WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

A Review on Benefits and Uses of Vitis Vinifera (Grapes)

[1]Jayshree Aate, [2]Sunita Ogale

[1,2]VIVA Institute of Pharmacy, Virar (E)
HI Tech College of Pharmacy, Chandrapur

ABSTRACT

Vitis vinifera, known as the grapevine, is native to southern Europe and Western Asia. The fruit is used as food supplement and the seeds and leaves are employed in herbal therapy. The potential health benefits of flavonoids in food and beverages have been discovered for anti-oxidative, anti-carcinogenic, anti-inflmmatory effects etc. The nutritional and phytochemical constituents present in the grape have resulted in its health beneficial effects.

Keywords: - Vitis vinifera, flavonoids, grape, Antioxident activity, Antimicrobial and antiviral effect; Anticarcinogenic activity .

INTRODUCTION

Fruits of Vitisvinifera have been used for thousands of years because of their nutritional and medicinal benefits. They are rich in sugars, flavonoids, anthocyanins and proanthocyanins, organic acids, tannin, mineral salts and vitamins. Grapes skin, especially from the red and black species is rich in resveratrol which is a derivative of stilben. Studies have shown that resveratrol is one of the strongest known natural antioxidants. It is found in a large quantity in black grape juice, skin and seed. [4]The seeds and the leaves of the grapevine are used in herbal medicine and its fruits are utilized as a dietary supplement. In recent years, the grapefruit [Citrus paradise Mact. (Rutaceae)] has received much attentions because of its nutritional and antioxidant properties. Besides ascorbic acid, it also contains abundant flavonoids, which are reported to be the important part of active ingredients. The potential health benefits of flavonoids in food and beverages have been discovered for anti-oxidative, anti-carcinogenic, anti-inflmmatory effects etc. Grapefruit is cultivated principally to obtain the juice. Flavonoid components, articularly naringin, are contained abundantly in this juice. Now, more reporter are mainly focused on the beneficial effects of the grapefruit juice on human health, such as antioxidant, antiallergic, and anti-carcinogenic benefits as well as protection against high blood pressure or cholesterol increase. Surveyors have also found that peels of fruits are the major sources of natural antioxidant, because of their abundant content of naringin, hesperidin and other flavonoids. While grapefruit peels are currently generally treated as waste of juice industry, this practice is not only a waste of resource, but also causes environmental pollution. Some even propose to use these by-products of the juice extraction industry as the important source for natural antioxidants. Therefore, the peeled fruit juice and their peels were studied separately. A number of HPLC methods have been developed for the determination of flavonoids in biological fluids, either alone or in combination . The last two to three decades there has been a growing awareness of the role of diet in the etiology of the chronic diseases that are major contributors turbidity and mortality in industrialized countries. Natural sources have provided us with an excellent ground for discovering newer therapeutically active moieties and plant kingdom is one of these sources for giving us natural drugs. A wide range of bioactive substances have already been identified in foods and drinks and it is likely that many more exist. Many diseases, such as cancer, atherosclerosis and inflammation are caused by free radicals and lipid peroxidation inside human bodies. This kind of risk can be reduced by an appropriate dietary pattern including a great portion of fruit and vegetables 1,2 because of the great amount of natural antioxidants in these plant foods. There are many biologically active substances in fruits including both nutrients and non-nutrients for which protective health effects have been postulated. Citrus fruits, including oranges, lemons, limes and grape fruits, are a principal source of such important nutrients, which are suggested to be responsible for the prevention of degenerative disease. These include vitamins C, folic acid, dietary fibers, potassium, selenium and avoide range of phytochemicals. A great number of epidermiological studies have shown that Citrus fruit consumption is protective in a variety of human cancers.[1]

It is presumed that most, if not all, of this protective effect is due to vitamin C. The frequency of Citrus fruit consumption is more closely related to risk reduction than vitamin intake. This suggests that Citrus fruits contain not one but multiple cancer chemotherapy prevent . Citrus genus belongs to the large family Rutaceae, containing 130 genera in the seven subfamilies with many important fruit and essential oil producers. A genus of green aromatic substance and small trees distributed in the Indo-Malaysian region, South-East Asia and China but cultivated throughout the topical and temperate region of the world. About 22 species occur in India, besides about 15 exotic species have been introduced for experimental trials . *Citrus* occupies a place of considerable importance in the fruit economy of the country. Citric culture as a garden industry existed for centuries in India. It comprises the third largest fruit industry after mango and banana and occupies about7.5% of land under fruits. Among the *Citrus* fruits of commerce oranges (sweet, mandarin and sour) are the most important as fresh fruit and they contribute throughly 80 percent of the world's *Citrus* fruit production.[2]

The species cultivated in India includes: Citrus aurantifolia, C. aurantium, C. deliciosa, C. grandis, C.jambhiri, C. karna, C. latifolia, C. limetta, C. limettioides, C.limon, C. limonia, C. lycopersicaeformis, C.macroptera, C.maderaspatana,C.madurensis, C.medica, C.megaloxycarpa, C. nobilis, C.

paradisi, C.paratangerina, C.pennivesiculata, C. pseudolimon, C. reshni, C. reticulata, C.rugulosa, C. sinensis, C. unshiu . Citrus is one of the most important fruits, which is consumed mostly fresh and has been used as an herbal medicine or additive or food supplement. Citrus fruit and juices have long been considered a valuable part of a healthy and nutritious diet and it is well established that some of the nutrients in *Citrus* promote health and provide protection against chronic disease. Citrus is believed to possess bioactive it such as antioxidant, anti-inflammatory, antimicrobial, suggested to be responsible for the prevention of cancer and degenerative diseases. .The composition of the fruits is affected by climate, growing conditions,various treatments, maturity, rootstock and variety. The beneficial health effects of a diet supplemented with fruit and vegetables have enhanced interest in their bioactive compounds. It has been shown that the positive effect of these natural products is usually connected with their antioxidant compounds . Naringin and hespiridin are the main citrus flavonoids with physiological properties present in grapefruit and orange juice. These flavonoids have been detected in human plasma after orange and grape fruit diets .There are numerous reports of HPLC analysis of the composition of commercial juices, concentrates, fresh oranges, and grapefruit. [3]

Commercial brands of grapefruit juice have been analyzed for their flavonoid content by HPLC. Naringin was identified in all grape fruit juices. Although hesperidin and naringin are the predominant flavonoids in oranges and grapefruit, few investigators have studied their antioxidant activity. The amounts of bioactive compounds in fruit, including citrus flavonoids, are a function of geographical region, climate, soil conditions, type of cultivar, growing season, harvest date, storage, low-dose irradiation, and other conditions. It is natural that authors who study the bioactive compound content and antioxidant potential of citrus and other fruit from different geographical regions have obtained different results. It must be emphasized that the work cited above did not include investigation of the relationship between the amount of flavonoids and the antioxidant potential of the fruit. It was therefore decided to use high-performance liquid chromatography to determine the naringin and hespiridin content of four types of citrus fruit from the same region (Sharon, Israel) and to determine the correlation between the amounts of these compounds and the antioxidant potential of the fruit. Many epidemiological surveys of diet have analyzed the relation between fruit intake and lifestyle-related disease . It has been claimed that fruit consumption reduces blood pressure, hypertension risk and the prevalence of cerebral prevents Alzheimer's disease and gastric cancers teeth and gum condition in elderly persons, glucose tolerance in middle-aged and older women, and mental outlook in middle-aged and older men and women. However, none of these reports clearly tested the protective efficacy of fruit consumption in an international study design. Excess fruit consumption may lead to excess calorie intake and, in consequence, cause obesity and hyperurecemia .Recent surveys of junior high school students and senior citizens in urban areas found fruit consumption has declined. In contrast, the consumption of western-style cakes and jellies by students in women's colleges has increased. The increase in the consumption of confectionery, which contains high levels of fructose and corn syrup, leads to increase intake of isomerized sugar and may cause nutritional problems. One study of a health program that promoted fruit intake, found that as fruit intake increased, lipid intake decreased.[4]

One or more of the citrus flavonoids may be responsible for their possible beneficial effects, although at present such evidence is limited chiefly to in vitro and mechanistic studies. Therefore, it is important that the flavonoid composition of citrus fruits be documented so dietary intakes can be measured and linked to disease out comes. This paper focuses on the flavanone content of grape fruit, lemons, and limes in the genus Citrus, each of which has several varieties. A similar treatment of oranges, tangerines (mandarins), and tangelos is presented in this journal issue. All grapefruit are members of the species Citrus X paradis, the varieties vary in the color of their flesh owing to the presence (pink/red) or absence (white) of lycopene. Although several species of citrus are called lemons or limes (such as C. jambhiri or C. limettioides, respectively),this paper focuses on the several varieties of C. limon for lemons, and C. aurantiifolia for limes as information about the consumer use of the other species was not readily available and the flavanone data was sparse. The goals of this study were to summarize analytic data of acceptable quality from the scientific literature and present values on the flavanones in grapefruit. [6]

History

The origin of the grapefruit, also known by the Latin name, Citrus Paradisi. It is thought that the grapefruit was first found in Barbados during the 1750's as a mutation of the pummelo. Years later, research confirmed that grapefruit is a hybrid of a pummelo (citrus grandis) and the sweet orange (citrus sinensis). Originally known as "the forbidden fruit," it wasn' t until the 1800' sthata Jamaican farmer called the fruit "grapefruit" for the grape-like cluster in which it grows country. During this time, it's believed that grapefruit made its way to the United States in the form of seeds brought by either Spanish or French settlers to Florida. Eventually, grapefruit made its way to South Texas, most likely by visiting Spanish mission aries. The first reported planting of a grove in Texas was in 1893. Initial grapefruit plantings in Texas were the white varieties, followed by pink varieties. John H. Shary, a developer originally from Omaha, Nebraska, was so impressed by the small crop raised by early citrus experimenters that he felt citrus was the crop of the future for Texas. Shary, also known as the "Father of the Citrus Industry," combined his interest in growing citrus with the latest irrigation techniques and a determination to sell valley citrus commercially. In 1914, he bought 16,000 acres of brush land and after clearing it, proceeded to grow his first crop of seeded white grapefruit. The grapevine has about 60*Vitis* species and many cultivars cultivated widely for fruit, juice and mainly for wine. It is classified as V.vinifera L. subsp.vinifera (or sativa),derives from wild progenitor, V. vinifera subsp. Sylvestris and the domestication started 6,000–8,000 years ago in the Near East Vitis genus has major agronomic importance. The V. vinifera widely used in global wine industries among all the grape species. It has proposed that V. vinifera emerged 65 million years ago to Eurasia and still exist both forms in Eurasia and in North Africa. The historical separation into subspecies occurred due to the morphological differences. The geographic disjunction has shown for wild grapes (Vitis spp.) including the 34 American species, the Asian species and the rare European–Middle Asian wild grapevine (V. vinifera subsp. sylvestris). V. vinifera subsp. Sylvestrisis believed to be the living ancestor of modern grapevine cultivars. It is generally grows along river banks alluvial and colluvial deciduous and semi-deciduous forest. The wild type grapevine widely distributed but the progressive has declined due to introduced of anthropogenic pressure on their natural habitats and pathogens populations from North America during the second part of the 19th centers. The grapevine cultivation and domestication have emerged between the seventh and the fourth millennium BC, in a geographical area between the Black Sea and Iran. After that the cultivated forms was spread by humans in Near East, Middle East and Central Europe. For this reason, these are as might comprise secondary domestication centers. In fifth millennium BC, the culture would have started in Greece and Crete. Archaeological studies have exposed a considerable development of viticulture and viniculture between the first and the end of the second century AD. The extensive knowledge of viniculture and viticulture has been documented widely from the archaeological and historical stand point to develop the model of development, expansion and diffusion. However, the identity, history and biogeography of ancestral cultivars and mechanisms of grapevine domestication and varietal diversification remain. [7]

Distribution and Production

The V. vinifera is aperennial tree like and tendrils-climb in vascular plants which is distributed through Asia Minor to and then introduced in Europe. At present, it is domesticated in all temperature regions of the world. It is also commonly found in Asian and European countries, Turkey, Greek, Arabian countries, India, Pakistan, France, Germany . It is one of the largest fruit crops in the world and total grape production was about 67.09 million metric tons (MMt) in 2011 all over the world. The top 20 countreis of grape production in 2011 is shown in. The highest production of grapes in 2011 was found in China mainland (about 9.07 MMt) and the lowest production was found in Republic of Moldova (about 0.59MMt). The total dedicated area for the grapes cultivation was about 7,586,600 ha around the world and it is increasing about 2% per year. The grapes are used for production of wine (71%), as a fresh fruit (27%) and as a dried fruit (2%).

Grapefruits are the only citrus fruit that originated in the Americas. The discovery of grapefruit occurred in the 1750s in Barbados. It is a cross between the pomelo and the orange – fruits that were brought to the Americas by Spaniards as early as the 15th century. Grapefruits were first planted in Florida between the 1820s and 1840s. However, most people planted them for their appearance – large trees with dark green leaves and beautiful yellow fruit growing in clusters. Once people discovered their delicious taste, grapefruit were shipped across the nation.

Varieties

There are over 20 varieties of grapefruit grown in the US, and there are unique differences in grapefruit depending on its growing region. For instance, Florida grapefruit have a thinner peel and are sweeter than the California variety. Florida varieties are available in stores from November through June while California varieties are found in late summer and early fall.

TAXONOMICAL CLASSIFICATION OF GRAPES

- Kingdom–Plantae, Angiosperms, Eudicots, Rosids
- Order–Sapindales
- Family–Rutaceae
- Genus–Citrus
- Species–C.×limon
- Binomial name - Citrus × limon

BOTANICAL DISTRIBUTION

Grapes grows on small, thorny trees which reaches a height of 10 to 20 feet. The leaves of the lemon are dark green in colour and they are arranged alternately on the stem. The lemon has a white, fragrant flower with five petals. This particular flower comes from a lemon cultivar called 'Pink Lemonade'. The leaves of this cultivar are variegated and the fruit is striped. Lemons are oval citrus fruits with smooth porous skin. Some fruits have a pointed tip on the bottom of the fruit while other lemons are rounded at the base. Some kinds of lemons are quite larger than other lemon varieties and resemble elongated grapefruits. Lemon has many varieties few of which includes Bush lemon, Eureka, Lisbon, Ponderosa**,** Variegated Pink, Verna, Villa franca, Yen Ben and Yuzu. The colour range of lemon fruit is from greenish yellow to bright yellow. Lemons look very similar to limes, but lemons tend to be a little larger and are yellow when ripe, where limes are green.

GEOGRAPHICAL DISTRIBUTION

The lemon is both a small every green tree which is native to Asia as well as tree's oval yellow fruit. Throughout the world, the fruit can be used for culinary and non-culinary purposes. Primarily it is used for its juice through the pulp and zest is also used mainly in cooking and baking. The top producers of lemon include India, Mexico, Argentina, Brazil, Spain, Peoples Republic of China, United States, Turkey, Iran and Italy.

NUTRITIONAL VALUE

Following is the nutritional value of 100 grams of raw Grape without peel.

•Carbohydrates-9.32g
•Sugars-2.50g
•Dietary,fibre-2.8g
•Fat-0.30g
•Protein-1.10g
•Thiamine(Vit.B1)-0.040mg(3%)
•Riboflavin(Vit.B2)-0.020mg(1%)
•Niacin(Vit.B3)-0.100mg(1%)
•Pantothenic,acid(B5)-0.190mg(4%)
•Vitamin.B6-0.080mg(6%)
•Folate(Vit.B9)-(3%)
•Vitamin.C-53.0mg(88%)
•Calcium-26mg(3%)
•Iron-0.60mg(5%)
•Magnesium-8mg(2%)
•Phosphorus-16mg(2%)
•Potassium-138mg(3%)
• Zinc – 0.06 mg (1%)

CULTIVATION AND COLLECTION OF GRAPE FRUIT

Origin and Distribution

The exact origin of grapes is unknown, although some believe that they originated from Asia. Grapes have been distributed largely in East Asia, Europe, the Middle East and North America. The cultivars were carried to France before 600 BC. Also, the spread grapes throughout Europe, and they were moved to the Far East *via* traders from Persia and India. Spanish missionaries brought them to the US in the 1700s.

Production levels

The South African table grape export industry is situated in mild and arid subtropical climates. More than 80% of table grape production in South Africa occurs in the Western Cape region. Other production areas include the Northern Cape, East learn Cape, free Stateand Mpumalanga...

Description

Mature plant*:* All grapes are woody, climbing vines. Grapevines use tendrils to attach themselves to other all-growing plants. Their shoots extend to nearly a year because most of the energy goes into growth in length and not in girth. Tendrils occur opposite leaves at nodes and automatically begin to coil when they contact another object. Grapes are cultivated on at other structure for support.

Leaves: Leaves vary in shape and size, depending on species and cultivar. Muscadine grapes have small, round, leaves with dentate margins. Vinifera grapes have large to orbicular leaves, which may be lobed. Leaf margins are dentate.

Buds: Buds are compound in grapes, meaning that they have multiple growing points or stems.

Flowers: Flowers are small, indiscrete, and green, borne in racemose panicles opposite leaves at the base of the current season's growth. Each flower has sepals, petals and stamens. Ovaries are superior and contain two lobules, each with two ovules. The cap is the corolla, in which the petals are fused at the apex, it abscises at the base of the flower and pops off at an thesis.

Fruit: Grapes are true berries, small, round to oblong and consisting of four seeds. Berries are having a fine layer of wax on the surface.The skin of the grape is thin and is the source of the anthrocyanin compounds that give rise tored, blue, purple and black (dark purple) coloured grape.

Green and yellow skinned cultivars are white grapes. Muscadine differs from other cultivar because it has thick skin which is sometimes bitter and tough. The fruit of the muscadine ripens one by one and detaches from the plant at maturity. The berries detach from the vine with a dry stem scar unlike bunch grapes, which remain attached to the cluster at maturity.

Essential parts: The essential part of the grapes would be determined by the intended end use of the plant. Grapes can be eaten fresh or dried or enjoyed in the form of juice and wine.

Climatic requirements:

Temperature: Table grapes typically require a hot, dry climate, i.e. warm days, cool nights and low humidity. These generally produce higher-quality grapes. The season at a particular site must be long enough to allow both the fruit and the vegetative parts of the vine to mature. It must provide enough heat energy to ripen the fruit and vegetation. There must be adequate sunlight hours to ensure that a sufficient supply of carbohydrates is produced by photosynthesis to mature the fruit and vine and to maintain future productive potential for healthier vines and sweetness of the fruit. There must be very little rain during the ripening period—this will prevent various grape diseases. Winter must be long enough to ensure a period of dormancy for the vines, and there should be no late frost because it will be a threat to the young buds. They are sensitive to freezing temperatures, which normally occur in winter and can damage and destroy flower clusters.

Water: Grapes require enough water for better production. Grapes are less tolerant to water logging and water stress. The volume of water required is determined by soil depth and soil bulk density. Soil texture influences soil bulk density, water drainage and water-holding capacity. In areas with summer rainfall the combined effect of these factors determines the volume of water which will be available to grapevines between rains. In South Africa it is

difficult to grow table grapes in areas receiving rain during their period of the grapes, although this depends on the variety. The Lower Orange River region produces earlier table grapes, and therefore there must be little rain during the ripening period to prevent various grape diseases.

Soil requirements: Table grape vines must be vigorous to ensure high yields and quality; the better the soil, the healthier the vines and the greater the chance for height and quality. Table grapes can be grown in a wide variety of soil types. The most important characteristics are good internal drainage and adequate depth. Waterlogged soils will lead to a reduction in vine health hand added difficulties in vineyard management. Grapevines require deep, well-drained soil with a minimum of 75 cm to 1 m of permeable soil with no impeding layers (shallow bedrock, chemical or physical hardpans) for optimum vine growth. Although grapevines can be grown in different soil types, they grow well in a sandy loam soil with average fertility. Regardless of soil type, the drainage must be good because this will help the roots to spread and grow well. Avoid growing grapes in soils that contain clay because it may cause poor drainage and salt accumulation. Grapes are fairly tolerant to a wide range of soils and pH, but do well in a pH of 5.5 to 6.0.

Propagation: Choose certified and disease-resistant rootstock. The most frequent method of grape propagation is bench grafting. However T-budding, layering , and rooted cuttings and (to a limited extent) tissue cultures are used in various situations. The most common method of propagation, trench layering, is used by specialised nurseries. If the soil is to be used for the first time (virgin soil), it must be cleared of weeds, tree stumps and stones. Ensure that wet spots are drained and that the planting site is levelled. Too much subsoil is not recommended on the surface as it will contribute to a poor growth rate. Grapes prefer deep, well-drained, sandy, loam soils. Excessively wet or dry soils should be avoided. Adequate soil preparation is essential because grapes are deep-rooted, long-lived plants. Work on the soil to remove perennial weeds, and humus (peat moss, compost, or aged manure) to improve soil quality.

Planting: Plants can be bought in the spring as bare-root or potted plants. Make sure hat you buy dormant, bare-root grapevines from a reliable nursery or garden centre. When planting, set the plant in a well-prepared hole of the same depth as in the nursery. At planting time, cut grapes back to three or four buds. Plant grape seedlings eight to 10 feet apart in a home garden. Plant one-year-old seedlings and wait for three years for them to produce maximum yields. Make sure that you buy dormant, bare-root grapevines from a reliable nursery or garden centre. Plant grape seedlings three to four weeks before the last hard frost of spring. The vines must be dormentand must not dry out before planting. Make sure vine roots are soaked two to three hours before planting. Grafted cultivars must be planted with the graft above the soil line. Make sure that the grafts are not placed below the soil line because this will produce unwanted suckers. It is important to plant at the same soil depth as in the original container. Planting rows should run at right angles to the slope .In areas that are normally very windy, plant in the direction of the wind to minimize damage.

Fertilization: Soil fertility should be moderate for grapevines. Soil that is too fertile with subsequent excessive vegetal growth can be problematic; in contrast, improve shed soils can require expensive applications of nutrients. It is important for the farmer to know the recent status of soil, so test the soil/soil sample and make recommended amendments before planting. Therefore, perform soil tests every three years as a guide. After a year, apply fertilizer 30 days before new growth begins. Additional nitrogen should be applied if the cane growth is 1 m or less in a year. Additional nitrogen must be applied to avoid nitrogen deficiency. The leaves will show poor colour (light green or yellowish). This is more noticeable on older leaves and during early defoliation. On the other hand, high nitrogen fertilisation promotes vine production at the expense of fruit production. Application of phosphate is beneficial. Fertilisers are applied two to four times a year.

Irrigation: Irrigation to supplement natural rainfall is a requirement for consistent, successful

grape production . Water must be available in adequate quantities when it is needed and the water must be of suitable quality for irrigation. Water quality concerns primarily involve salinity and the quantity of dissolved salts. Existing water wells should be tested for water quality to determine their suitability for grape production. Chlorides or boron in irrigation water may accumulate in grape leaves, and water that is high in sodium may reduce the water permeability of soil. Salts also accumulate in soils and can reduce grape yields. The volume of water required may change in response to day length and growth stage. Young vines grow best if they are watered on a regular basis; apply at least 20 literes per vine per week in two to three applications. Some farmers use a drip irrigation system. It is advisable to keep a weed-free environment to avoid water stress because this will promote growth. Mature vines require 100 to 300litres of water per vine per week in one to three applications. Season at changes may affect the volume of water needed and growth stages. It is important to maintain soil moisture during the critical growth stages of bud burst, flowering period, fruit setting and berry ripening. These periods can be extended by moist conditions. In most cases it is recommended that farmers use to monitor soil moisture. They make it possible to apply the optimum volume of water when it is needed.

Weed control: Maintain a weed-free environment because during the growing season, Weeds suppress the grape crops and this leads to competition for moisture and nutrients, especially if the plants are still young. For better growth, make sure that the yard is clean from early spring until mid summer. Removing perennial weeds from planting sites and keeping growing vines free of competing weeds are essential aspects of grape growing. Mulchingis a valuable way of eliminating many problem weeds. The method of weeding depends on the weed pressure and weeding can be done by three methods, i.e. mechanically, chemically and biologically.

Mechanical method: Weeds can be controlled by hand hoe. The hoe is used to control and remove weeds that surround the bark/trunk. To control weeds, grapevines should be cultivated, using a flat cultivator, a disk or a roller. Avoid cultivation when roots begin to spread out.

Chemical method: Weeds can be controlled through the application of herbicide, depending on species. Follow the label instructions carefully. The use of herbicides is a risk to soil that has a low organic matter content but it remains acceptable although it is harmful to the soil structure. This method must be repeated each year.

Biological control: Grapes can be used for mulching. They must be left on the soil surface to suffocate and repress emergent summer weeds. Any disturbance of the soil will destroy the weed controlling effect of the mulch. Mulching reduces during the growing season.

Pest control: Pesticides and fungicides are applied from early spring up to harvest. Grapes are frequently attacked by grape berry moth, whose larvae feed on grapes, and by birds, which are highly attracted to the grapes. It is difficult to control these pests.

Disease control: Disease control is critical for grape production. To control diseases, use resistant cultivars. Prune the plants. When necessary and if possible, apply fungicides. Sanitation is also important. The following diseases are common when rainfall, humidity and temperatures are high.

Control: Pruning is recommended and it is economical. Prune the vines after the second week of October. This will help minimize e the damage from the disease. All the affected parts must be removed at the time of pruning and be destroyed immediately. Consult your local (provincial) department of agriculture for recommendations on the latest fungicides.

Bacterial leaf spot: The disease is more frequent from February to March and in June and August when the temperature is 25 °C to 30 °C and humidity is 80% to90%. The first symptoms appear on young growing shoots. This disease infects leaves, shoots and berries. On the leaves it appears as minute water-soaked spots on the lower surface of the leaves along the main and lateral veins. The spots coalesce later to form larger patches and brown black lesions on the berries, which become small.

Control: The easiest method is to collect and burn the infected plant parts, this will help minimize the spread of the disease. For recommendation consult your local (provincial) department of agriculture for the latest copper fungicides.

Black Spot : The disease occurs more frequently in areas with a warm and moist climate and extended periods of rain and cloudy weather. The disease attacks the leaves, stems, flowers and berries. It is likely that all the new growth will be attacked during the growing season. The symptoms are usually reddish, brown, spots on the leaves and a black scab on the berries.

Control: Mummified berries left on the vines should be collected and destroyed It is important cultivate.

Other cultivation practices: Bench-grafting is unusual in that the rootstock is either bare-rooted or unrooted at the time of grafting. The ease with which grape rootstocks from dormant hard woodcuttings allows the propagator to handle the plants in this manner.

Harvesting: Because of their high quality requirements at the point of sale, table grapes demand manual labour, technical knowledge and experience. Grapes should be harvested when fully ripe. Colour does not always indicate maturity, so taste-testing is often the best method. Grape clusters should be cut from the vines with a sharp knife.

Harvest maturity: Grapes should be picked when the fruit reaches the desired ripeness for its

intended purpose. As the fruit ripens, the colour changes, the sugars increase and the acids decrease. The timing will vary from year to year. Berries should be sampled daily as the harvest approaches to determine sugar, acid and pH levels. Fruit quality can change under warm con -ditions. Grapes can be kept on the vine for several weeks after maturity or if picked and stored in a very cool, dry, well-ventilated place. As long as no berries are dropping it is best to leave the crop on the vines and pick the grapes as demanded by the market. Unless the weather is rainy, there will be no deterioration. If well protected by foliage, the grapes will withstand cold weather. Possible damage to the crop by birds and bees must be considered in the decision as to whether or not the mature crop should be left.

Harvesting method: To harvest the grapes, use a grape knife or harvesting shears/scissors.

Hold the grapes with one hand and cut upward, away from your hands and arms to prevent injury. Hand shears are safer but are slower and more difficult to use. Do not jerk or pull clusters from the vine as this may crush some of the grapes. Discard all green, immature or diseased fruit. Gently place the fruit into harvesting lugs or boxes and handle as little as possible. Take the container into the shade as soon as possible

POST-HARVEST HANDLING

Sorting: Sorting of grapes can be done by two different methods by hand or electronically. For the grapes to be sorted effectively the grower has to use many workers. Sorting should always be done in the vineyard first. The grapes are destalked and then put onto the sorting table, which moves the berries by means of vibrations. During sorting, leaves, stalks, snails and uncoloured berries that come through the removed. The grapes are then crushed and put into the fermenter without leaves and stalks. Electronic sorting is expensive, but it has been used successfully. Fruit is fed onto a horizontal conveyer belt and then dropped onto another horizontal conveyer belt. Between these conveyer belts are sensors and lasers that are connected to a computer. The computer has been programmed to distinguish between different coloured fruit by running fruit with desirable and undesirable qualities past it. If the computer recognises that fruit falling through the air does not meet the specifications it is shot out of the air by an air nozzle and then lands onto another conveyer belt. The use of this technology makes it possible to sort individual berries according to differences in size (eliminating small green berries or large berries),and to eliminate berries that are not fully coloured, along with stalks, leaves, pine needles, insects and berries showing signs of botrytis, mealy bug, bird damage, etc.

Grading: The harvested bunches are graded according to the size of their be arrises and their colours. Before grapes are packed the decayed, undersized, broken and discoloured berries are removed by their pedicels from the selected bunches, using long scissors. It is important for the workers to wear rubber gloves.

Packing: Grapes for the local market are packed into ventilated, corrugated box 2 kg to 4 kg of grapes. The boxes are lined with fine shredded paper, which is spread at the bottom and the top of the box for protection (cushioning). The open flaps of the box are secured firmly by means of adhesive tape. Grapes that are sent to foreign markets are packed in five boxes, 500 × 300 mm in size to accommodate 5 kg of grapes. The graded bunches are weighted into 5 kg lots of plastic trays. One or two bunches weighing between 350 g and 650 g are placed in small, thin polythene pouches. Before the pouches are placed into the carton, a sheet of bubble wrap is spread with its rough surface facing toward the base of the box. A white, soft polythene liner is spread over the top of the bubble sheet. These pouches are arranged in a single layer before pre cooling of the grapes. After pre cooling, dual purpose SO2 release pads are placed over the pouches and the polythene liners are folded in.

Storage: The grapes should be pre cooled promptly after harvest in separate rooms with large refrigerating capacity, high relative humidity and high air velocity. They are normally pre cooled at 1 °C to 2 °C within six hours of harvest. After precooling, the dual releasing SO2 pads are placed with their coated surfaces downwards on the filled plastic pouches and covered with the polythene liner. The boxes are closed and shifted into cold storage. The arrangement of the boxes in cold storage is very important to ensure uniform cooling of all the berries in all the boxes.

Transport: The cool chain is essential during the transport of export quality o f the way from the farm to the customer. It helps to maintain the temperature inside the box at the same low level as in cold storage .The various stages of the cool chain are:

• Cold store at the farm.

• Refrigerated truck from the farm to the airport or harbor.

• Cold store at the airport or harbor.

• Maintaining cold store temperature in the hold of the cargo aircraft.

Marketing: No grapes should be planted without a marketing plan, and a total management plan should always precede planting. If the grower wants to concentrate on early marketing he/she must plant early grapes. The grower's choice of cultivars will still depend on the requirement of the market. Some of the cultivars are suitable for the local market, for example Pirobella. This is because its berries are too small for export. Distance to the harbours can be a major constraint for the export market if any existing cultivars are planted. Cultivars like Queen of the Vineyard and Alphonse Lavallé are suitable for the export market because they are of good quality.

Utilization: Grapes are consumed as fresh or dried fruit, or as juice. As dried fruit, it used in cakes, sweets and salads (raisins, currants and sultanas). It is also used for making jam. Grapes are the main substance of wine. Grape vinegar is generally used as flavourant in salad dressings (e.g. mayonnaise), marinades, chutney, pickles. Because of its preservative qualities, vinegar is used for food preservation, e.g. canned fish, meat and vegetables. Grape seeds have antioxidant characteristics and are used in the pharmaceutical industry.

Antibacterial activity: The Aqueous extracts of grape skin were screened for the antibacterial activity against gram-negative bacteria such as *Aeromonas hydrophilic, Escherichia coli, Salmonella typhi O, Salmonella typhi H, Klebsiella pneumonia* and gram positive bacteria viz., *Bacillus subtillis, Staphylococcus aureus*using agar-well diffusion method. The antibacterial activity was presented by minimum inhibitory concentration through zone of inhibition (mm)

Fourier transform infrared (FTIR) analysis: FTIR spectrophotometer was used to identify the characteristic functional groups in the grape skin extracts. The aqueous extract (5.0mg), were added with potassium bromide (KBr) in a mortar and pressed at pressure of 6 bars within 2min in order to prepare a thin translucent sample discs. The FTIR spectrum was obtained using Perkin Elmer 2000 spectrophotometer system with a scan range from 400 to 4000 cm-1.

In vitro antioxidant activity: The Stable 1, 1-diphenyl-2-picryl hydrazine (DPPH) free radical scavenging activity of the AE was measured according to the methods of Blois, (2001) but with minor modifications. One ML of 0.2 MM DPPH solution in methanol was mixed with the 1mL extracts of 50,

100, 250, 500, and 1000 μg/ml The mixture was incubated in dark for 20min at 27°C and the absorbance was measured at 517nm. The free radical scavenging activity was determined by comparing its absorbance with that of a blank solution. Ascorbic acid was used as a standard. The ability to scavenge the DPPH radical was calculated using the following equation, A=13, A=20.

Essential oil: Citrus paradisi essential oil (EO) was obtained as a by-product in a citrus juice extraction plant. The method used for juice extraction was extruding or cold pressing in which follicular glands of citrus peel is mechanically ground torelease its content. For this purpose, a Food Machinery Corporation (FMC) extract or was used. The objective of this process was to separate oil from fruit juice.

Microorganisms and growth conditions: Forty autochthonous bacterial strains were obtained from "Institutional Collection of Wild Microorganisms" - Facultad and Ciencias Exactas y Natural (School of Natural and Exact Sciences, North eastern University of Argentina (Acronym: VCOR). In this study, the following were used as food spoilage bacteria: Lactobacillus (Lb.) plantarum (11strains),Leuconostoc(Leuc.) mesenteroides subsp. dextranicum (1 strain), Lactococcus (L.) lactis subsp.diacetylactis (1 strain) and L. lactis subsp. lactis (11 strains). Additionally, Staphylococcus aureus (3 strains) and Escherichia (E.) coli (13 strains) were tested aspathogenic bacteria of food. Bacterial strains were preserved on Milk-Yeast extract with glycerol (15%, v/v) at -20ºC. Lactobacillus strains were cultivated in MRS medium (Merck) at 30ºC;Lactococcus lactis strains were cultivated in El liker medium (Biokar Diagnostic) at35ºC; Staphylococcus aureus were cultivated in Brain Heart Infusion (Merck) at 37ºCand Nutrient medium (Britania) was used for proliferation of E. coli strains at 37ºC. Working bacterial cultures were transferred (2%, v/v) to a fresh broth three times prior to experiences.

Lactic bacteria count: Appropriate further decimal dilutions of bacterial suspensions were made in a peptone-saline solution (0.1-0.85%, w/v) for numeration of lactic bacteria (LAB) according to Aerobic Plate Count (Maturin and Peeler, 2001). Forgrowth, Elliker agar (Biokar Diagnostic) was used with incubation at 30°C for 48h.

Screening of antibacterial effect: Antibacterial activity *in vitro* of EOs was assayed using Disk diffusion method (Ortez,2005). Briefly,50l of EO were placed on sterile 0.55cm diameter filter paper discs (WhatmanN°1) located on the surface of adequate media in plates previously spread with 100l of 08 CFU/ml overnight cultures. Plates have been allowed to dry for 15min in a sterile environment, inverted and incubated for 24h at optimal temperature of growth. Diameters of zones of inhibition (ZOI) were measured using Vernier caliper. Controls were bacterial cultures without EO exposure.

Characterization of essential oil antagonistic effect on cell growth: Considering MIC results, the effect of this essential oil on the growth of wild strain was determined at different times by total count and spectrophotometric absorption (JASCO spectrophotometer V-630, Japan) to 560nm(Abs560nm). Active strains were transferred (2%, v/v) to two series of flasks containing Elliker broth, in sufficient number (30 tubes) for total monitoring of growth; third series of flasks without in coloum were used for blank test. Three series were incubated in water bath with low speed agitation (VICKING Thermostatic bath, Dub off model, Argentina) to 30°C during 120h. When cells reached exponential phase of growth, corresponding to 0.7-0.8 of spectrophotometric absorption, an aliquot (100µl) of EO dilution (5:95, EO: Tween 80) was added to each flask of one series and the other was used as positive control to normal growth. At different times, one flask from each series was used for determination of Abs560nm and count of viable cells.

PHARMACOLOGICAL ACTIVITIES RELATED TO DIFFERENT CHEMICAL CONSTITUENTS OF CITRUS

Citrus species show broad spectrum of pharmacological properties these properties are related to the presence of specific phytochemical groups.

Vitamin C: Citrus species are best known for being rich source of vitamin C. Vitamin C is an anti ascorbic factor and possess antioxidant properties.

Flavonoids : Citrus species are rich in flavonoids. *Citrus* flavonoids have antioxidant properties. They excellent hydroxyl radical scavenging activity18-20 superoxide scavenging activity and anti lipoperoxidant activity.

Some health related properties of flavonoids, which are based on their anti-oxidant activity:

A) Anti-carcinogenic properties: Plant flavonoids have attracted attention as important dietary cancer chemo protective agent Citrus flavonoids possess anti-carcinogenic and anti-tumor activities. Citrus flavonoids can inhibit the invasion of chick heart fragments and mice liver by malignant mouse tumour cells. Hesperidin and diosmin have exhibited anti-carcinogenic activities in various *in vivo* studies. The polymethoxylated flavones have been shown in numerous *in vitro* studies to exert strong anti-proliferative action against cancer cells27-32 antigen activated T lymphocytes33 gastric cancer cells34, prostate cancer cells35 squamous cell carcinoma and anti-metastatic actions against human breast cancer cells have also been observed with tangeretin. Naringin, hesperidin, nobiletin and tangertin inhibit the bacterial mutagenesis. Quercetin in experimental diets lowered the incidence of colon tumors in azoxymethanol treated rats38 and fibrosarcoma in mice. Naringenin reduces lung metastasis in a breast cancer resection mode.

b) Cardiovascular properties: Several studies indicate that certain flavonoids may have a protective and therapeutic effect on coronary heart disease.

1. Effect on capillary fragility: The effect of flavonoids on bleeding and capillary fragility was reported by SzentGyorgyi in 1938, capillary damage can be treated with flavonoids. Diosmin produces a significant decrease in venous capacitance, venous distensibility and venous emptying time.

2. Effect of platelet aggregation: Citrus flavonoids showan anti-adhesive and anti-aggregation action against red cell clumping. Quercetin, fisetin, kaempferoland myricet inhibit platelet aggregation.

3. Effect on coronary heart disease: Flavonoids inhibits the oxidation of low density lipoprotein (LDL) and reduce thrombotic tendencies. Flavonoids reduce the rate of oxidized compound formation, thus inhibiting the growth of atherosclerotic complications.

4. Hypercholesterolemia: Dietary intake of orange juice or grape fruit juice reduces hypercholesterolemia. Hesperidin and naringenin mixture lowered serum cholesterol level in rats and in ovaryectomized mice. Tangeretin, nobiletin or without causing toxic effect.

5. Hypertension: Long term administration of hesperidin and glucosyl hesperidin brings about antihypertensive effect in hypertensive rats.

c) Hyperglycemia: Citrus flavonoids play important roles in preventing the progression of hyperglycemia, partly by binding to starch, increasing hepatic glycolysis and the glycogen concentration, and lowering hepatic gluconeogenesis50.Hesperidin and naringin both significantly lowered the blood glucose level. Intravenous injection of diosmin reduced hyperglycemia induced by alloxan in rats.

d) Anti-inflammatory, Anti-allergic and Analgesic activity: Citrus flavonoids like hesperidin, diosmin, quercetin and other flavonoids have shown dose dependent anti-inflammatory activity by influencing metabolism of arachidonic acid and histamine release53-56. Diosmin reduced edema formation and inhibited the synthesis of prostaglandin E-2 (78.5%), prostaglandin F-2 (45.2%) and thromboxane B-2 (59.5%). Tangeretin and nobiletinexhibit slight to moderate activity. Hesperidin is an effective component with anti-allergic action58.Hesperidin inhibits bone loss and decrease serum and hepatic lipids in over miced. Citrus be rgamia efficiently block the inflammatory actions induced by IFN-γ and h on human keratinocytes. Naringenin may provide protection through suppression of inflammatory pathways Apigenin shows antidepressant activity some flavonoids shows anti-allergic, and anti-anxiety activity in activated BV-2 microglial cells.

e) Anti-microbial activity: One of the properties of flavonoids with their physiological action in the plants is their antifungal and antiviral activity. Quercetin and hesperitin actively inhibit the infectivity and/or replication of Herpes simplex virus, Polio viruses, Para influenza and Sviruses. Naringin metabolites have antibacterial activity. Bergamot peel is a potential source of natural antimicrobials that are active against Gram-negative bacteria**.**

f) Anti-anxiety, antidepressant and anti-allergic activity: Apigenin shows antidepressant activity some flavonoids shows anti-allergic, and antianxiety activity.

BIOLOGICAL ACTIVITIES OF GRAPES

Although a large number of compounds have been isolated from the grape, only some of them have been found to be having biological medicinal activities, as summarized in The major medicinal properties of grape and its constituents are antioxidant, anti-carcinogenic, immune modulatory, anti-diabetes, anti-atherogenic, neuroprotective, anti-obesity, anti-aging, and anti-infection. In particular, several biological activities of resveratrol, a major compound extracted from the skin and seeds of grape, have been reported.

Antioxidant property: Oxidative stress is a hallmark of various health problems. Resveratrol (3,5,40-trans-trihydroxystilbene) is a natural phytoalexin abundantly found in grapes and red wine, which has potent antioxidant property. In anotherstudy, proanthocyanidin, a variant of resveratrol, isolated from grape seed extract also exhibited antioxidant protection in smokeless tobacco-induced cellular injury, and this activity has been ascribed to be due to alteration in Bcl-2and p53 expression in in vitro and in vivo systems. Moreover, skin and seeds of grape are good sources phytochemicals like gallic acid, catechin, and epicatechin ,which are appropriate raw substrates for the production of antioxidative dietary supplements. Antioxidant the conjugates could also be obtained from the white grape pomace. Against oxidative stress and reduce the risk of free radical damage and onset of chronic diseases. Surprisingly, dried grape seeds, obtained after the color extraction and alcohol distillation of wine pomace, still kept considerable flavanol content with high antioxidant activity, even after exposure to high temperatures. The polyphenol is a natural polyphenol from Amur grape crest, and it has been documented to promote inhibition of lipid peroxidation and to have a glutathione-saving effect that might be due to the contents of polyphenols, which capture free radicals.27 On the basis of these observations the consumption of fruit of the grape and or its constituents may be part of therapeutic regimens to suppress oxidative stress-related threats. Another important group of components present in grapes is the anthocyanins, which belong to the flavinoid family. In recent years, several studies have shown that anthocyanins displaysa wide variety of biological activities, including antioxidant,anti-inflammatory, antimicrobial, and anti-carcinogenic activities. Antioxidant activity of anthrocyanins have been extensively studied and reviewed elsewhere.

Anti-carcinogenic activity : Cancer is a rapidly growing health problem that is the biggest challenge to researchers and medical professionals regarding various prevention and therapeutic strategies. Dietary intake of many vegetables and fruits, including grapes, has been found to reduce the risk of occurrence of cancer. Resveratrol is well characterized as having anti-carcinogenic effects as well as anti-neoplastic properties. Various molecular mechanisms for anti-carcinogenic effects of resveratrol have been proposed, and one of these is supposed to be associated with mitochondrial release of cytochrome, formation of the some complex, and activation. The anti-proliferative and pro-apoptotic effects of resveratrolin breast cancer cells are thought to be through accumulation of ceramide and the phenolic moiety of stil flenoids, which is necessary to induce ceramide associated growth inhibition.The inhibitory effects of red wine polyphenolics on human breast cancer cells have been demonstrated to be due to inhibition of cell proliferation by flavonoids, which in turn could be related to the inhibition of calcium calmodulin associated phosphor diesterase activity, indicating that flavonoids interfere with the function of the second messenger calcium. Thus, certain grape wine ingredientst hat have anticancer properties may be helpful for developing functional neutraceuticals with anticancer properties. Lung cancer cells, found that resveratrol could inhibit (by 50%) the growth of cells and could enhance the activity of a chemotherapeutic agent for lung cancer treatment; based on these findings, they recommended that resveratrol could be involved in an adjuvant anti-carcinogenic therapy for lung cancer.

Grape Flavonoids and Human Health: Currently, there are thousands of grape-derived products on the market including juices, wines, jam, jelly, raisins, and others. Recently, it was found that even byproducts, obtained as a result of grape processing (pomace, seeds, skins, seed oil) have high

nutraceutical values and were commercialized in various forms of different powders, granulates, concentrated or dried extracts and other innovative means of packaging. Here some recent scientific facts, concerning the effects of these products on body health status are briefly discussed.

Brain Function: Consumption of flavonoid-rich grape products may have a significant beneficial effect on brain function and central nervous system. Grape flavonoids, specifically anthocyanins, can prevent neuro generative processes both by inhibition of neuro-inflammation and by reducing oxidative stress. A clinical study demonstrated that 12 weeks supplementation with Vitis labrusca "Concord" var. grape juice in the diet may have neuro cognitive benefits in older adults with early memory decline. Consumption of "Concord" var. grape juice was also found to improve memory functions in older adults with mild memory decline . Recently, it was demonstrated that polyphenol rich grape seed extract has a significant capability of disrupting and disintegrating the ultra structure of native paired helical filaments (a key neuro pathological feature in Alzheimer'sdisease) .The authors showed that resveratrol was ineffective in this process but rather catechin and epicatechin were involved.

Obesity and Diabetes: Metabolic syndrome related diseases and obesity are the most prevalent nutrition-related issues in the United States .Evidence suggests that polyphenols in grapes and grape products may reduce metabolic syndrome and prevent development of obesity and type2. diabetes, by acting as multi-target modulators with antioxidant and anti-inflammatory effects Freeze-dried grape powder and grape powder extracts, obtained from red, green, and blue-purple seeded and seedless California grapes were tested for their effects on glucose tolerance and inflammation in obese mice . The authors found that grape powder acutely improves glucose tolerance and chronically reduces inflammatory markers in obese mice .They also reported that quercetin-3-*O*-glucoside was the compound with the highest bioavailability in grape powder extracts and can reduce several inflammatory markers in human adipocytes. Animal model study showed that, in addition to the currently known anti-inflammatory and antioxidant activities, grape seed extract prevents metabolic syndrome, type 2 diabetes and obesity, also by modulating of metabolic endotoxemia and improving of gut barrier integrity .

Cardiovascular Diseases: Several studies have shown that consumption of grape products may have beneficial effect on cardiovascular system by enhancing endothelial function, decreasing LDL oxidation, improving vascular function, altering blood lipids, and modulating inflammatory process. It has also been demonstrated that consumption of flavonoid rich purple grape juice may attenuate cardiovascular diseases and inhibit thrombosis .Clinical study suggested that this effect is probably due to the suppression of platelet-dependent inflammation by significant decrease in levels of platelet-dependent superoxide and the inflammatory mediator sCD40L after consumption of purple grape juice..Recent research showed that consumption of grapes hasanti-oxidative effect and increases the levels of anti-inflammatory factors in the absence of dyslipidemias in men with metabolic syndrome .

Cancer Prevention: Anticancer properties of grapes and grape products have been widely discussed in the scientific literature. The remarkable anticancer effect of grape products is considered to be due to their unique mixture of polyphenolic compounds with various biological activities . Flavonoids are the main group of active anticancer constituents in grape products, and are concentrated mainly in grape skins and seeds.. Researchers have shown that grape skin extract possesses chemotherapeutic efficacy against breast cancer with metastases in model system .Recently, extracts of raisins from two grape varieties (V. vinifera "Currant" and "Sultana" var.) were investigated for their effect on human colon cancer cells .The authors found that both extracts exhibited cancer preventive efficacy on colon cancer cells by having antioxidant and anti-inflammatory effects .Treatment of human pancreatic cancer cells with grape seed proanthocyanidins significantly reduced cell viability and induced apoptosis in a dose- and time-dependent manner.

BIOLOGICAL APPLICATIONS OF GRAPES

These effects are caused through involvement of activation of caspase-3 and caspase-9.8 Kim etc. have reported that resveratrol inhibited the growth of human T cell lymphotrophic virus-1-infected cell lines, at least in part, by inducing apoptosis mediated by down-regulation in survivin expression. In a study with breast cancer cells resveratrol has been found to induce apoptosisvia p53-dependent pathways. Additionally, heyneanol, a tetramer of resveratrol, isolated from the roots of Vitis amurensis, has been found to induce cytochrome released from mitochondria into the cytosol and subsequent activation.

Anti-inflammatory and immunomodulatory

Properties: The role of inflammation is widespread in various immune pathophysiological conditions. The main target of current research is to identify anti-inflammatory natural components to treat various inflammatory diseases. Thus far several findings have established that resveratrol has potent anti-inflammatory and immune modulatory activities. Martin etc. reported that resveratrol considerably reduced the colonic injury, index of neutrophil infiltration, and levels of cytokines in vivo. However, resveratrol could not reverse the increased prostaglandin (PG) E2 levels but produced a significant fall in PGD2levels. It targeted the PGH2 synthases, cyclooxygenase (COX)-1 and COX-2, that catalyze the synthesis of PGs via sequential COX enzymes while peroxidase reactions were inhibited. Treatment of cells with phorbol myristate acetate induced COX-2, causing a marked increase in PGE2. Resveratrol also inhibited phorbol myristate acetate-mediated activation of protein kinase C. 45Resveratrol and quercetin have been identified as novel non-steroidal compounds with anti-inflammatory activity that have applications for the treatment of inflammatory diseases. These molecules inhibit both interleukin (IL)-8and granulocyte-macrophage colony-stimulating factor release from A549 cells. Resveratrol, but not estradiol, inhibited cytokine-stimulated inducible nitric oxide (NO) synthase expression and nitrite production in human primary airway epithelial cells. The phagocytosis rate has been found to increase in a human promonocytic cell line, when treated with resveratrol and quercetin, whereas both polyphenol sdemonstrated cytostatic activity and a pro-intraphagocytic effect on U937 cell growth.

Anti-diabetic property : Currently a large part of the adult population world wide is suffering from diabetes , and prevalence of the disease is increasing day by day. Until now no therapy has been available to treat diabetes, and various therapeutic strategies have also been applied to suppress its increasing prevalence. Among these strategies the use of various natural components is common, of which grapes and its constituents are one.

demonstrated that the insulin response to the whole fruit of the grape was significantly higher than that to juice alone. This led to speculation that the glucose in grapes is more insulinogenic than those in orange sand apples. The plasma insulin and glucose responses to fruit depended on the fiber and glucose content. Oleanolic acid and aleanolic aldehydes present in grape skin have insulins cretor activities.

Cardioprotective effects: Among the biggest health problems today is cardiovascular diseases, which affect around 12% of the adult population world wide. The pathophysiology of cardiovascular diseases is very complex, and therefore it is termed as metabolic syndrome. Cardioprotective effects of various natural components have been investigated; here we discuss the role of grapes. Purple grapes have partial antithrombotic effects due to the availability of phytochemicals. Epidemiologic studies suggest that red wine from grapes is associated with are duced incidence of mortality and morbidity from coronary heart diseases, which might be due to changes in lipid metabolism, antioxidative effect, and changes in hemostasis. It has been reported that moderate intake of red wine increases high-density lipoprotein cholesterol, decreases LDL cholesterol, decreases the fibrinogen level, and inhibits platelet aggregation; this could positively influence stress, fear, anxiety, and depression. A study from the University of Wisconsin reported that grape juice improved blood flow by6.4% and protected LDL from oxidation. Research revealed that the flavonoids in grape juice decreased the tendency of blood to clot and that regular use of grape juice could reduce the risk of cardiovascular disease, a safer way to achieve protection against heart disease than wine. Grape juice also inhibits platelet activity and protects against epinephrine activation of platelets as well as enhances endothelial production.

Grape seed extract reduced aldehyde content of the heart, indicating reduction of oxidative stress during ischemia and fusion. The hearts of the grape seed extract-fed individuals are resistant to myocardial is perfusion injury, suggesting a cardioprotective role of grapes. The cardioprotective effect has been attributed to antioxidants present in the polyphenol fraction of red wine. The wine extract, resveratrol, and proanthocyanidins are equally effective in reducing myocardial ischemic reperfusion injury, which suggests that polyphenolic antioxidants in wineplay a vital role in cardioprotection. Grape seed proanthocyanidin extract significantly reduced the appearance of apoptotic cardiomyocytes and appearance of reactive oxygen species in the ischemic fused hearts, while functioning as an in vivo antioxidant. The proanthocyanidin fed animals were resistant to myocardial ischemia reperfusion injury asevidenced by improved recovery of postischemic contractile functions. A plausible mechanism of action of grape red wine for cardioprotection was found to be through inhibition of the c-Jun N-terminal kinase-1 and c-Jun pathway, which might lead to inhibition of production of reactive oxygen species and rate of apoptosis. The flavonoids in grape sare good inhibitors of plasminogen activator in vitro, which are present in grapes in the form of proanthocyanin. Hence grape juice may be a useful alternative dietary supplement to red wine without concomitant intake of alcohol Resveratrol is a potent anti-arrhythmic agent with cardioprotective properties, and the same could be correlated with up-regulation of NO production. Resveratrol suppresses levels of serum triglyceride and very-LDL (VLDL) and LDL cholesterol. This hypocholesterolemic action of resveratrol is partly attributed to an increased excretion of neutral sterols and bile acids into feces.

Neuroprotective property: The increasing prevalence of neurodegenerative diseases has attracted researchers to examine various components that can be used to treat prevent generation . Investigations of whether polyphenolic antioxidants off protective effects beyond the cardiovascular system and whether polyphenols from other plant sources offer beneficial effects to human health of interest are useful. Animal models have provided information clearly indicating the ability of grape polyphenols to ameliorate neuronal damages due to chronic ethanol consumption. Resveratrol has shown protective effects on neuron cell death induced by ethanol and other oxidative agents.68 Resveratrol is a potent neuroprotective agent in focal cerebral ischemia. Recently, it has been reported that resveratrol protects against ethanol induced neurotoxicity.

Effect on obesity and aging: Obesity is the main growing health problem leading to mature morbidity and mortality in a major part of the world's population. The main cause of obesity is high energy (fat) intake through food. One of the strategies to inhibit prevalence of obesity may be suppression of fat absorption from the gastrointestinal tract. Grape seed extract in riched with compounds that inhibit gastrointestinal digestion of lipids through inhibition of lipase enzymes (pancreatic lipase, lipoprotein lipase, and hormone-sensitive lipase in vitro)may provide a safe, natural, and cost-effective weight control treatment. Thus, grape seed extract may have its potential application as a treatment for obesity. Recently it has been reported that various analogs of resveratrol have the capacity to reduce insulin resistance by enhancing energy homeostasis. Resveratrol is also known to interact with numerous proteins and pathways involved in pathogenesis of obesity, including mitochondrial ATP synthase and complex Aging is a progressive accumulation of changes as time progresses and is responsible for the ever-increasing likelihoodof disease and death. The precise cascade of pathologicalevents responsible for aging mainly is the enhanced production of free radicals. The deleterious effects of free radicals on proteins, nucleic acids, and fats as well as enhanced glycosylation of proteins and DNA are prevalent during aging. Partial insulin resistance may be a common etiology, behind the biological alterations of advancing age. Grape seed proanthocyanidin extract has been demonstrated to improve insulin sensitivity and ameliorate free radical formation by reducing the signs symptoms of chronic. Age related disorders. Resveratrol and various anthocyanins of grapes have been well established as having antiaging effects through various mechanisms, of which the antioxidant property is the major one.

Antiviral activities: Resveratrol has been found to show anti-herpes simplexvirus activity as a cream with 12.5% and 25% resveratrol, which effectively suppressed lesion formation. Hepatitis is a widespread form of disabling viral infection of the liver. Grapes have been shown to improve the systemic condition of hepatitis-affected liver in experimental animals. Resveratrol synergistically enhances the anti-human immune deficiency virus type 1 activity of the nucleoside analogs zidovudine, zalcitabine, and didanosine. It was not toxic to cells and by itself reduced viral replication by 20–30%.

Other health beneficial effects of grapes: Resveratrol is suggested to be a potent food factor capable of suppressing proteinuria, albumin anemia, and hyperlipidemia. The glycosylation of resveratrol by resveratrol glucosyltransferase is distinct from glycosylation by the glucosyl transferase (s) active on the other phenolics. Resveratrol diffuses rapidly across thei ntestinal epithelium .[81]

Uses of Grape Fruit

Human: Cultured for fruit, eaten fresh or processed into wine, raisins, juice, with some cultivars adapted for the canning industry. Grape seeds contain 6–20% oil, used for edible purposes, soaps, and as a linseed substitute. The leaves of this and other species are eaten in other cultures.

Grapes Medicinal Uses and Health Benefits

Grapes are highly beneficial for health and known as the 'Queen of Fruits'. Grapes are rich in vitamins, minerals and antioxidants. Grapes are beneficial for many diseases and disorders such as kidney problems, constipation, muscular degeneration, fatigue, indigestion, cataract, etc. It is full of many important vitamins like Vitamins A, C, K, Vitamin B, B6, B-Complex, and Folate. Grapes contain minerals such as potassium, calcium, magnesium, phosphorous, iron, calcium and selenium. Grapes are containing powerful anti-oxidants, flavonoids, and polyphenolic, which helps to contend free radicals.

Grapes for heart disease prevention

Grapes are one of the few delicious fruits which is effective in preventing of heart diseases. Grapes increase the presence of nitric oxide in blood which acts like as blood clots breaker thereby reduces the risk of heart disease. The antioxidant flavonoids checks the oxidation process of LDL cholesterol thus reduces blood vessel blocks. The presence of polyphenol enhances blood movement and reduces the risk of cholesterol and plaque formation on arteries. Resveratrol which is found in grapes, known for strengthening of heart muscles. The phyto-chemicals such as Pterostilbene and Saponins help to bring down cholesterol.

Grapes for constipation cure

Grapes are helpful in curing of constipation. It contains adequate quantity of cellulose which is beneficial for treatment of constipation. Grapes also contains organic acid and sugar. Dried grapes called raisins are helpful in relieving of constipation. It is good to solve indigestion and stomach irritation.

Grapes for cancer prevention

In a recent scientific research, it has been confirmed that the grapes juice helps in reduction of mammary tumour. The presence of resveratrol signifies its anti-cancer properties. It contains anthicyanins and proanthocyanins . which have anti-cancer properties. Caffeic acid as well as bio-flavonoids fight cancer at the cellular level. The powerful anti-oxidants present in grapes protect against colon cancer, prostate cancer and breast cancer.

Gapes for hypertension

Grapes are having many minerals such as potassium, magnesium, calcium, phosphorous, iron, copper, zinc, and selenium. These are some of the few minerals which are necessary for proper functioning of the body system. Out of these minerals, the most vital minerals in grapes are Potassium and Magnesium. These two minerals help to maintain blood balance and blood pressure, and reduces the risk of hypertension. Potassium and magnesium also show good results with depression and enhances immunity of the body. So, grapes and grape juices may be taken as hypertension diet for hypertension treatment.

Grapes are good for digestion

Grapes are known for anti-microbial properties as it has the capability of inhibiting the growth of many harmful bacteria that are found in the human intestine and stomach. Taking grapes extract helps to cure stomach ulcer. Red grapes are also known for anti-bacterial and anti-viral properties.

Grapes for anti-ageing

Grapes are containing powerful anti-oxidants such as flavonoids and resveratrol. These phyto-chemicals are efficient in controlling of free radicals of the body. These anti-oxidants not only contend the free radicals, yet fight against heart disease and cancer too. Regular eating of grapes is good in the improvement of muscles and eye vision.

Grapes home remedies

Grapes can be used in prevention and management of various diseases and disorders. Dried grapes are beneficial for constipation and anemia. Grapes also help to arouse sexual urges. When grape juice is taken in the morning, it helps in curing of migraine and headache. Grapes also acts like as acid remover, thus helps in preventing of Kidney disorders.

Grapes for alzheimer's treatment

There is a good correlation between grapes and proper functioning of brain. Grapes contain bio-chemical such as resveratrol. which is beneficial for brain health and also helps in minimizing the process of brain degeneration.

Top Benefits of Grapes:

Apart from their many varieties and uses, grapes provide many health benefits too!

1. Migraine:

Migraine attacks can push the sufferer over the edge. These debilitating headaches can be triggered by loud noise, light, or stress. But grapes can prove to be beneficial for people suffering from migraines. Ripe grape juice is an orthodox remedy that can cure migraine. The ripe juice must be consumed pure without dilution every morning for best results.

2. Alzheimer's disease:

Resveratrol content in grapes can reduce the levels of amyloidal-beta peptides in Alzheimer's disease patients. Grapes can also enhance the health of your brain and delay neurodegenerative diseases.

3. Antibacterial activity:

Red grapes are high in antibacterial and antiviral properties. This protects you from many infections. The antiviral properties of grapes are effective in treating and preventing poliovirus and herpes simplex virus.

4. Anti-ageing benefits:

Ageing is a natural process. But due to ever increasing pollution and stress level, our skin tends to age prematurely. Free radicals are the basic cause of premature ageing that leads to wrinkles and fine lines on your skin. The antioxidants present in grapes along with vitamin C protect your skin from free radicals and reverses the signs of ageing. Grapes for skin also help tone the skin, when the pulp is rubbed on the face in a circular motion. So no more worries about wrinkles and dark spots, you can now look forever young with these tiny gems.

5. Skin softener:

Grape seed extract contains vitamin E that helps in retaining the moisture in your skin. This also acts as an exfoliate removing dead skin cells to provide healthy and smooth skin. Grape seed oil is very gentle on the skin and acts as a good moisturizer. You can massage your skin with this oil to nourish it thoroughly.

6. Turn Down Inflammation:

Resveratrol has anti-inflammatory property that very effective in curing heart disease by treating inflammation in the arteries.

7. LDL cholesterol:

Grapes increase nitric oxide levels in your blood to prevent blood clots and reduce the chance of heart attacks. Antioxidants in grapes prevent the oxidation of LDL cholesterol that blocks the blood vessels causing coronary diseases. Grapes have many flavonoids like resveratrol and quercetin, which fight free radicals. This also works as a cleaning-up crew and reduces clumping of platelet to filter toxins from the blood.

CONCLUTION

The extracts of grape leaves are effective antimicrobial agents, against comman pathogens causing infection. Very little work has been done on the biological activity. Grape the versatile medicinal plant is the unique source of various types of compounds having diverse chemical structure. Crude extracts from various parts of grape have medicinal applications from modern drug can be developed after extensive investigation of its bioactivity, mechanism of action, pharmacotherapeutics, toxicity and after proper standardization and clinical trials.which can be utilized for the benefit manki. The changing global scenario,towards the use of nontoxic plant products. Advocates development of modern drugs from grape for the control of various diseases and its use as a prebiotic (non digestible feed ingridients that stimulate the activity and grouth of beneficial native bacteria in the GI tract, eliminating the pathogenic ones). Using natural products as therapeutic agents will probably prevent development of resistance in microorganisms and prove veritable and cheaper substitutes for convential drugs.

REFERENCE

1. Ting Wu, Yueqing Guan, Jiannong Ye, Department of Chemistry, East China Nornal University, Shaghai 200062, PR China, Recived 31ST Oct. 2005.501-503.

2. Jaspreetkaur Sidana, Vipin Saini, Sumitra Dahiya, Parminder Nain, Suman Bala, M. College of Pharmacy, MM University, Mullana(Ambala) -133207, India. Department of Pharmaceutical Science, G. J. University Hissar (Haryana), India. 2012-2013.590-598.

3. Marjan Nassiri-Asland HosseinHosseinzadeh; Re-view of the Pharmacological Effects of Vitisvinifera (Grape) and its BioactiveCompounds, Phytother.Res., 23, 1197-1204, (2009).

4. Gorinstein S., Huang, Leontowicz H, Leontowic, M., Ya Mamoto M, R. Soliva-Fortuny, O. Martin Belloso, Martinez Ayal. L.M, and Trakhtenberg S. 109.1824-1827.

5. Mari Ogura, Masayuki Yogi, Keitaro Nomto, Ryo Miyazaki, Masaya Kongoji, Show Wantanabe, Umenoi Hamada, Yoshikazu Yonei. 2016.01494.

6. Julia J. Peterson, Gary R. Beecher, Seena A. Bhagwat, Johanna T. Dwyer, Susan E. Gebhardt, David B. Haytowifz, Joanne M. Holden.2014.104-112.

7. Zannat Urbi, Md Sanower Hossain, K. M. Hafizur Rahman and Tareq Mohammad Zayed.2004.501-503

8. Mohanapriya M., Dr. Lalitha Ramaswamy and Dr. R. Rajendra.2003. 1819-6608.

9. Department of Agriculture, Forestry and Fisherics 2012.6699.

10. Bupesh, G. T ,Siva Vijaykumar, S Manivannam, M Beerammai, E. Manikadan, P Shanthi and A Vijaya Anand.2008.509-598.

11. Vasek,O. M, Caceres M.L, E. R. Chamorra, G. A. Velasco.2003.2220-6655.

12. Jaspreetkaur Sidana, Vipin Saini, Sumtra Dahiya, Parminder Nain, Suman Bala, M. College of pharmacy, MM University, Mullana (Ambala) - 133207, India. Department of Pharmaceutical Science, G. J. University Hissar (Haryana), India. 2012-2013.2278-4357.

13. Mukesh Yadav, Shalini Jain, Aarti Bhardwaj, Ravinder Nagpal, Monica Puniya, Radha Tomar, Vinod Singh, Om Prakash, G. B. K. S. Prasad, Franceco Marotta, and Hariom Yadav:72-76 (2012).

14. Vasil Georgiev, Anthony Ananga and Violeta Tsolova Centre for Viticulture and Small Fruit Research, College of Agriculture and Food Science Florida A and M University, 6505.(2008).

15.Kasey Hartz Natural Area Reference Sheet, Muskegon Community College. 4321.(2011).