

# Standardization, Sensory Evaluation and Physico Chemical Analysis of Grape Seed Powder Incorporated Home Made Noodles

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## Abstract

As grape seed is the waste material in grape processing, these waste material is generally utilized as cattle feed in many countries, while grape seed has been shown to contain high amount of antioxidant compounds and is a good source of polyphenols a wide variety of proanthocyanidins. For the current study, grape seeds were collected, dried and powdered separately and incorporated in different variety of noodles such as tomato, mint and beetroot at 10%, 20% and 30% levels. Among the three varieties, 20% grape seed powder incorporated beetroot noodles was highly accepted. Grape seed powder incorporated noodles were found to be rich in protein, vitamins like carotene, vitamins C and Vitamin E and minerals like iron and calcium. The microbial load was assessed for highly accepted grape seed powder incorporated homemade noodles and it was found to be safe level.

**Keywords:** Antioxidant, Grape Seed Powder, Homemade Noodles, Microbial Load, Polyphenols

## 1. Introduction

A functional food is a modified food or food ingredient that claims to improve health or well-being by providing benefit beyond that of the traditional nutrients it contains. It may be included cereals, breads and beverages that are to be fortified with vitamins, some herbs and nutraceuticals<sup>1</sup>.

Functional foods includes whole foods and fortified foods, enriched or enhanced foods or dietary components that may reduce the risk of chronic disease and provide a health and physiological benefit to consumer<sup>2</sup>.

The noodle is the most popular food product and preferred by all age groups and it is considered next to

bread. The presence of excellent antioxidant profile in grape seed is used in medicine to cure the chronic disease in recent years. The tomato, mint and beetroot have antioxidant and medicinal properties which also improves the consumer's health. The incorporation of the grape seed powder in noodles is more effective when compared with other products because of the customer's specific interest on the noodles. For the current research, an interest has been developed to formulate antioxidant enriched, a colorful functional foods added noodles (tomato noodles, mint noodles and beetroot noodles), to analyse physico chemical parameters, organoleptic evaluation, quality assessment and storage stability of grape seed flour incorporated homemade noodles.

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## 2. Materials and Methods

### 2.1 Phase I

#### 2.1.1 Selection of Raw Materials

Raw materials such as whole wheat, salt, egg are purchased from the department store in Sivagiri and the fruits and vegetables such as fresh grapes, tomato, mint leaves and beetroot are purchased from the Palamuthir nilayam in Sivagiri, Erode Dt. Tamil Nadu.

#### 2.1.2 Preparation of Raw materials

For making grape seed powder incorporated colorful noodles, the purchased raw materials were cleaned and made into required form like flour, paste etc. The

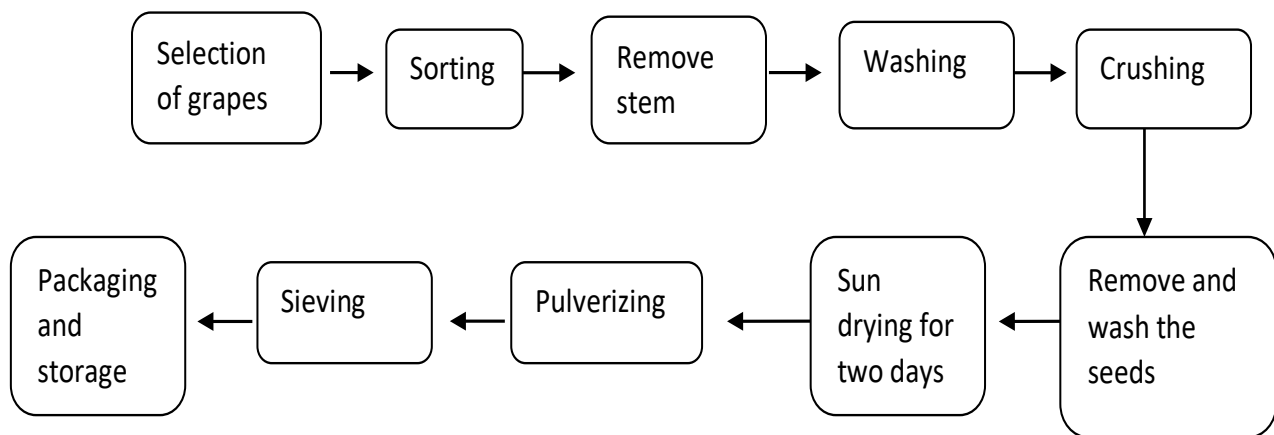
preliminary preparation work for grape seed powder, wheat flour, tomato, beet root and mint paste is given the following Figures 1, 2 and 3.

#### 2.1.3 Formulation of Noodles

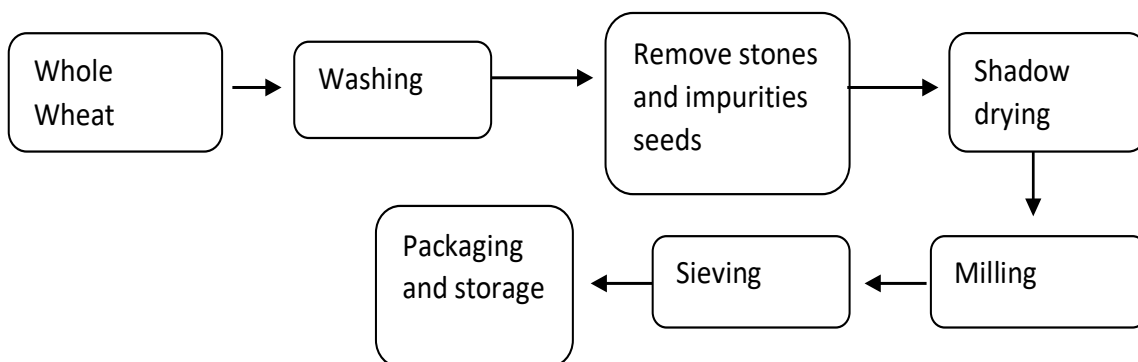
The grape seed powder with different proportions like 10%, 20% and 30% is incorporated with the replacement of wheat flour into different varieties of noodles such as tomato noodles, beetroot noodles and mint noodles. The procedure for the preparation is given in the Figure 4.

### 2.4 Organoleptic Evaluation of Homemade Noodles

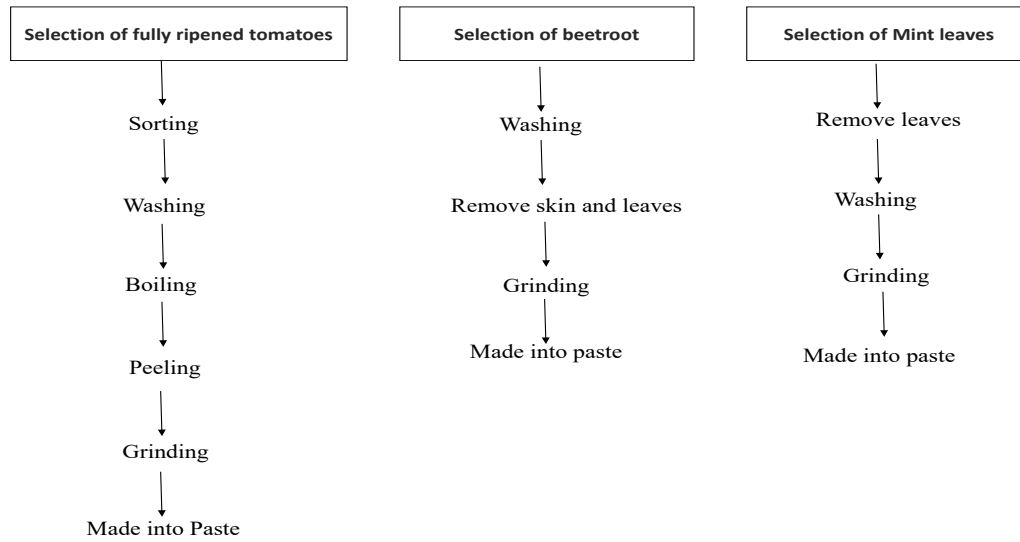
Organoleptic evaluation is the composite characteristic



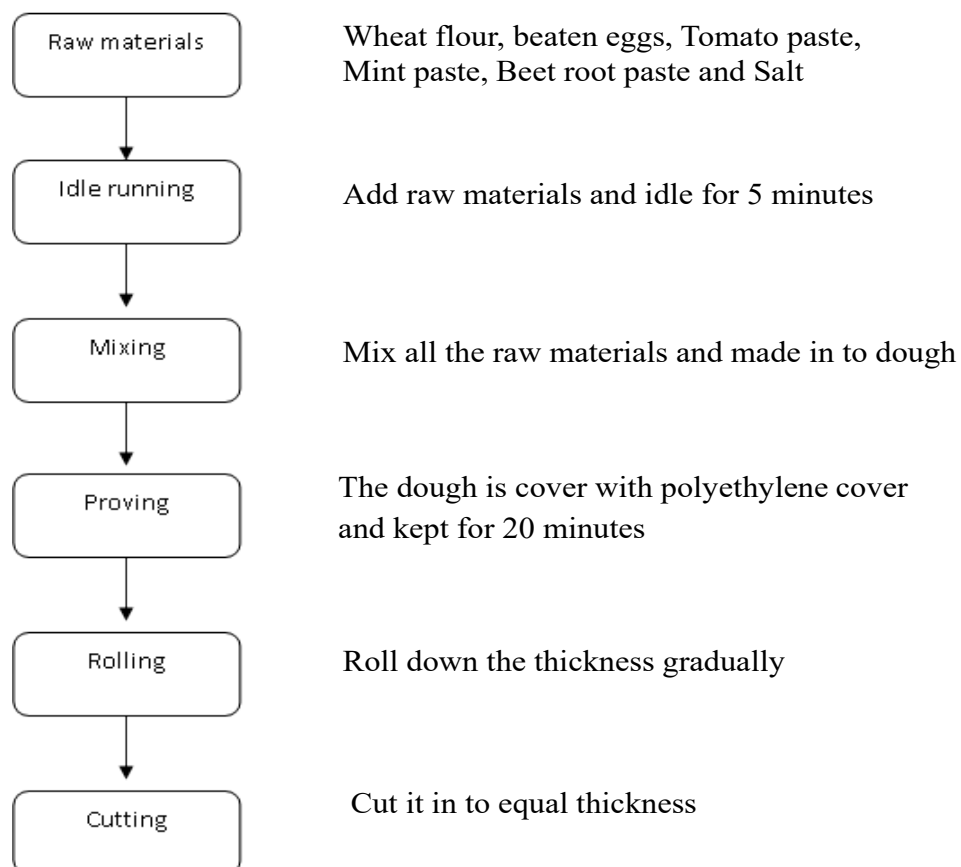
**Figure 1.** Preparation of grape seed powder.



**Figure 2.** Preparation of wheat flour.



**Figure 3.** Preparation of Tomato, Beet Root and Mint Paste.



**Figure 4.** Preparation of tomato, beet root and mint paste.

which determines the degree of equitability of specific product by the consumer. The quality attributes of food are broken down into component characteristics like flavor, texture, taste and overall acceptability<sup>3</sup>.

The standard and grape seed powder incorporated homemade noodles are subjected to organoleptic evaluation. The 9 point hedonic scale was used to test the liking or disliking of noodles which contribute to the acceptability of the noodles.

## 2.2 Phase II

### 2.2.1 Physico Chemical Parameters and Nutrient Analysis of GSP Incorporated Homemade Noodles

The standard and highly accepted GSP incorporated homemade noodles were analyzed for physicochemical parameters such as moisture<sup>4</sup>, ash<sup>5</sup> and nutrients such as iron<sup>6</sup> and phosphorous<sup>7</sup> were analyzed using standard procedure.

### 2.2.2 Nutrient Content of Standard and GSP incorporated Homemade Noodles

The nutrient contribution of standard, GSP incorporated homemade noodles was computed factorially using nutritive value of Indian foods. The nutrients such as protein, fat, carbohydrate, energy, folic acid, vitamin C, vitamin E, carotene, Iron, calcium and phosphorus were calculated and the percentage increase or decrease were also noted.

### 2.2.3 Determination of True Density, Bulk Density and Porosity of Wheat Flour and Grape Seed Powder

The structural properties of food materials are significant for the characteristics and prediction of the quality of processed products. It is very essential for the developing of new products with desired properties. The structure of food material can be characterized by density (apparent and true), porosity, and specific volumes and so on. Among these, density and porosity are the most common structural properties. From this point of view, the structural properties like bulk density<sup>8</sup>, true density<sup>8</sup> and porosity<sup>9</sup> of wheat flour and grape seed powder were determined.

### 2.2.4 Quality Analysis of GSP Incorporated Homemade Noodles

In order to produce nutritionally and sensorily satisfactory homemade noodles the quality properties like length, thickness and breadth of noodles has been estimated.

#### 2.2.4.1 Length, Thickness and Breadth

Random sample of noodles are selected from the mass and its length, thickness and breath and weight are recorded. The length, thickness and breath is measured using the vernier caliper, while the sample can be weighed using a digital balance<sup>9</sup>.

### 2.2.5 Cooking Quality of GSP Incorporated Home Made Noodles

Cooking quality of GSP incorporated homemade noodles assessed for optimum cooking time, cooked weight, cooking loss and water absorption of GSP incorporated noodles<sup>10,11</sup>.

### 2.2.6 Storage Stability of GSP Incorporated Homemade Noodles

To extend the shelf life of the noodles, packaging material is important and high quality is vital. Hence, the bags made up of oriented polypropylene were used to pack the formulated noodles. The microbial load will be determined using standard procedure for highly accepted GSP incorporated homemade noodles at the initial day and at the 30 day of storage.

### 2.2.7 Statistical Analysis

The data obtained from the study was consolidated and statistically analyzed.

## 3. Results and Discussion

### 3.1 Organoleptic Evaluation of Standard and GSP Incorporated Homemade Noodles

Overall acceptability scores of standard and 10, 20 and 30% GSP incorporated tomato, mint and beet root noodles were compared and the results showed that 20%

GSP incorporated tomato, mint and beet root noodles received maximum scores in terms of appearance, color, flavor, texture and taste.

### 3.2 Comparison of Mean over All Acceptability Score of GSP Incorporated Homemade Noodles

The mean overall acceptability scores of highly accepted proportion of GSP incorporated noodles are presented in Table 1.

The results of organoleptic evaluation of GSP incorporated homemade tomato, mint and beetroot noodles showed that the mean scores for appearance, colour, flavor, texture, taste and overall acceptability was found to be higher in the GSP incorporated beetroot noodles and hence it was proved that among the three varieties 20% GSP incorporated beetroot noodles received maximum scores and it was highly accepted.

### 3.3 Physico-chemical Characteristics of GSP Incorporated Homemade Noodles

The physico-chemical characters such as moisture and ash content was analyzed and the results are given in Table 2.

The physico-chemical properties like ash and moisture content was analyzed in GSP incorporated homemade tomato, mint and beetroot noodles and it was found to be 2, 1.83 and 11 g of ash content and 12.33, 9.83 and 11 % of moisture respectively. It was found to be in optimum level.

### 3.4 Nutrient Content of GSP Incorporated Homemade Noodles

The nutrients such as iron and phosphorus were estimated for all the varieties of homemade noodles and the results are presented in Table 3.

**Table 1.** Comparison of mean overall acceptability scores of highly accepted GSP incorporated homemade noodles

Criteria	Mean $\pm$ Standard Deviation		
	20%GSP incorporated tomato noodles (a)	20%GSP incorporated mint noodles (b)	20%GSP incorporated beetroot noodles (c)
Overall acceptability scores	8.65 $\pm$ 0.36	8.68 $\pm$ 0.28	8.87 $\pm$ 0.15
Groups compared	a and b	band c	a and c
't' value	0.359 <sup>NS</sup>	2.54*	3.476*

GSP – Grape Seed Powder, NS – Not Significant, \* – 1 percent significant

**Table 2.** Moisture and ash content of GSP incorporated homemade noodles

GSP incorporated noodles	Moisture Content (%)	Ash Content (g)
Tomato noodles	12.33 $\pm$ 0.94	2 $\pm$ 0.40
Mint noodles	9.83 $\pm$ 0.23	1.83 $\pm$ 0.23
Beetroot noodles	11 $\pm$ 0.40	2.83 $\pm$ 0.47

GSP – Grape Seed Powder (mean  $\pm$  SD values of triplicates)

**Table 3.** Iron and phosphorus content of GSP incorporated homemade noodles

GSP incorporated noodles	Iron Content (mg/100g)	Phosphorus Content (mg/ 100 g)
Tomato noodles	30	52
Mint noodles	132.5	82
Beetroot noodles	65	66

GSP – Grape Seed Powder

The iron and phosphorus content of GSP incorporated homemade tomato, mint and beetroot noodles was found to be 30, 132.5, 65 mg of iron and 52, 82, 66 mg of phosphorus respectively.

### 3.5 Comparison of Bulk Density, True Density and Porosity between Whole Wheat Flour and Grape Seed Powder

The bulk density, true density and porosity of wheat flour and grape seed powder were noted and the results compared are given in Table 4.

From the Table 4, it was observed that the bulk density, true density and porosity was found to be 0.55 g/ml, 0.72 g/ml, 23.61% in wheat flour and 0.50 g/ml, 0.62 g/ml and 19.35% in grape seed powder respectively and it shows wheat flour found to have greater values than the grape seed powder.

### 3.6 Quality Aspects of GSP Incorporated Noodles

The quality aspects such as thickness, length and breadth of the GSP incorporated homemade noodles were assessed and the values are presented in Table 5.

**Table 4.** Comparison of bulk density, true density and porosity between whole wheat flour and grape seed powder

Criteria	Wheat flour	Grape seed powder
Bulk density	0.55	0.50
True density	0.72	0.62
Porosity	23.61	19.35

**Table 5.** Quality aspects of GSP incorporated noodles

Criteria	GSP incorporated tomato noodles	GSP incorporated mint noodles	GSP incorporated beetroot noodles
Thickness (mm)	1.84±0.23	1.71±0.9	1.08±0.05
Length (cm)	25.6±2.21	28.3±3.63	27.8±3.11
Breath (mm)	3.07±0.38	3.32±0.13	3.16±0.27

GSP – Grape Seed Powder (Mean ± SD values of Triplicates)

The results showed that the qualities such as thickness, length and breadth of GSP incorporated homemade tomato, mint and beetroot noodles was found to have optimum score.

### 3.7 Cooking Qualities of GSP Incorporated Homemade Noodles

The cooking qualities of GSP incorporated homemade noodles were assessed and the values are presented in Table 6.

From the above table, it was noted that GSP incorporated mint noodles have better cooking qualities due to its higher water absorption and lower cooking loss, followed by GSP incorporated beetroot noodles and tomato noodles.

### 3.8 Microbial Load of GSP Incorporated Homemade Noodles

Microbial load of initial and 30<sup>th</sup> day after storage of highly accepted GSP incorporated homemade noodles was assessed and the results are given in Table 7.

Microbial count like total bacterial and yeast and mould count in GSP incorporated tomato, mint and beetroot noodles at initial stage of storage was found to be  $2.1 \times 10^4$ ,  $2.2 \times 10^4$  and  $1.1 \times 10^3$  Cfug/m of bacterial count and  $1.3 \times 10^3$ ,  $2.5 \times 10^4$  and  $1.4 \times 10^3$  Cfug/m of total yeast and mould count respectively. At the end of 30<sup>th</sup> day storage the microbial count is slightly increase and it was found to be within safe level.

**Table 6.** Cooking qualities of GSP incorporated homemade noodles

Cooking qualities	GSP incorporated tomato noodles	GSP incorporated mint noodles	GSP incorporated beetroot noodles
Water absorption (%)	240±20.57	287.71±6.06	283.43±6.45
Volume increase (%)	10.85±0.05	16.59±0.77	14.58±2.04
Cooking loss (%)	5.15±0.53	4.98±0.51	5.33±0.18

GSP – Grape Seed Powder (Mean ± SD values of Triplicates)

**Table 7.** Microbial load of GSP incorporated homemade noodles

GSP incorporated noodles	Total Microbial Count (Cfu/gm)		Total Yeast and Mould Count (Cfu/gm)	
	Initial Day	30 <sup>th</sup> Days	Initial Day	30 <sup>th</sup> Day
Tomato noodles	$2.1 \times 10^4$	$4.2 \times 10^4$	$1.3 \times 10^3$	$3.6 \times 10^3$
Mint noodles	$2.2 \times 10^4$	$5.3 \times 10^4$	$2.5 \times 10^4$	$4.7 \times 10^4$
Beetroot noodles	$1.1 \times 10^3$	$2.3 \times 10^3$	$1.4 \times 10^3$	$2.8 \times 10^3$

GSP – Grape Seed Powder

## 4. Conclusion

Hence, it may be concluded that GSP incorporated homemade noodles such as tomato, mint and beetroot noodles were formulated. Among the varieties, the GSP incorporated homemade beetroot noodles was highly accepted than the other GSP incorporated noodles. The physicochemical properties such as ash, moisture and nutrient content like iron and phosphorus were present optimum in GSP incorporated noodles. The GSP incorporated mint noodles found to have better cooking qualities than the other noodles. The incorporation of GSP in homemade noodles can increase the antioxidants like vitamin A, C and E and minerals like iron, phosphorus. The GSP incorporated beetroot noodles had good shelf life up to 30 days. GSP incorporated homemade noodles can serve as a vehicle to prevent the occurrence of micronutrient deficiencies and provide eye appeal being a convenience food it can tempt children and adolescents to procure and consume.

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