

EVALUATION OF PHYTOCHEMICAL COMPOSITION AND SENSORY QUALITY OF GRAPE SEED INCORPORATED MOUTH REFRESHNER GRANULES

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Abstract

Objective: To incorporation of grape seed incorporated mouth refreshner granules to assess the phytochemical, nutrient content and consumer acceptability. **Methodology:** Grape fruit were purchased from local market of Ramanathapuram district of Tamilnadu, India. The seeds of the fruits have been cleaned and taken for development of the flour. The seed powders were extracted successively with ethanol in a soxhlet extractor for 18-20 hrs. The extract was subjected to qualitative and quantitative analysis of phytochemical present in Grape seed powder. To estimate nutrient composition of Grape seed powder by using AOAC procedure. The sensory analysis was finished through a panel of twenty experts by using A5 point hedonic scale. A mouth refreshner granule was prepared with and without incorporation of the developed at 5%, 10% and 15% level of the product. **Result & conclusion :** Qualitative phytochemical analysis of Grape seed extract reveal that except Acidic Compounds and phlorotannins and other possible constituents including alkaloids, flavonoids, saponins, tannins, HCN, Anthroquinone, Cardiac glycosides, phenol, phytosterols were present in Grape seed. Quantitative estimates in percentage of these phytochemicals of Grape seed were identified as follows Phenols (392.58±1.70mg) Flavonoids (256.16±1.60) Tannin (30.95±0.17mg). The nutrient composition of Grape seed powder is high amount of fat (15.8gm), Protein (10.7gm), dietary fibre (30.1gm) and moderate amount of Carbohydrate (18.5gm) present in Grape seed powder. The estimated micro nutrient content of selected grape seed powder contain moderate amount of Calcium, manganese and higher amount potassium and phosphorus (72.5mg, 90.24mg). Low amount of sodium and zinc were present in grape seed. The acceptability and sensory evaluation test conducted by the three variation in selected food products like the mouth refreshner granules were prepared with 5% and 10% incorporated grape seed had good colour, appearance, taste, texture and flavour and scored higher overall acceptability than 15% incorporation, the shelf life of the food product was not affected by incorporated of Grape seed powder. The dietary consumption of grape and its products is associated with a lower incidence of degenerative diseases such as cardiovascular disease and certain types of cancer.

Index terms: Grape seed, Phytochemicals. Sensory evaluation, Mouth refreshner granules.

I. Introduction

Research for new bio-efficient antioxidants has specially focussed on natural antioxidants to address the consumer issues over security and toxicity. Grape seeds and by-products of wine/grape juice processing supply a considerable supply of flavonoids, in which the most abundant classes include the flavan-3-ols¹. Nutritional interest in polyphenolic compounds has increased greatly in light of their antioxidant activity but there have been very few studies on the digestibility and intestinal degradation of polyphenols and other major constituents².

Nowadays we observe a large expansion of wine production, increasingly biomass residue which, from an environmental point of view, can be used for a beneficial purpose for human beings and the environment³. Reusing the biomass residue would solve, at least in part, storage troubles and wine by-products. However, the main importance is due to its content is rich in lipids, bioactive compounds (such as vitamin E, phytosterols and phenolics) which is important to food and pharmaceutical industries.^{4,5}

Grape seeds have been said to exhibit scavenge superoxide radicals. Grape seeds are rich in flavan-3-ol, inclusive of proanthocyanidins and catechins. They contain high concentration of polyphenol proanthocyanidins, which are the oligomers of flavanol including catechin and epicatechin⁵. Proanthocyanidins, which belong to condensed tannins, are present as procyanidins and prodelphinidins in grape seeds and skins. They form a cheap source of natural antioxidant and antimicrobial agents owing to its richness in phenolic contents. Grape seed extract (GSE) is a waste product of the winery and grape juice industry.⁶

Grape seed extract is otherwise known as a powerful antioxidant that protects the body from degenerative tissues. A grape seed is a rich source of phenols such as proanthocyanidins (oligomeric proanthocyanidins). Scientific studies have proven that the antioxidant power of proanthocyanidins is twenty times greater than vitamin E and fifty times greater than vitamin C^{5,7}. Extensive research suggests that grape seed extract is beneficial in many areas of health because of its antioxidant effect to bond with collagen, promoting youthful skin, cell health, elasticity, and flexibility. Other studies have proven that proanthocyanidins help to protect the body from cell damage, to enhance vision, to improve flexibility in joints, arteries, and body tissues such as the heart, and to improve blood circulation by strengthening capillaries.^{8,9}

In current years, the possible nutritional characteristics of Grape seeds have been steadily revealed, showing their potential benefits in functional foods, cosmetics, and pharmaceuticals. High nutritional dense properties of grape seeds as well as the development and utilization status in order to provide a basis for further research and development Information regarding to nutritional aspects of underutilized seeds will be a basic requirement, before consumption and commercialization. The major aim of the present study was to determine the phytochemicals, nutrient and sensory qualities of grape seed incorporated mouth refreshner granules.

II. Materials and Methods:

2.1. Selection of sample.

This study was carried out with Grape seed (*Vitis vinifera* L. Muscat) was collected from the processing and preservation training centre, Tamil Nadu Agricultural University campus (TNAU), Coimbatore, Tamil Nadu, India. After collection the seed was dried with at room temperature. The dried samples were grinded properly using a mortar and pestle and later using a grinder, to obtain the powdered form and stored until analyzed

2.2. Extraction of grape seed

After the grape seed are shade dried and powdered, they were extracted successively with ethanol in a soxhlet extractor for 18-20 hrs. The extracts were concentrated to dryness under reduced pressure and controlled temperature (40- 50°C) in a rotavapor. After which they were filtered using Whatman filter paper No.1. Extracts were then evaporated at 45°C to form a paste, and further transferred into sterile bottles and refrigerated until use^{7,8}. Then the extract was subjected to analysis of phytochemical substance.

2.3. Estimation of nutrient content of grape seed

In order to estimate the micro and macro nutrients such as carbohydrate, protein, fat, dietary fibre, calcium, Phosphorus iron and crude fibre content of the grape seed powder, was determined using the methods of AOAC. Ash solution was prepared and used for estimating the mineral content.

2.4. Qualitative phytochemical analysis of grape seed

The ethanol and water extracts of grape seed were subjected to preliminary phytochemical screening and the following tests were done to check the presence of phytochemical substance. Test for Alkaloids (Mayer's test), Flavonoids (Alkaline reagent test), Carbohydrates (Molisch's test), Glycosides (Legal's test), Saponins, Tannins, Phytosterol (Salkowski test), Triterpenoid (Liebermann Burchard test), Proteins and Amino acids (Ninhydrin test), Biuret test, Anthraquinones, steroids, Catachol, Reducing sugars (Fehling's Test), Acidic compounds, Lipids/Fats, Phlobatannins and Resins.

2.5 Quantitative analysis of phytochemicals

The total phenol content was determined using Folin-ciocalteu reagent¹⁵ and the total flavonoid content was estimated using aluminium chloride method¹⁶. Determination of Ascorbic acid was done by using the method of Sadasivam et al, 1987

2.6. Overall acceptability of standard and incorporated mouth refreshner granules

The sensory evaluation was done by a panel of twenty five panelists drawn from Department of Homescience and Research centre, Thassim Beevi Abdul Kader College for women, Kilakarai. Mouth refreshner granules were prepared with and without incorporation of Grape seed powder was incorporated in 5%, 10% and 20% level. To get over all acceptability of the product A 5 point hedonic scale was used for evaluating the sensory attributes like colour, appearance, flavour, texture and taste using the score were calculated to find the over all acceptability of the grape seed incorporated mouth refreshner granules.

III Result and Discussion

3.1. Nutrient analysis of Grape Seed Powder

The value of proximate nutrient composition of grape seed powder is presented in Table I. Shows that nutrient content grape seed (2.36g/100g) of moisture, moderate amount of carbohydrate(18.5g/100gm), protein(10.7gm/100gm), high amount of fat (15.8gm/100gm) and dietary fibre(30.1gm/100gm) content present in grape seed. The proximate data revealed that the moisture content was low (7.5/100gm) which was advantageous for prolonging the shelf life of the seeds.

Table-1
Nutrient content of the grape seed

Macro Nutrients	Grape Seed Powder /100gm	Micro nutrients	Grape Seed Powder /100gm
Ash	4.8	Calcium	22.7
Moisture	2.36	Potassium	72.65
Carbohydrate	18.5	Phosphorous	90.24
Protein	10.7	Sodium	6.2
Total Fat	15.8	Zinc	7.45
Fiber	30.1	Manganese	32

The estimated micro nutrient content of selected grape seed powder contain moderate amount of Calcium, manganese were (22.7 mg, 32 mg) respectively. The grape seed contain higher amount potassium and phosphorus (72.5mg, 90.24mg). Low amount of sodium and zinc were present in grape seed (6.2 mg & 7.4 mg /100gm) respectively.

3.1. Qualitative Analysis of Phytochemical Substance in grape Seed

Table –II
Qualitative analysis of phytochemical substance in Grape seed

Phytochemical constituents	Grape seed extract	
	Ethanol	Aqueous
Alkaloids	+	-
Flavonoids	++	+
Tannin	++	++
Saponins	+	+
Terpenoids	++	+
Phenols	+	+
Anthro quinone	+	+
Glycosides	++	+
Phytosterol	-	-
Pholoro tannin	+	+

The phytochemical tests was carried out by using standard methods of analysis of phytochemical substance present in grape seed such as alkaloids Flavonoids tannins, saponins, terpenoids, phenols, Anthro quinines, glycosides and pholoro tannin.

Phytochemicals are biologically active compounds found in small amounts which are not established nutrients but on the other hand contribute significantly to protection against degenerative diseases ⁸. The qualitative phytochemical analysis of the ethanol and aqueous extracts of grape seed powder showed positive results for the presence of alkaloids, flavonoids tannins, saponins, terpenoids, phenols, Anthro quinines, glycosides, pholoro tannin. While phytoesterol were absent in both extract of seed and alkaloid was absent only in the aqueous extracts which are shown in Table 1. These obtained results were corroborative with the reports of that its seeds contain the active principles such as terpenoids, steroids, carbohydrates, flavonoids and phenolic compounds which shows an antioxidant, anti-diabetic, anti-obesity, anti-fungal activity ^{9,10}.

3.2. Quantitative estimation of secondary metabolites of grape seed

Quantitative estimation of secondary metabolites were done depending upon the presence of phytochemicals during the phytochemical screening of grape seed extract, the experiment was repeated in triplicate, the results were expressed in mg/g, and the data were given Table-

TABLE –III

Quantitative estimation of secondary metabolites of Grape seed

Extract	Phenols (mg gallic acid equivalent/g dry material)	Flavonoids (mg catechin equivalent/g dry material)	Tannin(mg catechin equivalent/g dry material)
Grape seed	392.58±1.70mg o	256.16±1.60	30.95±0.17mg of CE/g

*Values are expressed as mean±SEM (n=3).

The maximum phenolic (392.58±1.70mg of GAE/g), flavonoid (256.16±1.60 mg of QE/g), and tannin (30.95±0.17mg of CE/g) contents were also found in the ethanol extracts of grape seed respectively.

3.3. Overall acceptability of standard and grape seed powder incorporated mouth refreshener granules

Overall acceptability of standard and grape seed powder incorporated mouth refreshener granules was subjects to sensory evaluation with a 5 points hedonic scale and the mean score given by 20 experts. The result revealed that the mean score for acceptability and grape seed powder incorporated mouth refreshener granules. It was prepared with the incorporated 5%, 10% and 15% of grape seed powder for each preparation of the mouth refreshener granules. The seed powder mouth refreshener granules preparation with 5% and 10% incorporation of recipes had good colour, appearance, taste, texture and flavour and scored a higher overall acceptability than 15% incorporation. Only 5% and 10% grape seed powder incorporated mouth refreshener granules were acceptable because increasing the amount up to 15% brought considerable changes in taste of food products.

V. Conclusion

Finally, it can be concluded that the Muscat variety of black grapes are rich in antioxidants and possess antimicrobial activity which can be useful for pharmaceutical or food industry. These high activities are due to the high amount of phenols present in the grape seed and skin. Generally, we separate the seeds from the skin and pulp of grapes before consuming which have to be averted as it possess excessive antioxidant endeavor than the other parts. It may be concluded high amount the nutrient and phytochemical substance present in grape seed. Value addition of grape seed into processed products will enhance the health benefits of consumers due to several bioactive components present. Further product formulations and process optimization of grape seed value added products can help explore the untapped potential of seeds. The value-addition initiative allows grape farmer producers to gain better income by promoting utilization of underutilized grape seed . Hence grape seed should be extensively promoted for development of various value added products etc for income generation as well as to reduce post harvest losses.

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