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Grapes Drying: An Indigenous Profitable Enterprise in Balochistan

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Abstract: This study was carried out in Pishin and Killa Abdullah districts, which are known as the main grapes producing area of Balochistan. Raisins are simply dried grapes produced from grapes mostly produced in Pishin and Killa Abdullah districts of northern upland Balochistan. Ripened grapes are either marketed in the fresh form to different markets or transformed to raisins to increase its shelf life. Two types of grapes drying common in the area; when the drying process is done in the sun shine after pre-drying treatment the end product is locally called as Monaka, while when drying process is done in a shady and well ventilated room without any treatment the end product is locally called as Kishmish, they both are collectively called as raisins. The study results revealed that 3000 kg of fresh Haita grapes are required to produce 1000 kg of Monaka with grape raisins ratio of 3:1. Similarly for making 1000 kg Kishmish, 3500 kg of fresh Kashmishi or Shundokhani grapes are required with a ratio of 3.5:1. Overall average yields of Monaka and Kashmish produced from one acre grapes were, 1528 and 1148 kg, respectively in the study area. The producer net profit margin for producing 1000 kg of raisins (Monaka and Kashmish) was Rs. 60,786 and Rs. 52,663, respectively. The study results showed that drying of grapes is a good source of income generation in the grapes growing area.

Key words: Raisins, Monaka, Kishmish, shelf life, Haita, Shundokhani

INTRODUCTION

Grapes (*Vitis vinifera*) are grown on far more land than is used for any other sub-tropical fruit. There are probably more than 8.5 thousand ha, with the production of 74.1 thousand tones of vines produced in Pakistan^[1]. The larger part is grown in Balochistan particularly in Pishin, Killa Abdullah, Quetta and Mastung districts because their climate is considerably suitable for the production of quality grapes.

In Balochistan grapes were grown on 8740 ha with an annual production of 73787 tones in 1998^[2]. The study sites, Pishin and Killa Abdullah districts are called as the heart of the grapes growing area of Balochistan as they contributed about 51% in area and 69% in production of grapes. The area during the year 2001-02 in Pishin and Killa Abdullah under grapes was 6,481 ha with the production of 34,518 tones^[3]. Besides local production a large quantity of fresh grapes and raisins were also imported. In 1999 about 540 thousands tones of raisins and 42,196 tones of fresh grapes were imported from Afghanistan and Iran^[4].

Raisins are dried fruit of certain varieties of grapevines (*Vitis vinifera*) bearing grapes with a high content of sugar and solid flash. Grapes have been dried

for out-of-season consumption from ancient times. Raisins are valuable nutritionally because of their sugar, mineral (especially Iron) and vitamin (B and A) content. Raisins are one of the most nutritious dry fruits in the world. Raisins are cholesterol free, low in sodium and totally fat free, provide vitamins and minerals, including iron, potassium, calcium and certain B vitamins, raisins are good source of fiber and rich in antioxidants, raisins are 70% pure fructose which is easily digested for quick energy^[5].

The largest producers of raisins today are the United States, Turkey and Greece; other raisins producing countries include Australia, South Africa, Chile, as well as some countries in the eastern Mediterranean basin and in the Middle East^[5].

According to their use, vinifera grapes are classified into raisins and table varieties. In Balochistan, the main grapes varieties grown drying are, Haita, Kashmishi and Shundokhani. In USA, grapes most commonly used for drying are table grapes, which usually have a tender skin, a rich flavor and high sugar content. The Muscat, Malaga, Sultana and Thompson Seedless varieties are among the most commonly marketed. Thompson seedless grapes are the best for making raisins. Over 30% of American grape crop are dried to produce raisins^[6].

Over the last ten years there has been an increasing trend towards raisins making in Balochistan because of the skill developed after migration of skilled afghani labor from Afghanistan, which has now dominated at industry level. The drying was made by two methods: 1. Without pre-drying chemical treatment, the end product is called Kishmish, the drying is made simply in ventilated room. The grapes varieties Kashmish and Shundokhani are used for this purpose. 2. With the help of chemicals pre-drying treatment, the end product is known as Monaka locally called as Aabjosh. Haita variety of grapes is used for this purpose.

There are two basic harvesting systems used to produce dried vine fruit in Australia. They are the traditional Australian "rack drying system" and the developing "trellis drying" systems. For rack drying the grapes are handpicked into containers ('dip tins' or 'buckets') measuring about 36x25x18 cm. The most commonly used buckets are made of sheet steel and have perforated bottoms and sides to allow free flow of oil emulsion through the fruit during dipping. Unperforated plastic buckets are used when the fruit is not to be dipped and are becoming more popular. The trellis drying system involves drying the fruit while it is still attached to the vine foliage, to the point where it can be mechanically harvested. "Finish drying" then proceeds in a similar manner to that used for rack dried fruit after it is shaken from the rack^{7]}

As the fruit is perishable and post harvest losses are great, thus its transport to other parts of country is laborious, because its packing and transportation charges are high, thus less of produce is exported. To increase shelf life, eliminate disease attack and regulate the supply and demand and get higher profit margin the drying process is mainly adopted in the area. When once the grape fruit are dried then its shelf life increase and can be kept for more than two years. Moreover, drying provide ease in transportation to distant markets and other countries. Recently the process of drying of grapes took an industrial role with a significant profit margin. The thrust of this study is therefore, to identify the factors that motivated farmers to produce raisins than marketing grapes in fresh form and to highlight the constraints to raisins producers in the main producing area. The specific objectives are;

- I) To study the methods used for raisins making in area.
- ii) To find out the profitability of raisins making
- iii) To highlight the constraints of raisins makers and make recommendations for improvement

MATERIALS AND METHODS

In order to achieve the objectives primary and secondary sources of information were used. For primary information farmers interviews were conducted at their premises.

A sample of 38 grapes growers from main raisins producing area of Pishin and Killa Abdullah districts were selected to obtain information on raisins production. A team of TTI, Quetta scientists conducted the present survey in the month of February 2002. Purposive sampling technique was used for selection of grapes growers for data collection.

Selection of sample grapes growers: Thirty eight grapes growers were selected purposively in the study area of Pishin and Killa Abdullah districts to get the required information. Out of the total sample size 19 (50%) of respondents were selected from Pishin and 19 (50%) from Killa Abdullah.

Distribution of raisins (Monaka and Kashmish) makers in the study area: Out of entire sample of 38 grapes growers some 13 (34.21%) were producing raisins making of which 10 growers (26.32%) were producing Monaka and 3 growers (7.89%) were producing Kashmish. The remaining 25 (65.79%) grapes growers were marketing grapes in fresh form due to lack of know-how about raisins making and skilled labor for this purpose.

Method of data analysis: Data collected from different category of respondents was entered in the computer. Software SPSS was used to analyze the data. Arithmetic means and weighted averages were used for analysis and interpretation of data.

Calculation of cost of production of raisins

Monaka: For estimating the cost of production of Monaka the costs were divided into two types i.e., fixed costs and variable costs,

1. Fixed costs incurred once in three years and included following items:
 - a) Ground for spreading and drying of Monaka
 - b) Boiler (Bhatti) for chemical treatment

For calculating the costs incurred on the above items the rate prevailing in the area was used. Their costs were estimated by dividing their costs by their durable life, which is three years.

2. Variable costs are incurred for every production process and included following items:

- a) Chemicals: The actual market prices were used.
- b) Other variable costs include activities like, picking, sorting, separation of grapes from bunches, transportation, processing, spreading of grapes on ground for drying and look after. Manual labour was mainly used for the above operations; their costs were calculated by multiplying the number of labour used for that particular activity with the prevailing wage rate.

Kishmish: Two types of costs include in the cost of production of Kishmish i.e., fixed costs and variable costs.

1. Fixed costs incurred once in ten years and include the construction of a well-ventilated room. While estimating cost the rental charges prevailed in the area for one-month period were used.
2. Variable costs include activities like, grapes picking, sorting, cleaning, transportation to ventilated room, placing of grapes on racks in ventilated room and their look after. Manual labour was mainly used for the above-mentioned operations and their costs were calculated by multiplying the number of labour used for that particular activity with the prevailing wage rate.

Method used for raisins making in area: The method used for Monaka and Kishmish is briefly described in the following lines:

a) Monaka: Monaka that is locally called (Aabjosh) is commonly prepared in Balochistan from one of the variety of grape known as Haita.

Pre-drying chemical treatment: Pre-drying chemical treatment is given to Haita grapes. The method is simple and following ingredients were used:

- I. Sulphur in crude form
- ii. Calcium carbonate
- iii. Water iv. Color (specified) v. Haita grapes

In the study area hot dip pre-drying treatment that hastens drying is used. Grapes are dipped into boiling emulsion, which is prepared according to following procedure:

The water is taken in a sufficient quantity and the sulphur is put according to the quantity of grapes. The water is boiled to mix the sulphur in a homogeneous form

and then the calcium carbonate is mixed and the color usually brown are mixed (Table 2). When all the ingredients are completely dissolved then the standard hot dip solution is ready. The harvested grapes detached from the vine bunches are separated from stems, grit and other foreign material and is put in a steel basket and dip into the boiling mixture for few seconds. The mode of action seems to be a physical or chemical modification of the structure of outer wax layer so that its permeability to water is increased. Also the skin of emulsion treated berries appears to be more transparent to infrared rays. This treatment reduced drying time of grapes from four to five weeks to one week because it produces fine cracks in the grapes, which increased the rate of moisture loss, considered important because of large berry. The treated grapes are then put out of the boiling mixture and spread out on mud-plastered ground in sunshine for one-week period. This process was observed both in Killa Abdullah and Pishin districts. This process has shortened the drying time and the fungal diseases infections are also eliminated and hence the produce shelf life is increased.

b) Kishmish: It is the dried form having less moisture content so the shelf life is increased when once they became dried. This is the best form for its export to various countries. Kishmish is produced according to following procedure:

Prior to drying all the infected grapes are removed and only healthy fruits are subjected to drying. For producing Kishmish the grapes are put on flat wooden stick for one month in a well-ventilated room or either tied with the sticks in separate bundles. Special care is undertaken to ensure ventilation in the room. The fruit become shrinkled as and when the moisture percentage decreases and after 30-40 days the dried fruit is collected. They are further graded placed in gunny bags and exported to various districts and countries.

In Australia currants are placed directly on the rack. They require no pre-drying treatment because of their small berry size. Bunches of large, seeded berries ('bucks') are segregated because they dry more slowly and seeds are not acceptable to the trade. Better-quality currants can be produced by shading the drying fruit from direct sunlight. Hessian side- curtains are hung on the rack, but these are removed if drying conditions deteriorate. While the trellis drying system involves drying the fruit while it is still attached to the vine foliage, to the point where it can be mechanically harvested. "Finish drying" then proceeds in a similar manner to that used for rack dried fruit after it is shaken from the rack^[7].

Output prices: Out put prices used were the average actual price received by the farmers at different markets after selling their produce. Moreover, market prices of Monaka and Kashmish were mainly dependent on the quality of the commodity. The prices of commonly ranged between Rs. 45-120 kg⁻¹ in case of raisins and 40-100 kg⁻¹ in case of kishmish. Average prices were used while estimating costs.

RESULTS AND DISCUSSION

Grapes varieties grown: In the study area, the main varieties of grapes (*Vitis vinifera*) grown for raisin making were Haita, Kashmish and Shundokhani.

Table 1 shows the proportion of different grape varieties grown by the sample farmers. Variety wise comparison indicated that Haita variety was the major variety followed by Kishmish, Shundokhani, Sahibi and Shekhali. The last two varieties Sahibi and Shekhali were not used for raisin making. It indicates that varieties used for raisins making covered more than 80% of entire grapes area because of their taste.

In California USA most of seedless raisins are produced from Sultanina, or Thompson variety of seedless grapes, known as Sultana in international trade. The Muscat, a seeded variety, is also used for making raisins are noted for its flavour and meatiness^[9]. In Australia, the main varieties of grapes grown for drying are, in order of importance, Sultana (Sultaniana, Thompson seedless, Kishmish) Currant (Zante Currant, Carina) Muscat Gordo Blanco (Muscat of Alexandria) and Waltham cross (Rosaki, Dattier, Regina, Malaga). The dried fruit of the last two is collectively called raisins in Australia^[7].

Rack spraying is the most recent way of applying oil emulsion in the rack spraying method. Fresh Sultanas are spread on the rack where they are sprayed with standard strength emulsion using a specially designed

multiple-nozzle forked wand. Various wand designs are available and usage varies with local preference. Spraying is best done at the end of each day, or when a rack is filled. The amount of spray applied is 450 L/1000 buckets each of about 8 kg capacity^[7].

In United States most raisins are produced by sun-drying grapes directly in the vineyard between the rows of vines, which takes 2 to 4 weeks for preparation depending on the temperature. Golden raisins are obtained by treating Thompson grapes with Sulphur dioxide are dried in order to conserve their light colour, which varies from golden yellow to amber^[5]. Bahattin ^[8] reported that Turkey is one of the leading seedless grapes exporting countries, where 32.5% of total grapes are seedless and seeded raisin grapes. He further reported that nearly all the seedless raisin grapes are dried naturally on the ground or on wire fence after dipping into a potash (K₂CO₃) and olive oil solution.

Initial costs involved: Initial costs of raisins (Monaka and Kishmish) are briefly described in the following paragraphs:

Monaka: Information about the costs was obtained from raisin (Monaka) producers who were considered knowledgeable and cooperative enough to provide detail estimate of initial cost involved in Monaka making. The initial costs for Monaka were calculated on the basis of 1000 kg in the study area. Aggregate initial costs incurred are presented in Table 4. The initial costs included ground making and boiler (Bhatti) were Rs.3000 and Rs.1000 for both items, respectively.

Kashmish: The total costs of the establishment of ventilated for Kashmish making were Rs. 80000. But in estimating the cost of production one month's rental charges of ventilated room for producing 1000 kg of Kashmish were used i.e., Rs.1000. (Table 5).

Grapes raisins ratio: The study revealed that 3000 kg of fresh Haita grapes were required to produce 1000 kg of Monaka with ratio of 3:1, similarly for 1000 kg Kishmish production 3500 kg of fresh Kashmishi or Shundokhani grapes were required with a ratio of 3.5:1. (Table 3) According to Columbia Encyclopedia 2004 about 1.6 kg of grapes yield 0.45 kg of raisins. About 4 pounds of fresh grapes are required to produce one pound of raisins^[9].

Raisins produced from one-acre grapes: The average yield of Monaka and Kishmish produced from one acre of fresh Haita and Kashmishi grapes were 1456 and 1086 kg in Pishin, 1600 and 1211 kg in Killa Abdulla But overall

Table 1: Grapes varieties grown by sample farmers in the study area

Varieties	Pishin	Killa Abdullah	Overall
Haita	09 (23.68)	12 (31.58)	21 (55.27)
Kashmishi	06 (15.79)	04 (10.53)	10 (26.32)
Shundokhani	02 (05.26)	02 (05.26)	04 (10.52)
Sahibi	01 (02.63)	01 (02.63)	02 (05.26)
Shekhali	01 (02.63)	-----	01 (02.63)
Overall	19 (50)	19 (50)	38 (100)

Source: Survey results 2002 (Figures in brackets are percentages)

Table 2: Type of chemicals and their cost used to produce 1000 kg raisins (Monaka)

Chemicals	Quantity (kg)	Rate (kg ⁻¹)	Price (Rs.)
Sulphur	25.00	60	1500.00
Calcium carbonate	17.50	03	52.50
Colour	02.50	250	625.00

Source: Survey results 2002

Table 3: Grapes raisins ratio required for production of Monaka and Kashmir

Variety	Grape required to produce 1000 kg raisins (kg)	Average price/kg	Pishin		Killa Abdullah		Overall average	
			Yield kg/ac	Value Rs.	Yield kg/ac	Value Rs.	Yield kg/ac	Value Rs.
Haita	3000	80	1456	116480	1600	128000	1528	122240
Kashmish	3500	60	1086	65160	1211	72660	1148	68880

Survey Results 2002

Table 4: Cost of production of raisins (Monaka) in the study area. (Rs/1000 kg)

Activity/Costs	Unit	Quantity	Rate /Unit	Total amount
Initial fixed costs				
-Ground making				3000
-Bhatti (boiler)				1000
Total fixed costs				4000
Chemical costs				
-Sulphur	kg	25.00	60	1500.00
-Calcium carbonate	kg	17.50	03	52.50
-Colour	kg	02.50	250	625.00
Total chemical costs				2177.00
Labour costs				
-Picking	M. day	05.00	80	400.00
-Sorting	M. day	03.00	80	240.00
-Transportation	M. day	03.00	100	300.00
-Separation from bunches	M. day	30.00	80	2400.00
-Processing	M. day	01.00	300	300.00
-Spreading of processed raisins on the ground in the sun for drying	M. day	02.00	80	160.00
-Look after	M. day	07.00	100	700.00
Total labour costs	Rupees			4500.00
Marketing costs	Rupees			7337.00
Other costs				
-Fire wood etc.	Rupees			1200.00
Grand total of costs	Rupees		19214.00	
Gross income	Rupees	103.00	1000	80000.00
Net income	Rupees			60786.00

Source: Survey results 2002

Table 5: Cost of production of kishmish in the study area

Activity/Costs	Unit	Quantity	Rate /Unit	Total amount
Initial fixed costs				
Ventilated room				
-Ventilated r(reented for one month period)	Rupees			1000.00
Total fixed costs				1000.00
Labour costs				
-Picking	M. day	05	80	400.00
-Sorting	M. day	03	80	240.00
-Transportation	M. day	03	100	300.00
-Cleaning of grapes	M. day	27	80	2160.00
-Placement on wooden shell	M. day	05	100	500.00
-Look after	M. day	01	100	100.00
Total labour costs	Rupees			3700.00
Marketing costs	Rupees			2637.00
Grand total of costs	Rupees			7337.00
Gross income	kg	80	1000	60000.0
Net income				52663.0

Source: Survey results 2002

average yields per acre were 1528 and 1148 kg for Monaka and Kashmir in the study area (Table 4 and 5). The yield in Killa Abdullah was high due to high grapes productivity and more skilled persons available.

Producer's profit margin: The financial benefit of the producer in the process is the profit margin for 1000 kg of raisins calculated in Table 4 and 5. The results show that producer net margins for Monaka and Kashmir were Rs. 60,786, Rs. 52,663. The profit margin in Monaka was 15% higher than Kashmir. Since it may be concluded that drying of grapes can be a good source of income generation involve low risk, therefore drying of grapes should be advocated.

Implications and recommendations: Raisin making is a profitable business in the area but old and traditional methods of raisins making are practiced in the area, which are lacking proper sanitation. The processed grapes are exposed to dust and insect's invasion. Therefore, it is needed to organize raisins industry on modern lines by introducing modern technology which will not only improve the sanitation but also the per capita income of farmers. The following recommendations are made for improvement:

- Raisins industry should be developed on modern lines by importing expertise from developed countries, which will not only increase the production of quality raisins in the country but can also be exported on large scale and may be a source of foreign exchange earnings for the country.
- Most of raisins producers complaint against government agencies i.e., Frontier corps, Customs etc. for making difficulties in transporting their produce to Quetta and other markets of the country and asking for permit locally called as "Rahdari" and suspect that the produce is smuggled from Afghanistan. To overcome this difficulty of farming community the government should take the necessary arrangements.

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