)	Reducing sugars (%)	Non-reducing sugars (%)
0 (Fresh)	10.20	1.30	6.70	30.20	29.00	1.20
15	10.15	1.28	6.50	30.22	29.10	1.12
30	10.10	1.23	6.20	30.25	29.25	1.0
45	10.0	1.20	6.00	30.28	29.32	0.96
60	9.80	1.18	5.80	30.30	29.40	0.90
S.E.	0.526	0.116	0.370	0.145	0.333	0.145
C.D.	1.657	0.368	1.165	0.458	1.028	0.458

**Table 5. Energy value of prepared products**

Energy value of 100g pomegranate mouth freshner	134.19 Kcal
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**Table 6. Cost of pomegranate mouth freshner**

Sr.No.	Particular	Quantity	Price Per Unit (Rs.)	Cost (Rs.)
1.	Anardana Powder	100g	40/100g	40/-
2.	Cardamom	5g	10/10g	5/-
3.	Clove	3g	10/10g	3/-
4.	Fennel	4g	25/100g	1/-
5.	Black salt	1g	5/10g	0.5/-
6.	Mint	0.5g	5/5g	0.5/-
7.	Total raw material cost			50/-
8.	Processing and Packaging cost @ 10% of raw material cost			5/-
9.	Production cost for 100g of pomegranate mouth freshner			55/-

Sample of both cultivars prepared by sun drying had minimum score may be due to dull colour developed due to non-enzymatic browning. These results are in accordance with cabinet dried apple as reported by Bhardwaj and Lal (1990). The data from Table 4 reveals that the moisture content of anardana was found to be decreased throughout the storage period. Initially it was 10.20% and 9.80% at the end of two months storage. Similarly it was noticed that acidity decreased from 1.3% to 1.18% at the end of storage. Similar results were reported by Pruthi and Saxena (1984). The ascorbic acid content was

creased from 6.7 mg/100gm to 5.8 mg/100gm during storage period. The reduction in ascorbic acid content might be due to oxidation during storage. The production cost of pomegranate mouth freshner is worked out in Table 6. After drying 1Kg of pomegranate arils 100g of anardana was prepared.

### Conclusion

It can be concluded that a good quality moth freshner can be prepared from pomegranate fruits. In case of preparation of anardana powder

cabinet drying method was found more effective than sun drying method. Pomegranate cultivar Ganesh is suitable for preparation of highly nutritive and palatable mouth freshner. Hence this product could be recommended for commercial exploitation.

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