



# DEVELOPMENT AND ANALYSIS OF POMEGRANATE MOLASSES ADDING ON ITS SENSORY ATTRIBUTES

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**Abstract:** In this study, molasses from a sugar industry and fruit-based molasses of pomegranate molasses is developed and analysis have been done to understand the difference between, both the control molasses and newly developed pomegranate molasses. Pomegranate molasses were developed and analysis on pH., polarimetry, refractometry, Ultraviolet-visible (UV-Vis) spectroscopy and sensory analyses have been done. Interestingly, the sensory analyses revealed beneficial effects in terms of maintenance of the visual aspect of the sample without any detrimental effect on taste, aroma, or flavors and mouthfeel.

**Keywords:** Pomegranate molasses, ph., polarimetry, refractometry, Ultraviolet-visible (UV-Vis) spectroscopy and sensory analyses

## I. INTRODUCTION

Pomegranates are rich in antioxidants and flavonoids, both of which are known to prevent free radicals from damaging your cells. In some studies, pomegranates show potential to be effective in preventing prostate, breast, lung, and colon cancers. With the potential to support many aspects of health, from immunity to brain health, pomegranates are worth adding to your healthy eating routine. Overall, pomegranates are low in calories and fat but high in fiber, vitamins, and minerals.

They also contain some protein. Antioxidants are compounds that help protect the cells of your body from damage caused by free radicals. Free radicals are always present in your body, but having too many of them can be harmful and contribute to a number of chronic diseases. Pomegranates are rich in antioxidants and polyphenolic compounds that offer protection from this damage.

The main bioactive compounds with antioxidant activity that are found in pomegranates are called punicalagins, anthocyanins, and hydrolysable tannins. Getting antioxidants from vegetables and fruits such as pomegranates is a great way to support overall health and help prevent disease. Pomegranates are rich in an array of antioxidant compounds that help protect your cells from free radical damage. Some test-tube studies have found that compounds in pomegranate fruit, juice, and oil can help kill cancer cells or slow their spread in the body. Both test-tube and human studies indicate that pomegranate may help fight inflammation and slow cancer cell growth. In fact, the fruit has demonstrated anti-tumor effects in cancers of the lung, breast, prostate, skin, and colon.

Other animal research has found that pomegranate helps slow tumor growth in the early stages of liver cancer. It also helps suppress inflammatory responses and oxidative stress. According to an older test-tube study, pomegranate extract may also be useful for slowing the growth, or even causing the death, of prostate cancer cells.

Prostate-specific antigen (PSA) is a marker of prostate cancer in the blood. If PSA levels double in a short amount of time, it indicates a significantly higher risk of death from prostate cancer.

Molasses is a viscous substance resulting from refining sugarcane or sugar beets into sugar. Molasses varies in the amount of sugar, method of extraction and age of the plant. Sugarcane molasses is primarily used to sweeten and flavor foods. Molasses is a major constituent of fine commercial brown sugar. Unlike refined sugar, molasses contains some vitamins and minerals.



## **II. MATERIALS**

The materials required for performing this work are 300 ml of Pomegranate juice, 100 grams of brown sugar and , ¼ cup lemon juice which are all bought in local market.

## **III. METHODOLOGY**

Pomegranates of good quality are selected and arils are separated from the outer layer. The pomegranate aril are ground and seeds are filtered out through a filter. The acquired pure pomegranate juice is made to boil, sugar, and lemon juice are added in a saucepan over medium high heat. When the juice boils, the heat is reduced to a medium-low. We can notice the liquid boiling very gently in the middle. Let the mixture simmer for about two hours, uncovered Stirring is done occasionally to make sure that the brown sugar don't stick to the bottom of the saucepan. After 45 minutes of simmering, a lot of liquid burnt can be seen. The heat should be reduced very slightly and let it simmer for another 15 minutes. Take a spoon and dip into boiling molasses. If it coats the spoon, the molasses is done cooking. Turn off the heat and let it cool for 30 minutes before pouring into a jar. The molasses thickens as it cools. The molasses is stored in refrigerator.

### **Physicochemical evaluation of prepared sample:**

#### **Determination of pH:**

The pH of the samples was estimated by the method of AOAC depicted by Horwitz by using pH meter at room temperature ( $28 \pm 2^\circ\text{C}$ ). The decision of the pH was made by setting up a buffer at pH 7.0 and the temperature was set to  $28^\circ\text{C}$ . pH meter is brought to neutral 7 using buffer and the tip washed with double distilled water. Again the pH is brought to 4 using buffer and the tip is washed with double distilled water. The tip is then immersed in the sample (ice cream) and the pH is noted.

#### **Determination of optical property using polarimeter:**

A polarimeter is a device for determining the polarization direction of the light or the rotation of an optically active substance. The physicist Francois Jean Dominique Arago made a discovery on quartz, which was very important for polarimetry. Arago cut a quartz crystal perpendicular to the crystal axis and saw the rotation of linearly polarized light on the cut quartz crystal. Polarization, an important property of light. The polarimeter used for this sample is **ANTON-PAAR SUCROMAT**. It is mainly used in sugar industry in determining the sugar concentration in raw materials, preliminary, intermediate and end products. Monitoring of chemical processes, e.g. during the manufacture of invert sugar. Purity control -Sugar cane, beet pulp, molasses, refined sugar, syrup, invert sugar etc.

#### **Determination of brix value using refractometer:**

A refractometer is a laboratory or field device for the measurement of an index of refraction (refractometry). The index of refraction is calculated from the observed refraction angle using Snell's law. For mixtures, the index of refraction then allows to determine the concentration using mixing rules such as the Gladstone–Dale relation and Lorentz–Lorenz equation. Brix is determined by measuring the specific gravity of molasses. After the specific gravity has been obtained, the value is applied to a conversion table from which the level of sucrose can be determined. As sugar content increases, degrees brix likewise decreases.

#### **Determination of wavelength using UV-VIS spectrometer:**

UV-Vis spectroscopy is an analytical technique that measures the amount of discrete wavelengths of UV or visible light that are absorbed by or transmitted through a sample in comparison to a reference or blank sample.

This property is influenced by the sample composition, potentially providing information on what is in the sample and at what concentration. Wavelength for control and sample is noted.

### **Sensory analyses:**

Sensory analyses such as the taste, texture, colour, mouthfeel, appearance and flavor test were carried out with 20 local panelists.

## IV. RESULT

### Determination of pH:

pH of molasses(control) – 5.6

pH of pomegranate molasses – 4

The acidity in pomegranate molasses is due to the added lemon juice.

### Determination of optical property using polarimeter:

Pole Value	-0.33-degree Z
Wavelength	589nm
Nominal cell length	-200.00nm

The negative range is due to the activity of lemon juice.

### Determination of brix value using refractometer:

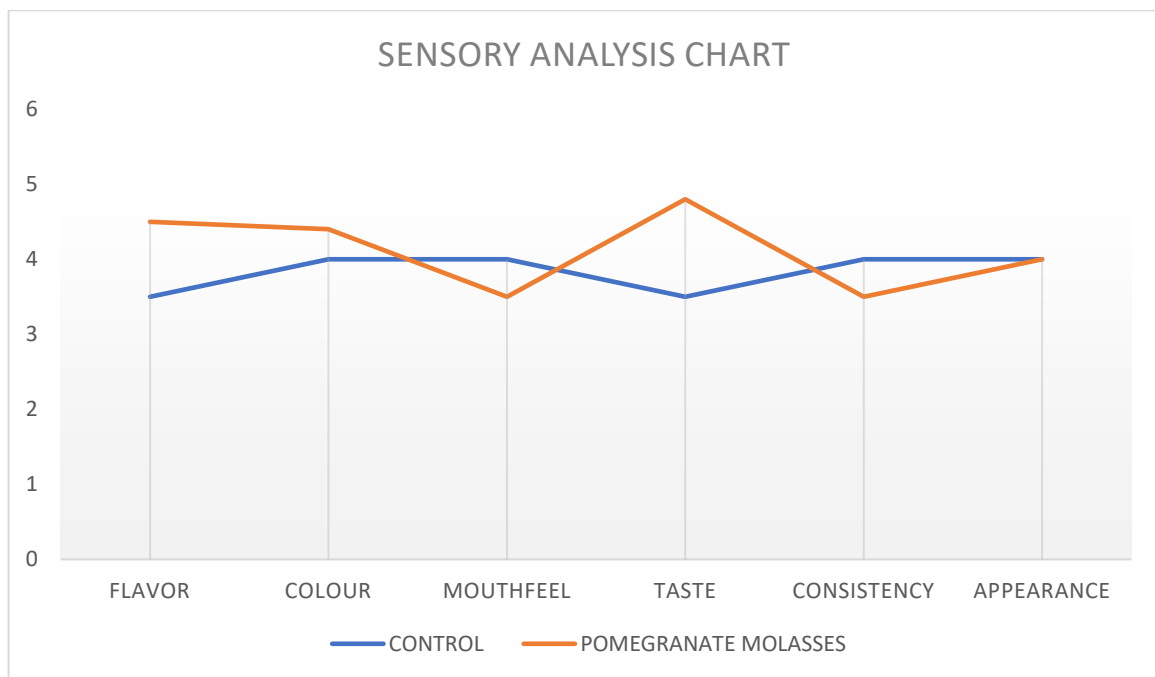
Brix value of high test molasses (control) is found to be 80°

Brix value of pomegranate molasses is found to be 50°.

### Determination of wavelength using UV-VIS spectrometer:

UV-VIS value of pomegranate molasses is found to be 73051.

## V. SENSORY ANALYSES:





## REFERENCE

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