

CHAPTER 5

Overview of Manufacturing Processes of Grapes Products and its Benefits

5.1 Introduction

The purpose of this chapter is to highlight some of the essential “Products” of grapes and its process, which use those benefits in increasing the income of grapes growers as well as for the government. Therefore, this chapter strives to study the beneficial effects on human health and its economic importance that is widely grown and eaten all across the world (Eldina, 2014). On an account of ranking, India goes on the twelfth rank in terms of grapes production. In India, around 17-20% of this production is used as raisin and 78% of the table remaining percentage is used for juice as well as wine (Sharma, 2013). It makes clear that raisins, wine and juice follow the major consumption of grapes in India and at the global level 78-80% grapes form raisin, fresh grapes and juice in providing good returns of growers through the value addition and diversification of grape products (Sharma, 2012). An excellent source of potassium encourages the balance between alkaline bloods to stimulate kidney and regulate heartbeat along with the mineral elements such as sodium, potassium calcium, phosphorous, iron and manganese, biotin, niacin, inositol, pantothenic acid, pyridoxine hydrochloride, thiamine, folic acid, ascorbic acid and choline (Sharma, 2013).

5.2 Value Added Products of Grapes

Factors like sugar level, acid content and flavor constituents are made the juice quality in which the specific composition of the juice from any cultivar changes continuously ripening from year to year (Bates, 2001), and affects the growth from one area to another in terms of soil, climatic conditions, biotic and biotic stress and vineyard management practices. In addition, color of grape juice is created as a result of anthocyanin pigments which is located around the skin and press techniques of hot and cold is used. Extraction temperature is affected by the quality parameters of juice yielded by the hot-press method rather than cold pressing. Within a cultivar, the pressing method has not only an effect on

soluble solids but also causes significant differences in PH and color density (Sharma, 2012).

5.3 Grapes Varieties for Juice Purpose

Nine assortments were assessed for juice quality based on the general acknowledgement of the organoleptic score, which was better for Country Bangalore in taking after by Gulabi x Bangalore Purple, Concord, Arka Shyam and Pusa Navrang (Sharma, 2017). From these assortments, juice yield per vine ran between poor to moderate. At Indian Institute of Horticultural Research (IIHR), Bangalore, Arka Shyam has evaluated a decent assortment of juice reason over Bangalore Blue and Concord. Pusa Navrang is a double cropper under Pune conditions with minimum or negligible risks for plant protection. As a result of, a cross between Madeleine Angevine and Ruby Red is developed at The Indian Agricultural Research Institute (IARI), New Delhi. Henceforth, the assortment teinturier of these colours are contributed by both the mash and skin. The anthocyanin shades are steady and squeeze, which can be kept until nine months under the conditions of encompassing room conditions. In spite of the fact, these assortments are not only rich in colours but also poor in flavour or season in mixing with another fragrant assortment such as Muscat, Black Champa.

Table No. 5.1 Cultivation Factors Influencing Juice Quality

Factor	Importance
Location	Harvest period, plant survival, market
Cultivar	Yield, desirable juice traits, harvest period
Plant spacing	Yield, ease of cultivation/harvest
Plant care	Yield, ease of harvest, quality
Pruning	Yield, maturation, ease of harvest
Irrigation	Fruit/juice yield, quality
Fertilization	Growth, designation (i.e. organic)
Pesticide use	Fruit quality, designation, regulations
Field protection	Yield, quality (bird, varmint damage)
Field sanitation	Juice safety, quality
Labour training	Fruit quality, cultivation/harvest efficiency

Source: Sharma, A. K. (2013)

Table No. 5.2 Varieties of Grapes Juice in India

Sr. No.	Particulars	Price in Rs.
1	DEEDO Grape Fruit Drink 150 ml	10 par Bottle
2	Grapes Juice	90 par Litre
3	Black Grapes Juice	150 par Litre
4	Grape Ceres Juice	155 par Piece
5	Grapes Fruit Juice	18 par Milliliter
6	Oms Grapes Juice	400 par Piece
7	Grape Blast Juice	20 par Bottle
8	White Grape Juice With Peeled Grape	45 par Piece

Source: Own Compilation based on idiamart (2018).

Above table 5.2 indicates the same basic and important varieties of grapes juice, which is made in the states of India. These varieties are prepared by various private companies in India. Grapes juice is very beneficial for our health as well as economic development. Another important thing is the price of juice which is mentioned in the above table.

5.4 Raisins

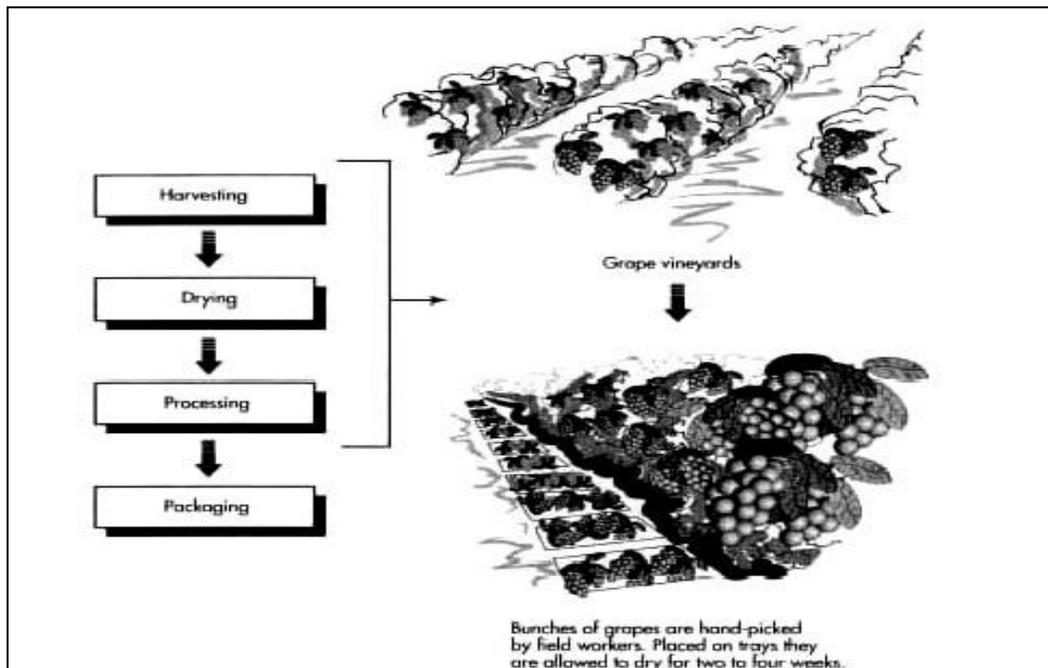
In different parts of Maharashtra, grapes are an essential horticultural crop, which has been developing as an outstanding pocket of grape development. The grape growers of this state have not only discarded the grapes as crisp natural products to far off the market of state; nation and abroad but also redirected some segment of their delivery for raisins making based on the situation of market price. In the present time, grapes growers have developed grapes for raisin making in western Maharashtra. The seasonal period of grape crops begins from February to April. From the nineteen nineties onwards the development of grapes has expanded in parts of Sangli and Sholapur of Maharashtra. Because of that, agriculturists are confronting the issue of grapes advertised for getting a low price for their goods. As a raisin is an important product of grapes farmers get a better price if they make raisins. At present, nearly 20 percent grapes are used for raisin production in western Maharashtra (Mulani and Rajeshirke, 2016).

In this regard, the dried grapes are known as raisins, Thompson Seedless white and thin-skinned grape variety have been a monopoly in the production of best quality raisins. At the global level, the drying of Thompson Seedless and clones is producing about 90% of

raisins. Under the raising sheds, the grape drying is performed in India (ICAR-National Research Centre for Grapes Pune). Before drying, the grape bunches are treated with grape drying oil. In some countries, the “Drying on Vine (DOV)” practice is used for grape drying. Grape berry in the water moves through the cells of the cuticle during the drying process as vapour in the high air temperature and rapid air movement are suitable climatic conditions for faster drying of grapes. Larger berries and thicker skin increase drying time in various factors such as drying structures; climatic conditions, dipping treatments, and sculpture fumigation are deciding factors of raisin quality. In some of the seasons, under persistent wet and humid conditions, mould begins to spread through the fruit in the racks. The green colored raisins far-fetched more prices in the market rather than dark brown colored. The colour of raisins depends on drying temperature, the presence of sunlight and high humidity. Raisins with a moisture content of 12-15% are found suitable for storage in containing raisins of hard and high moisture to lose raisins quality during storage.

Raisins are made primarily by sun drying different types of grapes having small and sweet flavored with a wrinkled texture. The technique for making raisins has been known from the ancient times and evidence of the products are found in the writings of ancient Egyptians (Adsule, 2014). Most raisins are small, dark, and wrinkled to be having a flavor similar to the grapes from which are made in the drying process. They are a naturally stable food to resist spoilage because of their low moisture and low PH raisins are composed of an important food element such as sugars, fruit acids, and mineral salts. The sugar provides a good source of carbohydrates. Fruit acids such as folic acid and pantothenic acid have shown to promote growth and its components. Vitamin B6 is found in raisins which is good for human nutrition. Minerals like calcium, magnesium, and phosphorus are also found in raisins. In addition, iron, copper, zinc, and other nutrients are found as trace elements in raisins Considering the composition of raisins and the fact that they have no fat, it is no wonder that this fruit is considered a healthy snack.

Figure No. 5.1 The Manufacturing Process of Raisins



Source: Raisins forum, 2018

Grapes are harvested in the month of August and September. The drying procedure of grapes reduces the moisture content between 75% and 15%, and the color of the fruit begins to change towards brownish purple. After the fruit is dried, the paper trays are rolled up around the raisins in terms of packaging. The rolls are gathered and stored in boxes or bins before being transported by truck towards processing plant where they are cleaned, inspected, and packaged.

5.4.1 Farming

The first step of producing good raisins is growing quality grapes in the vineyards. Grape farming is a year-round commitment, which includes the practices of pruning, irrigation, fertilization, and pest control (AZEUS, 2015). Most of the work is done in these vineyards and farmed on its own terms. Pruning involves removing parts of the vine to control its growth pattern and has benefits of equalizing the quality of grape throughout the vineyard in making other farming tasks easier and reducing costs. The vines are dormant in the month of December and March. Irrigation happens during the summer

season when the vines grow keeping a continuous supply of water in the vineyard soil (Eskay International, 2013). At the same time, fertilizers do not need all vineyards, some vines respond well to the use of nitrogen and zinc based on fertilizers. Vineyards are disposed to various diseases and insect attacks, so it is important for these factors to be controlled. Chemical and biological agents used to control mites and other insects in which Sulphur dusting prevents the growth of mildew and other fungi. These compounds have affected the overall grape quality in attempting to minimize the amounts used.

5.4.2 Harvesting and Drying

- Starting in the late August and beginning in September, the grapes are harvested (Wines Spain, 2017). At this point in the year, they have optimum sweetness. Bunches of grapes are handpicked by the field workers and placed on the paper trays, which are laid down on the ground between the vine rows. To provide a good surface for the trays, the soil between the rows is leveled.
- Depending on the weather, the grapes are dried on the trays for two to four weeks. During this time, the moisture content of the grape reduces from 75% to 15% and the color of the fruit changes to a brownish purple (Iran Dried Fruit, 2007). At night, the trays minimize the accumulation of sand to protect against raisin moth infestation. The paper trays are embedded with a compound, which kills insects and damage the grapes as they dry. After drying the grapes, the paper trays roll up around the raisins to cover in a package. The rolls are gathered and stored in the boxes or bins before transporting by truck to the process plant (Natural Dried Fruits, 2010).

5.4.3 Quality Control

The important step in the process of raisin in which the grapes are growing and checking for ripeness is to squeeze the juice from a grape by using a refract meter. This allows the growers to determine how much sugar is in the grape. Tasting sugar and its weight per volume measures the quality of the fruit. Before packaging or picking, workers handle

carefully so that no insects or mould are on the trays. Knives are used to cut down the grape bunches to prevent damage. At the factory, the raisins are inspected and subjected to a variety of laboratory analyses to ensure the production of a conspiracy of high-quality product.

Table No. 5.3 Varieties of Raisins with Price in India

Sr. No.	Name of Variety	Amount in Rs
1	Malayer Raisins	70/ Kilogram
2	Golden Dried Raisins	200/ Kilogram
3	Organic Dry Raisins	180/ Kilogram
4	Dry Grapes Resins	150/ Kilogram
5	Mera Rasins 200gms Pouch	140/ Pouch
6	Dark Brown Dried Raisins	50/ Kilogram
7	Delicious Raisins	250/ Kilogram
8	Kandhari Raisin	800/ Kilogram
9	Kashmiri Raisins	250/ Kilogram

Source: idiamart (2018)

Above table indicates same varieties of raisins, which is made in India. When grapes are dehydrated to produce raisins, the nutrients become more concentrated, making a handful of raisins a snack rich in B vitamins, iron and potassium. Besides nutrients, raisins are also a good source of carbohydrates for energy. One of the biggest benefits of eating raisins is that they're a quick, easy and tasty way to get some of your daily recommended fruit servings.

Table No. 5.4 India Export of Agro Food Products to Top Ten Country: Product of Raisins (Grapes Dried) (08062010)

Country	2014-15		2015-16		2016-17	
	Qty in MT	Rs. Lacs	Qty in MT	Rs. Lacs	Qty in MT	Rs. Lacs
Saudi Arabia	1,441.00	1,344.30	2,653.54	2,259.06	5,061.98	5,097.63
Russia	281.00	248.50	1,341.00	956.91	4,185.60	3,445.21
Ukraine	1,214.00	1,003.80	3,320.00	2,203.83	3,905.50	2,831.78
United Arab Emirates	197.28	299.45	1,382.47	1,865.84	2,057.71	2,480.09
Sri Lanka	1,122.00	822.21	1,398.66	922.53	1,602.76	1,232.19
Iraq	75.00	67.47	694.00	542.43	1,366.00	1,209.41
Poland	270.00	232.57	1,519.00	1,091.13	1,343.00	1,028.89
Malaysia	669.41	813.83	965.55	1,045.55	983.09	954.23
Lithuania	105.00	115.58	1,187.36	862.65	1,106.00	848.19
Croatia	76.00	63.04	755.00	536.72	720.00	590.67

Source: Agricultural & Processed Food Products Export Development Authority (Ministry of Commerce & Industry, Government of India)⁴⁰

Table number 5.4 indicates the export quantity in million tons (MT) of raisin from India to other countries in the last three years. This table has mentioned the name of top ten countries which import grapes from India such as, Saudi Arabia, Russia Ukraine, United Arab Emirates, Sri Lanka, Iraq, Poland, Malaysia Lithuania and Croatia. Another important thing this table indicates is value in lakh which got through export of raisins. It shows the increasing demands of Indian raisins in the foreign countries. So, it is also enables to create new markets in other countries and is also helpful in economic development of India.

5.5 Technical Interventions have been adopted for Quality Raisin Production

- More bunches per vine has more impact on raisin from a unit area. Growers retain more bunches per vine having small sized berries. GA3 is generally used for making bolder berries which turns in to thick skin. The raisin made by GA3

⁴⁰ Available at http://agriexchange.apeda.gov.in/indexp/Product_description.aspx?hscode=08062010. Accessed on date 15/01/2018

treated berries having leathery skin is not preferred by consumers. GA3 application is advised to rachis elongation only.

- Raisin industry helps in avoiding glut in the market. The growers divert the grapes for raisin making if market is not in a position to give a good price for fresh grapes. At the same time, if supply of grapes in market is more profitable then growers supplies the grapes in the market for fresh consumption instead of drying them.
- Thompson Seedless and its clones like Ta-A-Ganesh, Manik Chaman, Sonaka etc. are adopted to make raisins. However, some well-known varieties like Merbein Seedless and 2-A Clone were also introduced for raisin making, but couldn't get acceptance by the grape growers.
- Shortening of drying period always affect raisin quality and give chance to processors for more grape drying from a shed. Dipping of grape bunches in solution of 15 ml ethyl leate and 25 g potassium carbonate/L water for 2 is very common practice but people are modifying the defined concertation.
- In general, raisin appearance is judged by its colour. If the product is brown in it is considered lower in quality in the market and results in lower returns from the market. Sulphur fumigation is well adopted process for retaining yellow colour but Sulphur is a known allergen. To obtain good coloured raisins, spraying of ascorbic acid solution (300 ppm) on the 3rd day of grape drying is found helpful in maintaining its good colour during grape drying process. Spray of ascorbic acid solution replaces two sprays (dipping oil with potassium carbonate with varying concentrations) which are in practice to obtain good colour in raisins.
- To control insect-pests and diseases the application of chemicals are advised as per recommendations for table grapes. During grape drying process, changes occur in the content of agrochemicals. Standardizing PHI, work on processing factor has been initiated (Sharma, 2017).

5.6 Vinegar

Vinegar is an alcoholic liquid that has been allowed to sour. It is primarily used to flavor and preserve foods and as an ingredient in salad dressings and marinades. Vinegar is also used as a cleaning agent. The word is derived from the French word in (wine) and aigre (sour) (Vinegar Forum, 2018).

5.6.1 The Orleans Method

- Wooden barrels are laid on their sides. Bungholes are drilled into the top side and plugged with stoppers. Holes are also drilled into the ends of the barrels (Bhatia, 2016).
- The alcohol is poured into the barrel via long-necked funnels inserted into the bungholes. Mother of vinegar is added at this point. The barrel is filled to a level just below the holes on the ends. Netting or screens are placed over the holes to prevent insects from getting into the barrels.
- The filled barrels are allowed to sit for several months. The room temperature is kept at approximately 85°F (29°C). Samples are taken periodically by inserting a spigot into the side holes and drawing liquid off. When the alcohol has converted to vinegar, it is drawn off through the spigot. About 15% of the liquid is left in the barrel to blend with the next batch (Bhatia, 2016).

5.6.2 The Submerged Fermentation Method

- The submerged fermentation method is commonly used in the production of wine vinegars. Production plants are filled with large stainless steel tanks called acetators. The acetators are fitted with centrifugal pumps in the bottom that pump air bubbles into the tank in much the same way as the aquarium pump does.
- As the pump stirs the alcohol, acetozyim nutrients are piped into the tank. The nutrients spur the growth of acetobacters on the oxygen bubbles. A heater in the tank keeps the temperature between 80 and 100°F (26-38°C) (Hailu, 2012).
- Within a matter of hours, the alcohol product is converted into vinegar. The vinegar is piped from the acetators to a plate-and-frame filtering machine. The

stainless steel plates press the alcohol through paper filters to remove any sediment, usually about 3% of the total product. The sediment is flushed into a drain while the filtered vinegar moves to the dilution station.

5.6.3 The Generator Method

- Distilled and industrial vinegars are often produced via the generator method. Tall oak vats are filled with vinegar-moistened beechwood shavings, charcoal, or grape pulp. The alcohol product is poured into the top of the vat and slowly drips down through the fillings (Hailu, 2012).
- Oxygen is allowed into the vats in two ways. One is through bungholes that have been punched into the sides of the vats. The second is through the perforated bottoms of the vats. An air compressor blows air through the holes.
- When the alcohol product reaches the bottom of the vat, usually within a span of several days to several weeks, it has converted in to vinegar. It is poured off from the bottom of the vat into storage tanks. The vinegar produced in this method has very high acetic acid content, often as high as 14%, and must be diluted with water to bring its acetic acid content to a range of 5-6%.
- To produce distilled vinegar, the diluted liquid is poured into a boiler and brought to its boiling point. A vapor rises from the liquid and is collected in a condenser. It then cools and becomes liquid again. This liquid is then bottled as distilled vinegar⁴¹.

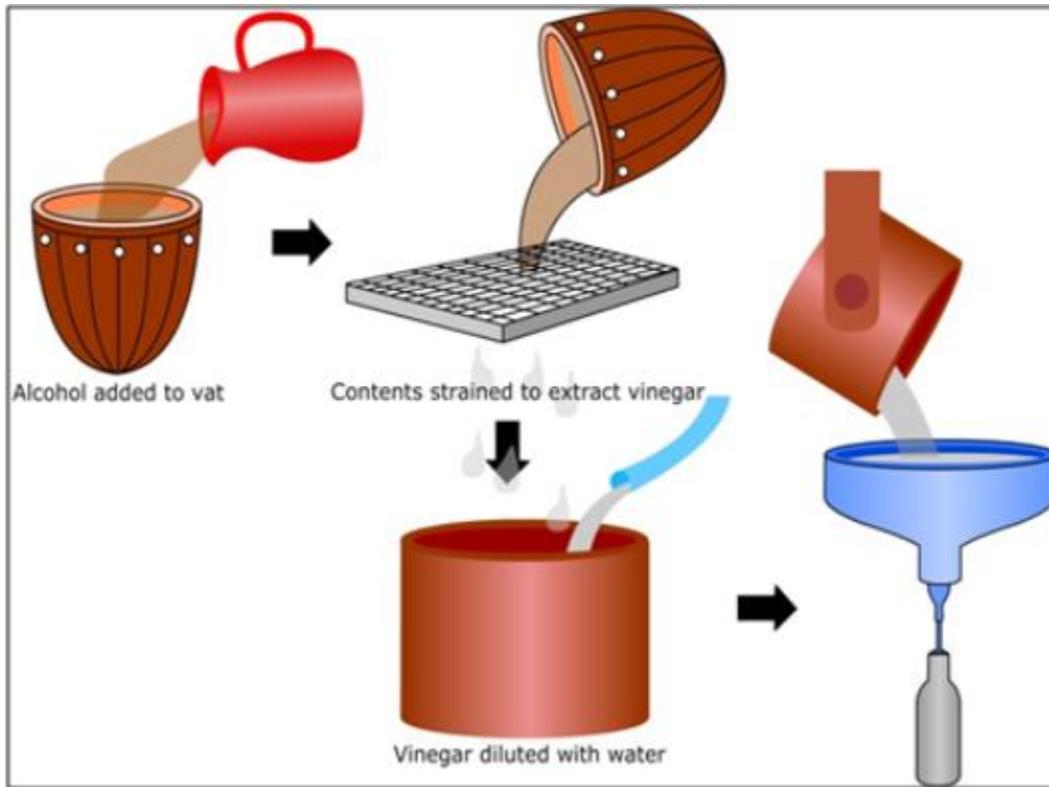
5.6.4 Balsamic Vinegar

- The production of balsamic vinegar most closely resembles the production of fine wine. In order to bear the name balsamic, the vinegar must be made from the juices of the Trebbiano and Lambrusco grapes. The juice is blended and boiled over a fire. It is then poured into barrels of oak, chestnut, cherry, mulberry, and ash.

⁴¹ Available at; <http://www.madehow.com/Volume-7/Vinegar.html>. Accessed on date 15/01/2018

- The juice is allowed to age, ferment, and condense for five years. At the beginning of each year, the aging liquid is mixed with younger vinegars and placed in a series of smaller barrels. The finished product absorbs aroma from the oak and color from the chestnut (Bhatia, 2016).

Figure No. 5.2 The Production of Vinegar



Source: Available <http://vle.du.ac.in/mod/book/print.php?id=13559&chapterid=30258>. Accessed on date 15/01/2018

5.6.5 Quality Control

Growing of acetobacters, the bacteria create vinegar and require vigilance in the Orleans Method of bungholes to be checked routinely and ensure that insects have not penetrated the netting. In the generator method, great care is taken to keep the temperature inside the tanks under the 80-100°F range (26-38°C). Workers routinely check the thermostats in the tanks. A loss of electricity kills the acetobacters within seconds where many vinegar plant systems produce electrical power in the event of a blackout.

5.7 Pekmez

Over the ancient times, evaporated grape syrup pekmez has been produced in the most Anatolian regions. Pekmez is produced in low heat evaporation steps, commercially sold and commonly consumed in viscous liquid and solid forms. The liquid concentrated form of the pekmez contains a minimum of 65 % total crystalline and soluble solids (45.3 to 75 °Brix) (Gupta, 2011). The viscosity of pekmez increases with increasing solids concentration and decreasing temperature. Grape pekmez is also produced and sold in thick, creamy and solid form. The color of the pekmez changes from dark brown to white depending on the processing conditions, concentration, types of bleaching agents, heat and mixing rate.

5.7.1 The Steps of Manufacturing Process of Pekmez

- Pick the grapes from vineyard
- Stomp the grapes to get the juice
- Mix dirt into the juice and let it sit for a few hours
- Bring the juice to a boil
- Let it sit for at least half an hour
- Bring it to a second boil for a few hours
- Filter it to extract any remaining dirt
- Enjoy your sweet, delicious pekmez.⁴²

5.8 Verjus

Verjus is the pressed, unfermented juice of unripe wine grapes (Gupta, 2011). It was first used in the sixteenth century, probably “as a result of the right given to peasants to pick the unripe grapes from the second growth left on the vine by vineyard owners. Verjus is the tart, fresh juice of unripe wine grapes. It is a culinary ingredient indigenous to the world's wine producing regions that are used in sauce making, for poaching fish and meat, and to dress lettuces, vegetables and fruit. Verjus or "verjuice" as it is sometimes

⁴²Available at; <https://www.captivatingcappadocia.com/how-to-make-pekmez-cappadocia-turkey/>. Accessed on date 15/01/2018

called, literally means green juice in the sense that it is made from fruit that is yet to fully ripen and is green. It is used to add acidity to foods, an important component in food and in cooking. The verjus is used in any recipe that calls for lemon juice as a contrasting acid, in place of or in addition to broth or stock, to make a refreshing sorbet and add to beverages.

5.8.1 Manufacturing Process of Verjus

There is a need of a lot of grapes, a meat grinder or food mill, a fine mesh strainer, paper towels, a ladle, some mason jars and some patience to hold up for a long time in the fridge and to get a little citric acid as sodium metabisulfite, which is available at any winemaking shop. This is the “sulfites” you see on wine labels. If you are sensitive to them, skip it⁴³. Make about 2 to 3 quarts. Prep Time: 90 minutes. Cook Time: n/a: 10 pounds unripe grapes, 1 teaspoon citric acid and 1/2 teaspoon sodium metabisulfite⁴⁴.

Sweet Spreads

The process of making grape jelly, jam, preserves, butter, or marmalade consists of cooking the grapes and/or their juice, in order to combine with sweeteners and pectin, 's to the proper solids level. Jam, preserves, and grape butter have been made from whole or crushed fruits. Preserves differ from jam, only in that the fruit pieces are usually larger. Muscatine butter is made by cooking the screened fruit (seeds and skins removed) to a smooth, thick consistency. It differs from jam in its ratio of fruit to sweetener and in the final solids concentration. Jelly is made from the fruit juice and the product is clear and firm enough to hold its shape when removed from the container (Sharma, 2012).

Grapes Seed Oil

Grape Seed Extract and its oil are derived from the seeds of a grape because of their nutritional and medicinal properties. Grapes, their seeds, and leaves have been used in many home remedies for centuries. Grapes Seed Oil is a great source of polyphenols - flavonoids, essential Fatty Acid - linoleum acid, vitamin E, and oligomeric

⁴³ Available at: <https://honest-food.net/how-to-make-verjuice/>. Accessed on date 12/01/2018

⁴⁴ Available at: <https://honest-food.net/how-to-make-verjuice/>. Accessed on date 12/01/2018

proanthocyanidin. These great components make grape seed oil an asset in terms of many minor to severe health conditions. It used in the production of massage oils and balms, hair and hygienic products face and body moisturizers, as well as in sunblocks and sunburn ointments. Even though Grape Seed Oil and its extract are derived from grape seeds, they have different uses due to the different concentration levels of their components (Jawairia Zafar, 2018).

Figure No. 5.3: Impressive Benefits of Grape Seed Oil for Skin, Hair and Health



Source: Sierra Bright, (2016)

5.9 Benefits of Grape Seed Oil

Studies suggest that grape seeds constitute anti-inflammatory, anti-oxidant, anti-histamine, anti-ageing, anti-allergic, antimicrobial, and adaptogenic activity. Therefore, its oil and the extract are beneficial for a number of treatment for health issues including arthritis, edema, dermatitis, acne, wrinkles, dry and itchy skin, age spots, sunburns, chapped lips, wounds, bruising, stretch marks, varicose veins, hemorrhoids, chronic venous insufficiency, premature aging, premenstrual syndrome (PMS), weight loss,

stress, dandruff, hair loss, warts, cardiovascular diseases especially atherosclerosis, hypertension, high cholesterol levels, diabetes, visual impairment, cataract, and macular degeneration. The studies also look at the free radical scavenging activity which may strengthen the immune system and reduce the risk of developing cancer (Jawairia Zafar, 2018).

Table No. 5.5 List of Best Grapeseed Oils in India

Name	Price in Rs	Description
Aloe Veda Distil Grape Seed Oil (200 ml)	445	<p>Almost all your skin problems can be caused because you ignored to supply the needed nutrition to your skin and body, the diet you follow can result in various skin issues. As you grow with time, your body pays the sum of your ignorance in the form of lost elasticity. The Aloe Veda Distil Grape Seed Oil is composed of Vitamins D, C and E which replenish the skin with all the lost nutrition and ensure that regeneration is accelerated. This oil prevents acne outbreaks and saves from embarrassing situations, making it ideal for men and women.</p> <p>This Aloe Veda oil is infused with the goodness of antioxidants that slow down the ageing process and leaves one with flawless beauty. This oil is a great skin care partner as it removes free radicals from the skin letting the skin grows more healthy every day. Regular usage will reward one with younger looking skin that is firmer and clean.</p>
Deve Herbes Pure Grapeseed Oil - 30 ml	304.15	<p>Grapes seed oil was once the well-kept secret of many traditional cosmetics. This is a light, slightly astringent, oil for toning and tightening the skin. It may be used as 100% strength and has a reasonable shelf-life.</p>
Grape Seed Oil - Pure & Natural - 5 ml to 250 ml	269	<p>Grapes Seed Oil contains linoleic acid, which is a polyunsaturated fatty acid that can prove beneficial for people having diabetes. Grapes seed oil can help strengthen and repair damaged or broken capillaries and blood vessels. This in turn, can help to improve circulation and alleviate conditions like, varicose veins, spider veins and hemorrhoids.</p>
Sula Grape Seed Oil 250Ml	315	<p>Grapes seed oil is extracted from grape seeds, typically it used for making wine. They were generally discarded during the winemaking processes. In the 20th century, people identified extraction of this seeds as a profitable venture and began to sell the oil extracted from the wine</p>

		grapes in large volumes. Sula pure grapes seed oil is first indian grape seed oil which is 100% natural and pure. It is cold pressed at Sula Nashik valley estate from premium wine grapes.
Grape seed oil 100% natural pure undiluted uncut carrier oil 5ml	207	Grapes seed oil contains Vitamin E. At 68 - 76%, it contains the highest amounts of linoleic acid among any oil or food source. One of two essential fatty acids that the human body cannot produce. Has a very light taste and can be used just as olive oil in cooking. High flash point - can withstand high cooking heat producing the least smoke and less danger of burning of cooking oils. Our Essential/Carrier Oils are, 100% natural and pure (undiluted/uncut). No fillers, additives, bases or carriers added.
NOW Foods - Grapeseed Oil	1599	100% Pure Sensitive Skin Care. All Skin Types. Light Silky Moisturizer.
Soulflower Coldpressed Grapeseed Carrier Oil	350	This oil is an answer to skin woes caused by dirt, grime, pollution, over active oily glands which can age the skin before time. Besides grapeseed oil, it consists the goodness of vitamin E, C and D which together helps to it is also fight pimples, stretch marks and sun damaged skin. An essential part of pedicures targeting foot odors and also used as a great head massage oil which adds to good health and shine to the strands.
Aroma Magic Grapeseed Oil	455	An amazing oil extracted via aromatherapy which moisturizes skin to reduce fine lines and scars. It is a true skin healer and treats pimples; sun burnt skin and adds life to the hair follicles on the scalp. Its astringent properties tightens skin and minimizes the signs of aging skin and scars by providing deep nourishment to dull skin.
Aurvedic Age Repair Firming Oil with Avocado Grape Seed	280	This oil is a fusion of oils extracted via the cold pressing method with grapeseed oil as the top ingredient along with extracts of papaya, chamomile, saffron, avocado, rice bran and many others. This oil is rich in anti oxidants which help to fight signs of aging like wrinkles, fine lines improving the elasticity of the skin. It nourishes the skin like a natural moisturizer and is extremely useful for mature and sun damaged skin.

Source: Own compilation based on Juthika, 2015 and prices based on e-commerce websites

5.10 Other Dried Products

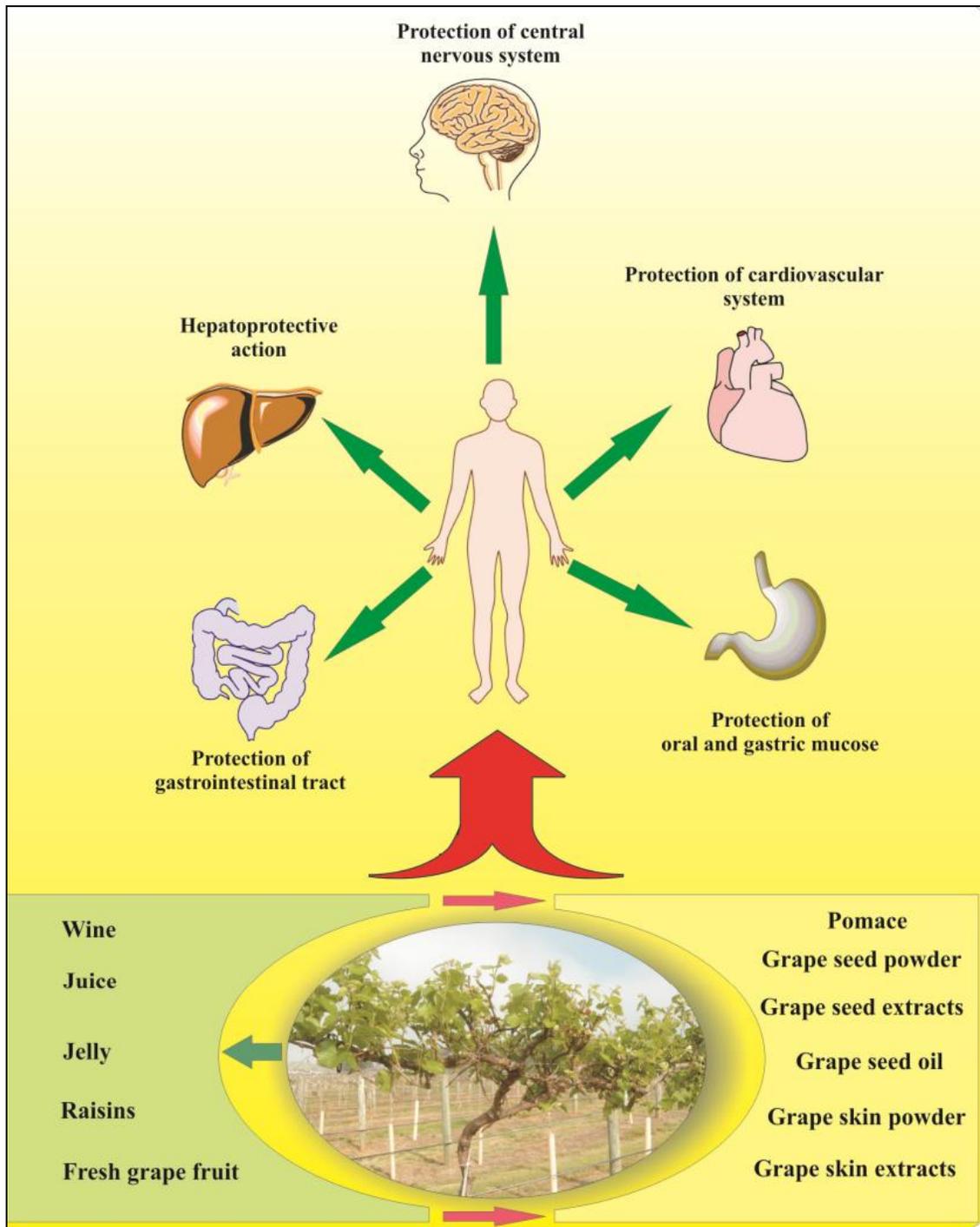
Drying involves the removal of moisture from foods to inhibit microbial growth and prevent spoilage. At the same time, it is important to preserve, the nutritive value, natural flavor, nutraceuticals, and quality the product as far as possible. Fruit leathers get their name from the fact that, when dry, the product is shiny and has the texture of leather. Fruit leather is essentially the same as commercial fruit roll products. They are made by drying puree of fruit on a flat surface. A single fruit can be used or purees of more than one fruit can be mixed to give a mixed fruit flavor. Sugar may be added to the leather to reduce the tartness of the fruit, or sugar may be omitted to produce a product appropriate for use by those on a reduced sugar diet (Sharma, 2012).

5.11 The Process of Manufacturing Grape-seed Extract

- 1. Separate the grape's skin and seed:** It begins with grapes seed extraction process, the skin and the seed of the grape is separated and divided by hand, or by using a strainer or sieve to make the process faster and easier. The grapes are washed and cleaned in the possible product (Laszlo Borocz, 2017).
- 2. Cold press method:** of the skin and the seeds have separated in the next step that sets them aside to dry for roughly 24 hours by setting possible. On an account of the necessary or crucial to the grape seed, extract allows seed to dry faster and produce a small amount of oil. Along with the oil, a small amount of grape juice seep which is removed from the grape skin and seed.
- 3. Separate the liquid from the solid:** adding the grape extracts into the cold press, apply pressure on to them by pressing up to the point at which the separation happen between the liquid.
- 4. Skimming the mixture: explores** as the name of the steps and suggests in which skimming involves separating the solid from the liquid and allowing skimming to apart from each other.
- 5. Save and store the skimmed oil:** It is blatantly clear that in order to make grape seed extract, store the oil in a cool, dry place and away from direct sunlight which will also keep it fresher for longer.

6. **Extract the grape seed:** moves on to the next step to extract the grape seed in order to contain massive amounts of nutrients, grinding the seed and the skin together.
7. **Start grinding the grape seeds and skin:** is the process of grinding the grape seeds and skin as an aid of a powerful competent grinder. In this regard, the grape seeds and skin foreground separate powder depending on personal preference.
8. **Store the grape seed extract in gelatin capsules: further goes to** the last step in the extraction of the grape seed, which stores the grape seed extract and allows the powder to remain fresh undisturbed for a long time. Exploring powder in the capsules put into a bottle (Laszlo Borocz, 2017).

Figure No 5.4 Primary Grape Products and By-Products and Their Beneficial Effects on Human Body



Source: Georgiev, V. Anthony, A. et al (2014)

5.12 Benefits of Grapes

Apart from these varieties and uses, grapes uses for the health

- 1) **Migraine:** attacks the sufferer over the edge of debilitating headaches including loud noise, light, or stress. However, grapes have been proved benefit people from migraines (Vineetha, 2014).
- 2) **Alzheimer's disease:** grapes reduced levels of amyloid-beta peptides in the Alzheimer's disease patients also enhances the health of brain and delays neurodegenerative diseases.
- 3) **Indigestion:** grapes are useful to prevent dyspepsia in curing indigestion and irritation in the stomach.
- 4) **Breast cancer:** Purple colour of Concord grape juice reduces the breast cancer and also regular grape juice consumption shows positive results in the breast tumor mass reduction (Vineetha. 2014).
- 5) **For vision:** Grapes are consider the best stake for eyes, lutein and zeaxanthin to maintain healthy eye. In doing so, people eyesight diminishes because of the ageing, consumption of grapes.
- 6) **Blood cholesterol:** Grapes are used as a medicine for cholesterol to prevent numerous cardiovascular diseases.
- 7) **Kidney disorders: through the** Grapes, reduces uric acid from the human body and help in kidney disorders.
- 8) **Asthma:** Grapes contain high assimilatory power to increase the level of moisture in the lungs, which help an asthma patient for easier breathing.
- 9) **Antibacterial activity: in the** red grapes are highly antibacterial and antiviral and protect from many infections that affect in treating and preventing poliovirus and herpes simplex virus.
- 10) **Constipation:** makes people heavy and irritable through the source of sugar, organic acid and polyose and so having grapes and its juice gives them relief from constipation (Vineetha, 2014).
- 11) **Protection against sunburns: From the grapes and its seed,** extract contain proanthocyanidins and resveratrol which are powerful antioxidants to protect for

the harmful UV radiation that works as a sunscreen and reduces the sunburn's redness.

- 12) **Anti-ageing benefits:** The antioxidants present in grapes along with vitamin C protects the skin from free radicals and reverses the signs of ageing. Grapes are for great skin help and the skin to glow.
- 13) **Skin softener: Of the Grape,** seed extract contains vitamin E which helps in retaining the moisture on the skin, and acts as an exfoliate removing dead skin cells to provide healthy and smooth skin.
- 14) **Rejuvenate the skin:** as a nutrient it helps in collagen formation in growing cells and blood vessels and makes the skin.
- 15) **Cures uneven skin tone:** Green grapes are very beneficial for managing uneven skin tones where Squeeze green grapes apply it on the skin. (Vineetha, 2014).
- 16) **Lighten scars:** Green grapes lighten the scars caused due to acne and Vitamin C removes scar tissues and helps in ligaments formation and repairs the skin.
- 17) **Youthful appearance:** Green grapes speed up metabolism to induce perspiration that gives people a youthful and radiant appearance.
- 18) **Encourage hair growth:** Grapes contain antioxidants to increase the blood circulation in the scalp, which leads to growing hair and gives soft, shiny and manageable hair.
- 19) **Treatment of dandruff:** to apply grape seed oil a day to remove the dandruff and seborrhea dermatitis by acting as a good moisturizer.
- 20) **Treatment of hair-loss: Of having the grapes, vitamin E and linoleum acid help,** losing hair by using its oil helps follicles for strong and healthy hair.
- 21) **Aromatherapy:** Grape seed oil has a non-greasy texture, which is suited for all types of skin. This is why grape seed oil is immensely popular in aromatherapy.
- 22) **Power up Your Weight Loss:** Resveratrol found in grapes work on the body to assist weight loss efforts. It also lowers the cells' ability to store fat and causes fat cells to disintegrate.
- 23) **Protect Your Heart:** Resveratrol in grapes has the ability to improve blood vessels dilatation in allowing the blood to flow very easily in the blood vessels it relaxes blood vessels walls and lowers blood pressure (Vineetha, 2014).

- 24) **Mop up Brain Damaging Plaques:** Grapes contain resveratrol which is used as a brain-protecting agent that mops up the brain-damaging plaques and free radicals that cause Alzheimer's disease.
- 25) **Cancer radiation:** A recent study at the University of Missouri wherein researcher shows resveratrol found in grape skins makes certain cancer cells vulnerable to radiation treatment.
- 26) **Improve Brain Power:** Resveratrol increases the blood flow to the brains by 200%, which speeds up the mental response of the human mind.
- 27) **Longevity Gene:** Resveratrol found in grapes activates the human gene for surviving longevity, because of which grape makes elixir of life.
- 28) **Fight Diabetes:** Pre-diabetics patients consume grapes with having experience 10 percent to drop them in their blood sugar levels in order to the presence Resveratrol. (Vineetha, 2014).
- 29) **Turn down Inflammation:** Resveratrol does have anti-inflammatory property to that in helps curing heart disease by treating inflammation in the arteries.
- 30) **Support Muscle Recovery:** Grapes act as a potent antioxidant and helps the cells and organs eliminate uric acid and other harmful toxins from the body.
- 31) **Bone Health:** Grapes as a source of micronutrients such as copper, iron, and manganese help in the formation and strengthening of human bones to prevent osteoporosis.
- 32) **LDL cholesterol:** Grapes increase nitric oxide levels in the blood to prevent blood clots and reduce the chance of heart attacks by preventing the oxidation of LDL cholesterol that blocks the blood vessels and causes coronary diseases.
- 33) **Indigestion:** Grapes come out as an important way to cure dyspepsia, relieve, and treat indigestion and irritation in the stomach. (Vineetha, 2014).
- 34) **Fatigue:** Juice of Light and white grape is packed with iron content to prevent body fatigue anemia patients eat grapes to promote good iron and mineral levels in the body.
- 35) **Grapes Macular degeneration:** Grapes help to prevent the loss of vision and macular degeneration. Consuming grapes reduces the risks of macular degeneration by 36 %.

- 36) **Immune System:** Grapes are packed with flavonoids, minerals and vitamins C, K, and A which is good organ systems and immunity.
- 37) **Dried grapes:** Dried grapes or raisins treat nutritious disorders such as constipation, anemia, fever, acidosis and sexual dysfunction. (Vineetha, 2014).

5.13 Wine: Grapes are also used for wine making in Maharashtra state of India. If we compare the making process of juice, raisins, vinegar, pekmez, verjus, grapes seed oil and other dried products with wine making process then it's clear that in the process of wine making technological innovations have taken place. And one of the main concerns of this study is the innovation that has taken place in the process of wine making. Hence one of the chapters is dedicated to technological innovations of wine-making (Naik and Thippesh, 2014-15).

5.14 By-Products of Grapes

After the process the grapes are pressed to remove the juice consisting of skins and seeds, is a large percentage of the fruit. It is approximately 40% skin, 50% pulp and 10% seed for processing operations like juice, wine, and jelly production, approximately half of the fruit. A variety of grape seed extract products are coming into the ingredient market as nutritional supplements in fruit-flavored beverages and beverage mixes and appear in hot and cold ready-to-eat cereals, meal replacers, snack bars, yogurts, and frozen dairy desserts. Grapes seed oil is a by-product of the grape industry in a certain ways including pressing, soluble extraction, and through centrifugation. It is with the explanation of these ways the seed oil product marked as a heart-healthy alternative to mayonnaise and its packaging of hang tag that refers to studies showing the oil's ability to raise high-density lipoproteins (HDL) cholesterol and lower low-density lipoproteins (LDL). Pigments extracted from grape skins are other by-products of the juice and wine industry for receiving considerable attention as food ingredients based on the level of usage these pigments have the potential to both color products. The large-scale production of juice and wine from these grapes assures an abundant supply of these by-products.

5.15 Summary

In this chapter, it has been tried to find out the importance of grapes in producing various sub-products like, Juice, Raisin, Vinegar, Pekmez, Verjus, Grapes Seed Oil and other dried products and wine in Nashik district of Maharashtra. This chapter also highlights some of the essential “Products” of grapes and its manufacturing processes.