Fresh Grapes Research

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ABSTRACT :

Red grape juice represents a natural combination. The red grape juice products is specific combinations of grape constituents provide us many uses.They are more efficient than green and black grapes.The Concord grapes had significantly higher antioxidant capacity. The pulp than in the cytosol approximately same amount.Recent research has suggested that skin of red grape product may help in maintaining heart health protect against aging associated disease neaurodegeneration.The majority of total antioxidant capacity of red grape.The whole grapes product specific combination of grape constituents provide us with the synergistics interaction leading to improved efficasy. The concord and purple grapes had the highest TAC when compared to the black and green grapes, whereas the red and green grapes had approximately the same total total antioxidant capacity.
Keywords- Red grape juice, health Benefits, Crimson grapes. Recent studies have show that the flavonoids in grape juice prevent the oxidation of the "bad cholesterol" or LDL, which leads to formation of plaque in artery walls in addition to lowering the risk of developing the blood. clots that lead to heart attacks. Concord grape juice stimulated the production of nitric oxide in endothelial cells, providing a vasorelaxation effect. It is known that nitric oxide is important in the body's natural system for maintaining healthy, flexible blood vessels and helps support healthy blood pressure. Concord grape juice produced this relaxation effect by stimulating the same chemical reactions in the arteries that are activated by red wine. The beneficial effect provided by Concord grape juice lasted up to six hours, whereas this extended effect has not been reported with red wine. Recent studies have show that the flavonoids in grape juice prevent the oxidation of the "bad cholesterol" or LDL, which leads to formation of plaque in artery walls in addition to lowering the risk of developing the blood. clots that lead to heart attacks. Concord grape juice stimulated the production of nitric oxide in endothelial cells, providing a vasorelaxation effect. It is known that nitric oxide is important in the body's natural system for maintaining healthy, flexible blood vessels and helps support healthy blood pressure. Concord grape juice produced this relaxation effect by stimulating the same chemical reactions in the arteries that are activated by red wine. The beneficial effect provided by Concord grape juice lasted up to six hours, whereas this extended effect has not been reported with red wine. The concord and purple grapes had the highest TAC when compared to the black and green grapes, whereas the red and green grapes had approximately the same total total antioxidant capacity

KEYWORDS : Red grape juice, health Benefits, Crimson grapes.

AIM :

Managment of storage condition for freshly prepared red grapes juice for all season.

The aim of this study is to explore the health benefits of red grape juice, particularly its antioxidant capacity, heart health benefits, and overall efficacy compared to other types of grapes such as green and black grapes. This study aims to highlight the specific advantages of Concord and purple grapes, with a focus on their ability to improve cardiovascular health and prevent aging-associated diseases.

OBJECTIVES :

- The objective of making red grape juice is primarily to extract the flavors, nutrients, and antioxidants from the grapes, creating a refreshing and healthy beverage. Additionally, it can be used as a base for various drinks, cocktails.
- To measure and compare the total antioxidant capacity (TAC) of red, green, black, Concord, and purple grape juices, identifying which types have the highest TAC.

- To examine the specific health benefits associated with red grape juice consumption, including its impact on heart health and protection against neurodegenerative diseases.
- To understand the synergistic interactions of various grape constituents in red grape juice and their contribution to its overall efficacy.
- To analyze the role of flavonoids in red grape juice in preventing the oxidation of LDL cholesterol and reducing the risk of arterial plaque formation and blood clots.
- To study the vasorelaxation effects of Concord grape juice, focusing on its ability to stimulate nitric oxide production in endothelial cells and support healthy blood pressure.
- To perform a comparative analysis between the health effects of Concord grape juice and red wine, particularly in terms of the duration and mechanism of vasorelaxation effects.
- To identify the duration of health benefits provided by Concord grape juice and determine whether these effects are unique compared to those of red wine.

INTRODUCTION:

Juices play an important role in a healthy diet because they are a source of free sugars and micronutrients. Among these, red grape juice stands out due to its unique combination of polyphenols and sugars, offering interesting organoleptic properties without the need for chemical additives. Grape juice, obtained by crushing grapes, can be sweetened and preserved as a non-alcoholic beverage, making it nutritionally important, especially for babies, children, sportsmen, and situations demanding urgent energy.

Red grape juice is particularly noteworthy for its high content of antioxidants such as flavonoids, which provide various health benefits. These antioxidants are beneficial to the skin and are believed to act as protectants against oxidative stress, control blood pressure, and reduce blood clot formation. Polyphenols found in red grape skins are key contributors to these health benefits, making red grape juice a valuable dietary component.

In the context of cardiovascular health, grape juice, especially from Concord grapes, has shown promise in improving blood pressure and supporting heart health. Flavonoids in grape juice prevent the oxidation of LDL cholesterol, which is crucial in reducing the risk of arterial plaque formation and blood clots, thus lowering the risk of heart attacks. Additionally, Concord grape juice stimulates the production of nitric oxide in endothelial cells, providing a vasorelaxation effect that helps maintain healthy, flexible blood vessels and supports healthy blood pressure.

Recent research has also suggested that the flavonoid intake from grape juice can have protective effects on the brain. Our group has described that oral administration of flavonoids extracted from red and white grapes and from the olive tree reduces the expression of brain genes involved in inflammation and oxidation mechanisms. This process also increases the expression of Nrf2, a gene related to protection against oxidative stress, and enhances the activity of antioxidant enzymes, preventing lipid peroxidation in the brain of stressed mice. These findings underscore the potential of red grape juice as a natural food product that can reduce the risk of various diseases and promote overall health.

In today's lifestyle, where natural food products are increasingly valued for their health benefits, red grape juice stands out as a differentiated beverage with positive energy, nutritional, and bioactive effects. Its ability to provide synergistic interactions between its various constituents leads to improved efficacy, making it a powerful ally in the pursuit of a healthier lifestyle.

FIG 1: FRESH RED GRAPES FROM FARM

FIG 3 : ORGANIC FARMING OF FRESH RED GRAPES

FIG 4 : ORGANIC FARMING TIED WITH STICKS

FIG 5 : RIPED RED GRAPES

FIG 6 : ORGANIC & FRESH RED GRAPES FROM FARM

LITERATURE REVIEW :

1.Dina M.Kersh et al.(2022) Red and purple grape juices (GJs) have long been consumed worldwide for their unique taste and nutritive value. Moreover, grape is postulated to play an important role in the improvement of cardiovascular risk factors owing to its rich polyphenol content. Little is known regarding GJ's holistic chemistry and functionality as compared to those of other fruit juices. This review aims to compile the state-of-the art chemistry of colored grape juices and in context to its analysis and nutritional values. Further, a review of potential contaminants to be introduced during manufacturing and other factors that infuence juice quality and or health efects are presented to help maximize GJ's quality. A comparison between analytical methods for juice QC establishment is presented employing hyphenated platforms versus direct spectroscopic techniques. The enrichment of the colored skin with a myriad of phenolics poses it as a functional beverage compared to that of skinless juice.

2.Ali Batu et al.(2020) Epidemiological studies have shown that flavonoid intake to be inversely associated with mortality. Quercetin and protoantocyanidins in grape seeds and skins are potent antioxidants in vitro, and protection against the oxidative damage to LDL implicated in atherogenesis has been suggested as a possible mechanism. Researchers nowadays have turned their investigations on the "French paradox" towards a family of natural substances called "polyphenols", which are abundant in grapes. Polyphenols of grapes are the main compounds responsible for color, taste, mouth feel, oxidation and other chemical reactions in wine and juice.

Recent studies have show that the flavonoids in grape juice prevent the oxidation of the "bad cholesterol" or LDL, which leads to formation of plaque in artery walls in addition to lowering the risk of developing the blood clots that lead to heart attacks. Concord grape juice stimulated the production of nitric oxide in endothelial cells, providing a vasorelaxation effect. It is known that nitric oxide is important in the body's natural system for maintaining healthy, flexible blood vessels and helps support healthy blood pressure. Concord grape juice produced this relaxation effect by stimulating the same chemical reactions in the arteries that are activated by red wine. The beneficial effect provided by Concord grape juice lasted up to six hours, whereas this extended effect

MATERIAL :

Synonyms

- Red Grape Extract
- Vitis vinifera Juice
- Crimson Grape Juice
- Concord Grape Juice (specific variety)
- Grape Must

Taxonomical Classification

- Kingdom: Plantae
- Clade: Angiosperms
- Clade: Eudicots
- Clade: Rosids
- Order: Vitales
- Family: Vitaceae
- Genus: Vitis
- Species: Vitis vinifera

Mechanism of Action as an Antioxidant

Red grape juice exerts its antioxidant effects primarily through the action of polyphenols, such as flavonoids and resveratrol, found in the grape skins and seeds. The key mechanisms include:

- Scavenging Free Radicals: Polyphenols in red grape juice neutralize free radicals by donating electrons, thus preventing these unstable molecules from damaging cells and tissues.
- Inhibiting Oxidative Enzymes: Polyphenols inhibit enzymes like lipoxygenase and cyclooxygenase, which are involved in the oxidation of lipids and the production of pro-inflammatory compounds.
- Enhancing Antioxidant Enzyme Activity: The consumption of red grape juice can upregulate the activity of endogenous antioxidant enzymes such as superoxide dismutase (SOD), catalase, and glutathione peroxidase, which help to detoxify harmful oxidative products.
- Modulating Gene Expression: Polyphenols can influence the expression of genes associated with oxidative stress response, including upregulation of Nrf2, a transcription factor that activates the expression of antioxidant proteins.

- Reducing LDL Oxidation: The flavonoids in red grape juice prevent the oxidation of low-density lipoprotein (LDL) cholesterol, which is crucial for preventing the formation of atherosclerotic plaques in arteries.

- **Side Effects**

While red grape juice is generally considered safe for most people, some potential side effects include:

- Allergic Reactions: Some individuals may experience allergic reactions to grapes, which can include symptoms such as hives, itching, swelling, and respiratory issues.

- Digestive Issues: Overconsumption of red grape juice can lead to digestive problems such as diarrhea, stomach cramps, and bloating due to its high sugar and fiber content.

- Interactions with Medications: The polyphenols in red grape juice can interact with certain medications, such as blood thinners (e.g., warfarin) and cholesterol-lowering drugs (e.g., statins), potentially altering their effectiveness.

- Blood Sugar Levels: Due to its natural sugar content, red grape juice can cause spikes in blood sugar levels, which may be a concern for individuals with diabetes or insulin resistance.

- Weight Gain: High caloric intake from excessive consumption of red grape juice can contribute to weight gain and related health issues if not consumed in moderation.

GENERAL BENEFITS TO HEALTH

Red Grapeare an excellent source of potassium, which encourages an alkaline blood balance and also stimulates the kidneys and regulates heartbeat.

Cleansing the liver and removing the uric acid from the body.

Protect each cell's DNA from damage.

Reduction of platelet aggregation, have also been reported.

Pasteurization Process

Once the samples were bottled, they were pasteurized to ensure shelf-life stability [26]. Two temperature probes (model Tracksense Pro, ELLAB AS, Hilleroed, Denmark) were used to monitor the pasteurization process: one to monitor the autoclave chamber temperature while another was inserted through the cap in a bottle to monitor juice temperature during the process. The pasteurization process took place in an autoclave (model APR-95, SURDRY, Abadino, Bilbao, Spain) and the process had three steps: (i) the samples were heated for 15 min. at 85 °C with an internal pressure of 1 bar; (ii) the samples were maintained at 85 °C for 20 min at 1 bar; and (iii) the samples were cooled at 25 °C for 40 min at 1 bar (Figure 1A).

MATERIALS AND METHODS :

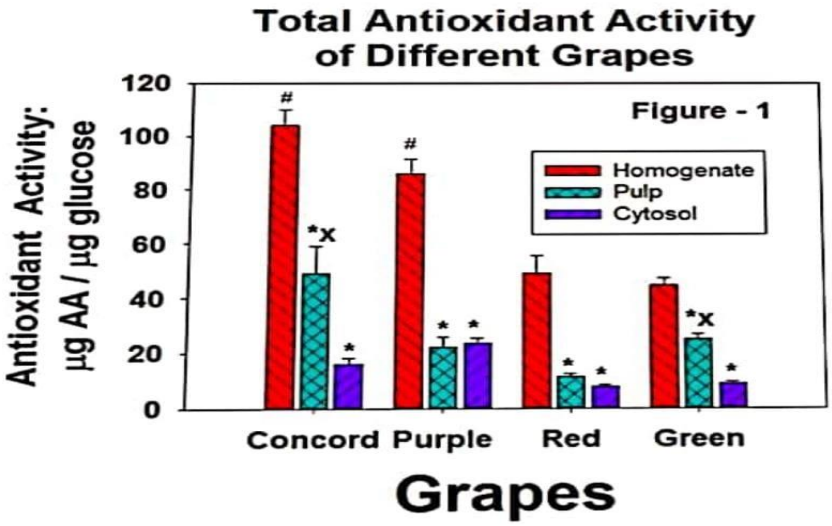
Natural Extracts and Grape Juice

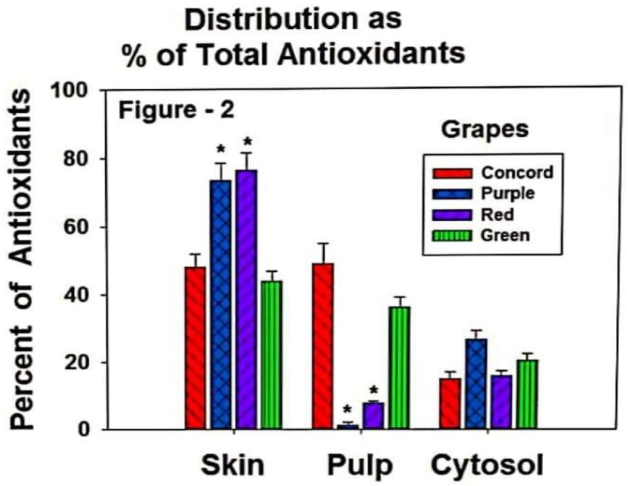
Two commercial natural food supplements were used in this study. They included red grape polyphenols (generously provided by Alvinesa Natural Ingredients, Daimiel, Ciudad Real, Spain) and MecobalActive® (generously provided by HealthTech Bio Actives, Barcelona, Spain).

Red grape polyphenols extracts from Alvinesa Natural Ingredients are entirely constituted by phenolic compounds (premium selected blending of monomers, dimers, oligomers, and polymers) and have a unique formulation that ensures direct absorption in the small intestine. These extracts are currently used as commercial supplements approved for human consumption. Red grape polyphenols extracts from Alvinesa are not only

interesting because of the flavonoids of low molecular weight (monomers) but also because the substantial content in PACs. Alvinesa's extracts present a PACs content (Porter Method) with a content 20–25% higher in comparison to our competitors (75% vs. 100%). Furthermore, Alvinesa is putting a lot of efforts in offering to the market the most natural extracts coming from grape producing extracts that are constituted 100% by polyphenols of the grape.

Grape juice was generously provided by Vintae winery (Logroño, Spain).





EVALUATION TEST :

Flavanoids Test

1) Alkaline Reagents Test

Extract treat with 10% NaoH solution formation of intense yellow colour indicates presences of flavonoids.

2) Zn Test

2ml extract were treat with Zn dust and concentration Hcl development of red colour indicates presences of flavonoids.

3)NH4OH Test

3ml extract 10% NH4OH solution development of yellow flavorescence indicates positive test.

Polyphenol Test

2ml extract add ethanol oxidised and decreased the colour of the compound.

TRANSPORTATION:

The post- harvest losses in transit can be minimized substantially by quick and efficient transportation.

The following points should be considered during transportation of grapes:-

1. Transportation should be quick.

2. Rough handling of boxes/cartons during loading/unloading should be avoided.

3. Over loading by using tier system should be avoided.

4. Low temperature should be maintained during transportation.

5. roads. To reduce bruising, good shock absorbers should be used on rough

6. Use of pallets be made to avoid handling losses.

7. Rail reefer container should be preferred over road transport.

8. No mixing of grape packs with the packs of other commodities.

9. Excessive rough roads should be avoided.

10. Use of reefer containers should be encouraged.

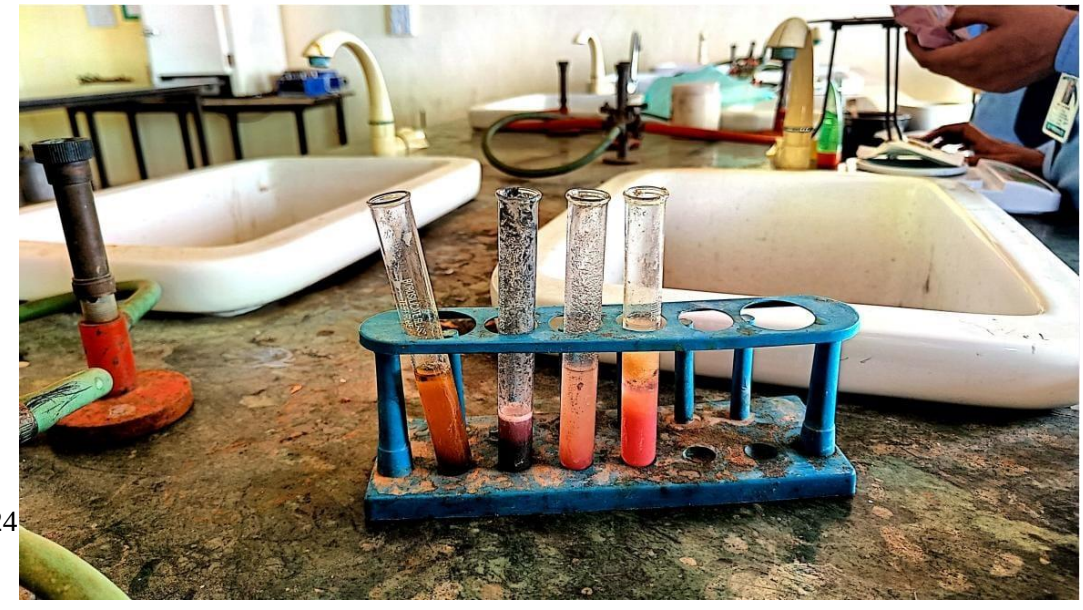


FIG 9 : EVALUATION TEST IN LABORATORTY

STORAGE:

Fresh grapes can be stored in cold stores for a period of about 6 weeks. Grapes should be pre-cooled promptly after harvest in separate rooms with large refrigeration capacity, high air velocity and high relative humidity. They are normally pre-cooled at 1-2° C within 6 hours of harvest. After pre-cooling, the dual releasing Sulphur dioxide pads (Grape guard) are placed with their coated surfaces downwards on the filled plastic pouches and covered with the polythene liner. The boxes with sufficient air circulation are closed and shifted to cold storage rooms where the temperature and humidity are maintained at 0-2 C and 90-95% respectively. In the cold storage ensure uniform cooling within a box and it's surroundings.

Cool chain:

Cool chain is essential during the transport of export quality commodity all the way from the farm to the customer. This helps in maintaining the temperature inside the box at the same low level as in the cold storage.

The various stages of the cool chain are:

1. Coldstore at the farm.

2. Refrigerated truck from farm to the airport

3. Coldstore at the airport.

4. Building up of the pallet in a coldstore at the airport.

5. Loading the aircrafts directly from the coldstore in a short time.

6. Cargo aircraft maintains coldstore temperature in hold.

7 Off loading direct into a coldstore in the receiving country.

8. Refrigerated truck to the customers.

Optimum Temperature

Grapes can be stored at 0.0 to 2° C. The highest freezing point for berries is -2.1° C. but freezing point varies depending on SSC.

Optimum Relative Humidity

90-95% RH and an air velocity of approximately 6-10 meter per minute (MPM) is suggested during storage.

COLD STORAGE:

The cold storage of grape is done at the temperature varying between 0-2° C and relative humidity ranging from 90% to 95%. Cold storage of grapes extends the shelf life of grapes by 3 to 4 months. Besides, it also preserves the freshness of fruit, prevents decay and discoloration. In addition, it also minimizes the discolouration on account of moisture loss and maintains the stem in good condition. Use of slow release grape guards further enhance the storage periodin a cold storage.

Since the cold storage do not have pre-cooling air movement facilities for quick cooling, pre-cooling prior to cold storage is a basic requirement for rapid removal of field heat. During storage, shattering of berry can be minimized by avoiding rough handling. Freezing is more in less sugar containing clusters and water loss is more in fruits of heavy bearing vineyards.

RESULT :

Antioxidant are present in red grape juice.

The analysis of red grape juice revealed significant findings regarding its antioxidant capacity, particularly when compared to other grape varieties such as green, black, Concord, and purple grapes

CONCLUSION :

Red Grape juice improves the function of the cells in blood vessel linings more

efficiently than wine.

The study confirms that red grape juice, particularly from Concord and purple grapes, possesses significant antioxidant capacity, which is higher than that of black and green grapes. The high polyphenol content in these grape varieties contributes to their superior antioxidant properties, which play a crucial role in promoting heart health and protecting against aging-associated diseases.

Red grape juice is a valuable dietary component due to its ability to prevent the oxidation of LDL cholesterol, reduce the risk of arterial plaque formation, and lower the incidence of blood clots, thus supporting cardiovascular health. The vasorelaxation effect observed with Concord grape juice, attributed to the stimulation of nitric oxide production, underscores its potential in maintaining healthy blood pressure and flexible blood vessels.

Moreover, the intake of flavonoids from red grape juice has shown protective effects on the brain by reducing inflammation and oxidative stress, enhancing the expression of protective genes like Nrf2, and increasing the activity of antioxidant enzymes. These findings highlight the comprehensive health benefits of red grape juice, making it a powerful natural food product that can contribute to overall well-being.

In conclusion, red grape juice stands out as a differentiated beverage with notable nutritional and bioactive effects, reinforcing its role in a healthy diet. Its synergistic combination of grape constituents offers improved efficacy in promoting health and preventing disease, making it an excellent choice for those seeking natural and effective dietary interventions.

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