Journal of
Environmental and Applied Bioresearch
Published online July 15, 2015 (http://www.scienceresearchlibrary.com)

ISSN: 2319 8745
Vol. 03, No. 03, pp. 133 - 136

Research Article **Open Access**

YIELD AND ACCEPTABILITY TRIAL OF MIX FRUIT JAMS FROM GOLA PEAR

Astuti Verma[1]* and Archana Kushwaha[2]

[1]Assistant Professor, Disha Institute of Science & Technology, Dhampur (Bijnor) -246761, Uttar Pradesh, India.
Email:astutiverma@gmail.com

[2]Professor, Department of Foods & Nutrition, College of Home Science, G.B. Pant University of Agriculture & Technology, Pantnagar-263145, Uttarakhand, India.

Received: June 18, 2015 / Accepted : June 22, 2015

Abstract

High seasonal production of Gola variety of pear (*Pyrus pyrifolia* cv. Gola) fruit in Uttarakhand hills has to be considered as an opportunity for its utilization. Mix fruit jams were prepared from Gola pear with different fruits (apple, peach, plum and mango). Four combinations were made by mixing fruits in the ratio of 50:50 viz. T_1 (pear + apple), T_2 (pear + peach), T_3 (pear + plum) and T_4 (pear + mango); whereas in fifth combination, T_5 (apple + peach + mango + plum + pear), 20 % of each fruit was taken. Fruit jams were prepared by standard method and subjected to organoleptic evaluation by preference ranking test to find out most acceptable mix fruit jam. T_5 was most acceptable followed by T_4, T_1, T_3 and T_2. Jam recovery was highest in case of T_5 and least for T_2.

KEY WORDS: Gola variety, pear, jam, yield, acceptability

*Corresponding authors: deepakchouhan22@gmail.com

Introduction

Fruits play a very significant role in human nutrition as they are important source of micronutrients, phytochemicals and dietary fibre. In the year 2012-13, fruit production in Uttarakhand was 805.67 tonnes with area of 200.85 hectares. Major fruits grown in the state are apple, mango, citrus, pear, peach, plum, litchi and walnut (GoI, 2012). Pear is a temperate zone fruit naturalized with maximum area in Jammu & Kashmir followed by Himachal Pradesh and hilly region of the state of Uttarakhand (NHB, 2014). The peculiar geography and agro-climatic condition of the hill region limits the scope for production of field crops, but offer most suitable conditions for horticultural crops particularly temperate fruits (Sharma, 2006).

Pear fruit (*Pyrus pyrifolia*) is Asiatic pear belonging to the family Rosaceae. It is merited with number of desirable attributes viz. hardiness, yielding without receiving external agro-inputs, processing potential, and most important its nutritional and phytochemical properties. A large number of pear varieties are grown in Uttarakhand. Early varieties of pear include Thumb pear (Chusni), Shinsui, Kosui and Shinseiki. Mid season varieties include Pathernakh, Gola, Hosui, Pant Pear-18, Victoria, Conference, Flemish Beauty and LeConte. Late season varieties include Winter Nails, Beurre Hardy, Jargnel, Bartlett, Max Red Bartlett, Babbugosa, Pant Pear-3, Pant pear-17 and Nijisseiki (Kundu et al., 2013).

'Gola' variety of pear is a highly seasonal with an average yield of 150 kg fruits per tree. Fruits are large, round, greenish-yellow with prominent dots. Pulp is somewhat gritty,

sweet with plenty of juice. It is a highly perishable climacteric fruit and ripens mid to late July (Kundu et al., 2013). It is cheaper than other table fruits and also is not utilized properly.

Fruits are available as seasonal surplus during certain period of year in different regions and wasted in large quantities due to poor post harvest facilities and ignorance for proper processing, handling, distribution, marketing and storage. Due to the short post-harvest shelf life, as much as 30-35 % of fruits and vegetables perish during harvest, storage, grading, transport, packaging and distribution. Only 2-2.2 % of these crops are processed into value added products (Rao, 1994). Preservation of fruit will go a long way to solve the problems of seasonal glut, rapid spoilage, and unavailability in regions of poor and unfavourable condition for growth of the fruits, storage and transportation, thus making the fruit not to go into extinction and increasing its utilization in many food formulations (Nwosu et al., 2014).

Literature search indicates that there is limited research work on processing and preservation aspects of pear fruit, particularly with respect to 'Gola' cultivar. There is limited work documented on use of pear in the product development. High seasonal production of Gola variety of pear (*Pyrus pyrifolia* cv. Gola) fruit in Uttarakhand hills has to be considered as an opportunity for its utilization. Thus, the present study was focussed to prepare mix fruit jam from Gola pear with other seasonal fruits viz. apple, peach, plum and mango and evaluate their yield and acceptability.

MATERIALS AND METHODS

Procurement of Materials

The present study was carried out in July 2014. Mature pear fruits of Gola variety were procured from Horticulture Research Centre, Pattharchatta. Other fruits viz. plum, peach (yellow flesh variety), apple, mango (Chaunsa variety) and necessary ingredients like sugar and citric acid were purchased from local market and transported to food processing laboratory, Department of Foods and Nutrition, G.B.P.U.A.& T., Pantnagar. Equipments and portable water for formulation and sensory evaluation of jams were obtained from the department.

Processing of Fruits and Pulp Recovery

All fruits were subjected to manual sorting and thorough washing with running tap water to remove, dirt, dust, pesticide residue and microbial load on the surface of fruits followed by wiping with clean dry muslin cloth. Pear, peach, apple and mango were peeled, cored (pear & apple), stones were removed (plum, peach and mango) and flesh pieces were made with the help of sharp stainless steel knife. Edible portion, peel and core contents of fruits were recorded. After preliminary operations, all the fruits except mango were steamed with water (20 ml/100 g edible portion) until softened and pulped manually with hand masher. Pulp recovery of individual fruit was recorded.

Jam Formulation and Recovery

Four combinations were made by mixing fruits in the ratio of 50:50 viz. T_1 (pear + apple), T_2 (pear + peach), T_3 (pear + plum) and T_4 (pear + mango); whereas in fifth combination, T_5 (apple + peach + mango + plum + pear), 20 % of each fruit was taken.

Fruit jams were prepared according to standard formula and procedure given by Lal *et al*. (2009) (Figure 1).The mixture (fruit pulp + sugar +citric acid) was cooked till desired TSS (68˚ Brix), necessary for jam (Figure 2). Fruit jams were hot filled in pre-sterilized glass jars and stored at room temperature for organoleptic evaluation. Product recovery of jams was recorded.

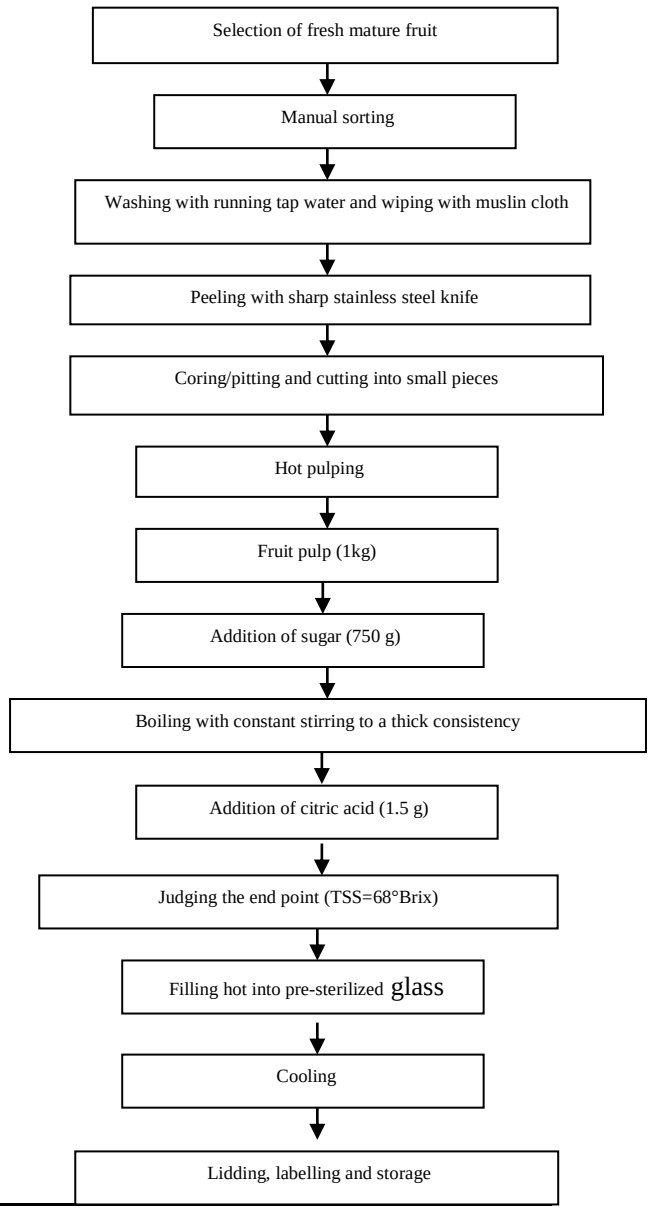

Figure 1. Process flow chart for mix fruit jam

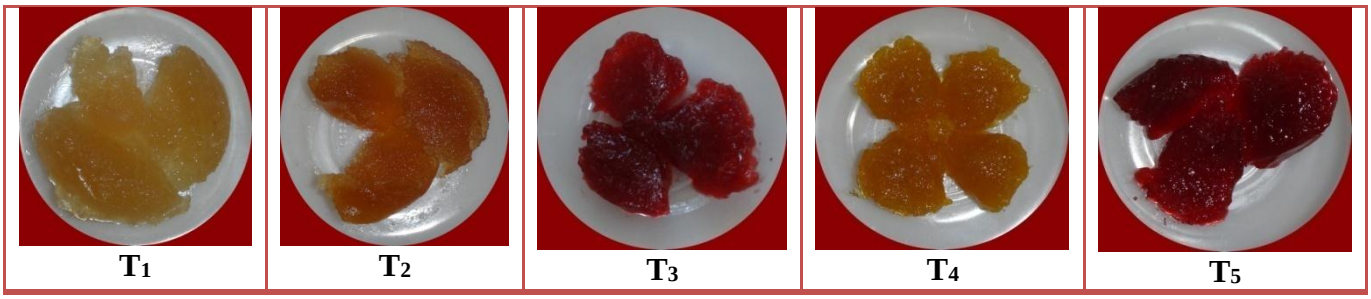

Figure 2. Formulated mix fruit jam

Organoleptic Evaluation

All the formulations of jam were subjected to organoleptic evaluation to determine acceptability by 10 semi-trained panelists from Department of Foods and Nutrition by preference ranking test (Ranganna, 1986). Different fruit jam samples were served to the panelists and asked to evaluate them by ranking as 1, 2, 3, 4 and 5 according to their acceptability preference. Rank sum obtained by 10 panelists was compared with table values to find out most acceptable jam formulation.

Statistical Analysis

The ranks for the treatments or jam samples were placed in columns and the replicates (panelists) in rows. The ranks for each treatment were added up. By referring rank sum tables, the significance of difference between the observed ranks sum was determined (Kahan et al., 1973).

RESULT AND DISCUSSION

Fruits were processed for formulation of jams and it was noticed that plum comprised highest edible portion (91.25 %) followed by apple (77.61 %), mango (73.64 %), peach (62.50 %) and pear (57.50 %). Edible portion in pear content was low and it may be due to presence of its hard core. Pulp recovery for plum was highest (75 %) in comparison to mango (59.09 %), peach (52.5 %), apple (49.25 %) and pear (47.5 %) (Table 2). On the basis of weight of different fruits used for making mix fruit jam, the maximum product recovery was for sample T_5 (39.88%) followed by T_3 (39.62%), T_4 (35.18%), T_1 (32.73%) and T_2 (32.35%).

Table 1.Preference ranking of different mix fruit jams by 10 panelists

Panelists	Fruit jam samples				
	T_1	T_2	T_3	T_4	T_5
1	3	5	4	2	1
2	4	3	5	1	2
3	3	4	5	2	1
4	3	5	4	1	2
5	3	5	4	2	1
6	3	5	4	2	1
7	3	5	4	2	1
8	4	5	3	1	2
9	3	4	5	2	1
10	2	5	4	3	1
Observed rank sum	**31**	**46**	**42**	**18**	**13**
Tabulated rank sum (p<0.05) (Ranganna, 1986)	20-40 (upper pair)				
	23-37(lower pair)				

Table 2.Edible portion, pulp recovery product recovery (on fruit weight basis)

Fruits	Edible portion (%)	Pulp recovery (%, w/w)	Mix fruit jam samples	Product recovery (%, w/w)
Pear	57.5	47.5	Apple + pear (50:50 pulp)	32.73
Peach	62.5	52.5	Peach + pear (50:50 pulp)	32.35
Plum	91.25	75.0	Plum + pear (50:50 pulp)	39.62
Apple	77.61	49.25	Mango + pear (50:50 pulp)	35.18
Mango	73.64	59.09	Apple + pear + peach +plum +mango (20% of each fruit pulp)	39.88

In present study, ranks sum for different jam samples were given in Table 1. Data of sensory evaluation revealed that, on the basis of overall acceptability T_5, T_4, T_1, T_3 and T_2 were ranked on 1st,2nd,3rd,4th and 5th position, respectively by 7,6,7,6 and 7 panelists, correspondingly. The tabulated rank sum values for 5 treatments and 10 replicates at 5 % level of significance ($p<0.05$) were 20-40 (upper pair) and 23-37(lower pair). Comparison of observed rank sum values with tabulated rank sum values indicated that the samples T_4 & T_5 whose rank sums were 18 and 13, respectively were lower than 23 (lower limit of lower pair). Hence, these samples were significantly most acceptable at 5 % level of significance. The samples T_2 & T_3 whose rank sum values were 46 and 42, respectively were higher than 37 (upper limit of lower pair), and hence significantly less acceptable at 5 % level. The sample T_1 whose rank sum was 31, falling within the range of 23-37, and hence significantly had average acceptability at 5 % level of significance. Shakir et al. (2009) reported that mixed apple and pear jam was acceptable for 90 days. Thus, incorporation of pear with other table fruits can formulate an acceptable jam that may reduce seasonal glut as well as cost of jam.

CONCLUSION

Thus, as the study showed mixed fruit jam prepared by incorporation of Gola pear fruit was acceptable. Therefore, it can be successfully incorporated with other expensive table fruits like apple for preparing mix fruit jam. It was concluded that an acceptable mix fruit jam was successfully prepared by processing fruits during seasonal surpluses.

References

GoI (2012) Checklist of commercial varieties of fruits. Macro Graphics Pvt Ltd, New Delhi, pp 136 & 141

Kahan G, Cooper A, Papavasiliou and Kramer A (1973). Expanded tables for determining significance of differences for ranked data. Food Technol. 27(5):61-69.

Kundu M, Joshi R, Rai PN, Bist LD (2013). Effect of plant bio-regulators on fruit growth, quality and productivity of pear [*Pyrus pyrifolia* (Brum.) Nakai] cv Gola under Tarai condition. J. Appl. Hortic. 15(2):106-109.

Lal G, Siddappa GS, Tandon GL (2009). Preservation of fruits and vegetables. 4th ed. Indian Council of Agricultural Research, New Delhi, p 488

NHB (2014). Indian Horticultural Database 2013. Ministry of Agriculture, Government of India.

Nwosu JN, Udeozor LO, Ogueke CC et al. (2014) Extraction and utilization of pectin from purple star-apple (*Chrysophyllum cainito*) and African Star-Apple (*Chrysophyllum delevoyi*) in jam production. Austin J. Nutr. Food Sci. 1(1):1-6.

Ranganna, S (1986). Handbook of Analysis and Quality control for fruit and vegetable products. 2nd ed. Tata McGraw- Hill Publishing Company Limited, New Delhi. 1112p.

Rao VS (1994). Post harvest technology and value addition in fruits, Central Research Institute for Dryland Agriculture, Hyderabad. pp. 103-110.

Sharma RP (2006). Current scenario of temperate fruits in Himachal Pradesh. *In*: Kishore DK and Sharma S K eds. Temperate Horticulture: Current Scenario. New India Publishing Agency, New Delhi (India). pp.19-26.

Shakir I, Hussain I, Zeb A and Durrani Y (2009). Sensory evaluation and microbial analysis of apple and pear mixed fruit jam prepared from varieties grown in Azad Jammu and Kashmir. *World J. Dairy Food Sci.* 4 (2): 201-204.