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STUDIES ON THE COMPOSITION OF THE CHERRY FRUITS

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Cherry fruits *(Prunus cerasus* L) have been analyzed for its nutritional constituents such as sugar, ascorbic acid, amino acids and minerals like sodium and potassium as well as total anthocyanin pigments. Nutritionally the quality of the fruit was found comparable to the ones produced elsewhere in the world except that no sucrose was identified. The quality and the shelf life of the preserved cherry juice has also been found satisfactory. In view of its low sodium and high potassium content the fruit juice particularly suites certain catagories of consumers like those suffering from high-pertension etc.

Key words: Cherry fruit; *Prunus cerasus* L, Cherry juice, Cold storage, Minerals.

Introduction

In Pakistan, cherry is cultivated in Chitral, Hazara, Kashmir, Quetta, Ziarat etc. etc. [1]. It belongs to the genus *Prunus* of the family Rosaceae of which several varieties are known. The common variety of cherry available in Pakistan and Afghanistan is sour or moderatly sour i.e. *Prunus cerasus* L [2]. Although the production level in the past has not been conspicuous-enough to find a place in the annual agricultural statistics reports published so far, the fruit nevertheless has recently appeared in the local markets of Peshawar as well, which points towards a rising trend in the quantum of its annual production. The area under cherry fruit orchard as well as production has increased appreciably in Baluchistan and now cherries worth several millions of rupees-contributing a share of 3% to the total income from fruits [1b] - are produced annually.

A large volume of research work is to be found on the composition, nutritive value, products and the preservation etc. of the cherry produced elsewhere [3,4] but we have not come across a comprehensive report regarding the composition, nutritional evaluation, quality and other characteristics of the cherries cultivated in this part of the world. It was, therefore, considered worthwhile to undertake a study of the cherry fruits available locally, for its composition and other characteristics with a view to assess its nutritional value, the overall quality of the fruit and the prospects for its utilization in some commercial food products.

Materials and Methods

Fresh cherry fruit *(Prunus cerasus* L) purchased from the local market were washed and a part of it was packed in polyethylene pouches and stored in a deep freezer for further experiments. The rest of the fruits were physically examined for weight, size, shape, edible portion, stones, kernels, fat and taste etc. Juice was extracted from a portion of the pitted fruits and this juice was used for the estimation of various parameters. A digital pH Meter (Corning 120) was used for the determination of pH, while total soluble solids were measured, using a Abbe's refractometer at 20° [5]. Total acidity was determined by titrating aliquotes against standard NaOH to pH 8.1 and results were expressed as % malic acid. N-bromosuccinimide method as described by Evered [6], was used for Vit-C determination. The procedure of Lane and Eynon [7], was used for the estimation of sugars. Glucose and fructose were estimated by the methos of Ting [8]. The identification of free sugars was carried out by the paper chromatography technique of freshly expressed filtered cherry juice, on Whatman No.1 papers alongwith standard markers. The papers were run in Phenol: Water (4:1) as the solvent, for 17 hr.

Silver nitrate as well as Partridge reagent, as described by Warsi [9] and Partridge [10] respectively, were used as spraying reagents. Amino acids were estimated by the method of Yokoyama [11]. For the determination of sodium and potassium, freshy expressed and clarified juice was subjected to flamephotometry [12] using Corning-410 digital flame photometer. Total anthocyanin pigments were assessed by the method of Lees and Francis [13]. A Shimadzu double-beam spectrophotometer Model UV-200s, was used for all the photometric measurements.

Results and Discussion

The appearance of cherry fruit in the local markets, in comparatively large quantities, is indicative of the increase in its production and it is likely that some of it might even have originated from Afghanistan, although the fruit reported there, is some what sweet in taste [2]. *Prunus cerasus* L is a small round shaped fruit having an average size of 1.5x1.5 cm, red in colour resembling small sized plums with an average weight of 2g per fruit (Table 1). In consonance with previous reportes [14] the edible part was found to constitute as high as 88.6 % of the fruit which

makes it very suitable for the extraction of the juice. Preliminary experiments in our Laboratory have shown that as much as 86% of the juice could be obtained from the cherry fruits under investigation. The quality of the freshly expressed juice is highly acceptable as far as flavour, colour and appearance is concerned, but it is slightly sour to tart, in taste. However addition of sugar to the juice overcomes this draw-back whereby an excellent tasting juice is obtained. The randomly taste tasting evaluation, carried out by casual visitors and staff members, has indicated that the product is highly acceptable.

Table 2 shows the nutritional constituents (other than sugars) of the fruit. The values for pH and acid ; content of the fruit reported here are, generally, very close to the values reported for Montmorency variety of Marshall [15]. Storage, under frozen conditions for one year, caused no significant change in acid content. The ascorbic acid of the fruit under investigation was 30-50% higher than those reported for the American Montmorency variety [15]. However when stored in deep freezer for one year, there was about 25% loss in the ascorbic acid. Amino acids of cherry fruit had an average value of 3.3 mg/100g. Similar findings have been reported by Boland and Blomquist [16]. Freeze storage resulted in a reduction of amino acids to 1/3rd of the values for the fresh fruit. The Maillared reaction, causing browning in the fruits and its products and involving amino acid, could be one of cause for the depreciation of amino acid during storage.

Anthocyanin pigments, responsible for the attractive colour of the fruit and also regarded as a measure of its maturity and ripeness [17], were also estimated. The anthocyanin content (21.9mg/100g) is very close to that reported by Nadezda [18]. A one year storage in frozen conditions resulted in 10% decline in the pigment content. The results of the present study also indicate low sodium (2 mg/100g) and high potassium (176 mg/100g). The farmer remained almost constant during one year cold storage but there was about 20% reduction in the latter. Our values for these minerals are supported by the findings reported in the literature [19,17]. The high potassium content of the cherry fruit (juice) is also beneficial for diseases such as cardiovascular and gastic hyperacidity where it may have some therapeutic value. The juice could be preserved by the routine procedures, the results, obtained by us for storing the product at refrigeration temperature, are promising in that it keeps very well at this temperature for several months even an year, without much loss in flavour, taste and other attributes, particularly when sugar had been added to it.

The ash content was slightly higher than the values reported [17,18] for edible portion as against our values for the whole fruit. The stones when crushed and extracted with fat solvents, yielded about 8% oil (Table 2). In the literature it has been reported [20] to range between 6.0-10.4% depending upon the moisture content. They cherry kernel oil are reported to be similar in most of its properties, to the almond oil where it is sometimes used as an adulterant. In literature the maximum yield obtained, from kernels of cherries, is reported [20] to be 38% which when converted to the whole seed basis, comes very close to the values given here.

The total soluble solids (Table 3) which represents the water soluble constituents of the fruit, were found to be intermediate between the values reported by others [4,16]. A 13.2% rise in total soluble solids, was observed in samples stored in frozen condition for one year. The entire sugar content of the fruit was found to comprise of reducing sugars. Further anslysis of the sugars showed that glucose contributed 6.2% and fructose about 7% of the juice. Paper chromatography, for the detection of individual sugars in the fruit juice, indicated only the presence of

TABLE 1. PHYSICAL CHARACTERISTICS OF CHERRY FRUIT*.

Average size[a] L x B (cm)	Average weight[b] Fruit (g)	Stone (g)	Edible portion (%)	Stone (%)	Hull (%)	Kernel (%)
1.5x1.5	2	0.5	88.6	11.4	8.3	3.1

*Mean of triplicate determinations, on as is basis; a, L= Length, B= Breadth, (mean of 10 fruits); b, Mean of 48 fruits and stones.

TABLE 2. NUTRITIONAL CONSTITUENTS OF CHERRY FRUIT.

	pH at (35°C)	Acid as malic (%)	L(+)Ascorbic acid (mg/100g)	Amino acid (mg/100g)	Total pigments (mg/100g)	Sodium (mg/100g)	Potassium (mg/100g)	Ash (%)	Oil (%)
Fresh sample[a]	3.56±0.01	1.7±0.1	4.0±0.2	3.7±0.1	24.7±0.3	2.0±0.2	176±4.0	_	_
Fresh samples[b]	_	1.3±0.1	3.3±0.2	3.3±0.1	21.9±0.3	2.0±0.2	156±4.0	0.8±0.01	_
Stone	_	_	_	_	_	_	_	_	8.0±0.95
Stored (frozen*)[a]	3.41±0.01	1.8±0.1	3.0±0.2	1.1±0.1	22.2±0.3	2.0±0.2	156±4.0	_	_
Stored (frozen*)[b]	_	1.4±0.01	2.5±0.2	1.0±0.1	19.7±0.3	2.0±0.2	138±4.0	_	_

(a), Edible portion (Juice); (b) , Whole fruit; *One year old frozen stored sample; Values are mean of three observations; Mean±S.D. are given.

TABLE 3. TOTAL SOLUBLE SOLIDS AND SUGAR CONTENTS OF CHERRY FRUIT.

	Total soluble solids (%)	Sugars			
		Reducing		Non reducing (%)	Total (%)
		Glucose (%)	Fructose (%)		
Fresh sample[a]	15.1±0.3	6.2±0.1	7.0±0.2	Nil	13.2±0.3
Fresh sample[b]	_	5.5±0.1	6.2±0.2	Nil	11.7±0.3
Stored (frozen*)[a]	17.0±0.3	6.9±0.1	7.8±0.2	Nil	14.8±0.3
Stored (frozen*)[b]	_	6.1±0.1	6.9±0.2	Nil	13.1±0.3

a, Edible portion (Juice); b, Whole fruit; *, One year old frozen stored sample;, Values represent; Mean ± S.D.

glucose and fructose. No sucrose, however, could be detected as against the report of Khan and Chughtai [14], whose findings, otherwise,support our data in respect of quantitative estimations. Cold storage resulted in an increase of about 12.0% in total and reducing sugars which could as well be the result of the hydrolysis of the anthocyanine glycoside pigments.

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