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Research Article

A REVIEW PAPER ON JELLY

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Preparation and Comparitive Studies of Orange-Aloevera-Gourd Based Jelly

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ABSTRACT

Jelly a smoothest consistency and is made by crushing a fruit and discarding the solid chunky leftovers. This leaves only the fruit juice, which is then mixed with a substance called pectin and heated to form the gelatious spread with 65% sugar. During storage study of jelly TSS, titrable acidity, reducing sugars and total sugar were increased, whereas moisture content, ascorbic acid and organoleptic quality was slightly decreased with increased storage period. The important components in the preparation of jellies are pectin, sugar and acid which need to be added in correct proportion for proper gel formation.

INTRODUCTION

Fruits are major food products and known as key ingredients in any processed food. A number of studies have supported the link between a high consumption of fruits and low incidences of certain chronic diseases. Jelly also defined as: that semisolid food made from not less than 45 parts by weight of fruit juice ingredient to each 55 parts by weight of sugar. This mixture is concentrated to not less than 65% soluble solid. The deficiencies that occur in fruit itself can be overcome by the addition of pectin and acid. Jellies are stable because thay are high in solids (sugar) and high in acids. Jam and jelly are the intermediate moisture foods (i.e medium amount of water is used in its preparation). The improtant constituents in the preparation of jam and jellies are pectin, sugar and acids in correct proportion for proper gel formation. It should be free from any residual parts of fruit and firm to hold its shape. Jam and jellies had considerable nutritional value, with higher leevels of vitamin C, phenolic comppounds, carotenoids and antioxidant activity.

Fruit jam and jellies made by cooking fruits (pieces, pulps and/or juice) with sugars, gelling agents (usually pectin) and edible (usually organic) acids and concentrating the mixture until a characteristic and suitable consistency is obtained. This is one of the oldest processes used to preserve fruit for consumption in the off-season and is also done to add variety to the food. The minimum amount of fruits in the final product may vary from about 35-45 wt%. A food substrate concentrated to 65% or more soluble solids and which contains substantial acid may be preserved with relatively minor heat treatment provided that food product is protected from air. The high fruit solids and the pectin bind or tie-up the moisture sufficiently to lower the water activity to a level where only molds can grow. Hermatic sealing protects the product from moisture loss, mold growth and oxidation.

Pectin

Pectin is a white, amorphous, colloidal hetro-polysaccharide (indigestible) so it cannot be digested by the body in its natural form and used as thickening or gelling agent in products like jam, jelly etc. It is naturally present in primary cell wall of terrestrial plants and helps to bind the cells together. Pectin cannot be extracted by water (water insoluble part is called protopectin) molecules as it is tightly linked in cell wall. Protopectin becomes soluble by acid hydrolysis and then extracted in hot water. The amount of pectin in the fruit varies with the type of fruit and there degree of ripeness. The amount pectin content in fruit is species specific in nature. Under ripe fruit has higher pectin content. As fruit ripens, the pectin is changed to a non gel forming substance through broken down it by the enzymes namely pectinase and pectinesterase and therefore the fruit become softer and the middle lamellae break down and cells become separated from each other.

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Sugar

Sucrose is usually used in domestic jellied products. From the practical point of view, the advantage of substituting the sugar for sucrose is either because of cost or for flavor modification or to reduce crystallization. Partial replacement of sucrose with other sugars such as maltose, glucose, syrups or high fructose corn syrup altered the setting time or many rheological properties of model gels. Sweeteners such as brown sugar, sorghum and molasses are not recommended because their flavors overpower the fruit and so their sweetness varies. Artificial sweeteners cannot be substituted in jam, jelly products as they cannot form gel matrix. Honey is less processed than sugar and more healthful. However, when it is heated, it loses complexity of its fragrance, flavor and perhaps also some of its health promoting properties. Besides, honey contains more water and so may necessitate longer boiling. It also produces lot of foam during cooking and gelled preserves made with honey tend to be soft. Therefore, honey cannot be used in making the fruit finished products. The exact amount of sugar for the production depends on the acidity. If sugar content is too low, the resulting jelly will be tough, excessive sugar on the other hand will create a "soft set" that can be broken easily.

Gelling

To obtain the desired consistency and firmness the addition of sugar is essential in the gelling process of jam and jellies. The ability of pectin (a natural content) of forming gel takes place only in presence of acid and sugar. In gelling process sugar attracts and holds water. The consistency of the gel is determined by the concentration of pectin which generally ranges from 0.5% to 1.5% by weight depending upon the type of pectin utilized.

Preserving

Sugar prevents the spoilage of jams and jellies. Properly prepared and packaged products are free from bacteria and yeast cells until the lid is opened and exposed to air. Once, the jar is obtained, sugar in capacitates any microorganisms by its ability to attract water through osmosis (the process whereby water will flow from a weaker solution to a more concentrated solution through semi-permeable membrane). In that case, water is withdrawn from these microorganisms towards the concentrated sugar syrup. The microorganisms become dehydrated and incapacitated and are unable to multiply and bring about food spoilage. In jellies and jams, a concentrated sugar solution of at least 65% is necessary to perform this function. Since the sugar content naturally present in fruits in less than 65%, it is essential to add sugar to raise it to this concentration for products preparation.

Chemical Preservatives

Processed foods contains many chemicals that are added to preserve the food by extending the shelf life and to prevent spoilage. Benzoic acids in the form of its sodium salts are used widely for the preservation of jam and jellies. Other chemical preservatives such as potassium metabisulphite, sorbic acid, calcium propionate and sodium benzoate are also used as preservatives in most of the food products.

Acidity in Jelly

Acid acts as a flavoring agent in the jam, jelly production. It also helps in the gel formation by lowering the pH. One of the most common causes of jelly failure is insufficient acid. The pH value (a measure of hydrogen ion concentration or acidity) of jelly should be taken when the jelly is concentrated sufficiently to pour. If the pH is above 3.3, citric acid should be added to reduce the pH to range of 3.1 to 3.2.

Causes for Jelly Making Faliure

Insufficient acid: The most common cause for failure of jellies to gel is insufficient acid. Commercial jelly makers should read the pH of each batch when it is ready to pour into containers and acidify with citric acid if the jelly is deficient. Quality control pH meters are available from most scientific supply companies.

Prolonged boiling: Excessive boiling results in the hydrolysis of the pectin and in the formulation of a syrupy caramalized mass devoid of natural fruit flavors. The juice and sugar should be concentrated to the gel point as rapidly as possible to avoid hydrolysis of pectin. The solution should be tested with a refractometer as it nears the 65^{o}Brix end-point.

Crystals: at ordinary temperature jelly may develop sugar crystals if the concentration of the finished product exceeds 70^{o}Brix. Monitoring the solids of the boiling fruit solution with a refractometer as the end-point is reached should eliminate over-concentration and crystallization of sugars.

Role of Enzymes in Fruit Products

Pectinase: the most important enzyme in fruits is Pectinase that breaks down the pectin into sugars and galacturonic acid. It can be derived from other organisms such as fungi (eg- *Aspergillus niger*). Pectinase become activated at 45-55^{o}C and work well at a pH of 4.5-5.5. it catalyzes the random hydrolysis of 1,4-α-D-galactosiduronic linkages in pectate and other galacturonans and degrade the structure of plant cell wall. So it speeds up the release of juice and helps the industries to save money and time.

Pectinase improves the color and the aroma of the juice. Break down the pectin with pectinase removes the cloudiness in the fruit juice. This reduces the density of the juice, which increases the volume of juice and makes it easier to pour. Pectinase also breaks down starches in the fruit juice which eliminates any plant materials left in the juice.

Invertase: is another important enzyme in the fruit products. It is derived from beneficial strain of *Saccaharomyces cerevisiae*. Invertase is a carbohydrate digesting enzyme that hydrolysis the sucrose into its component parts, glucose and fructose by cleaving α-1, β-2-glycosidic linkage. In the preparation of fruit products, added sugar contact with water and invertase enzyme become activated and split the sucrose. This chemical change in mixture produces some benefits in jam and jelly quality including brightness, fruit flavor enhancement and the avoidance of crystallization in case the concentration of sugar is higher than normal.

CONCLUSION

His review attempts to shed light on the preparation of jelly, increasing the shelf life by using different techniques and the

overall acceptability of the jelly. The results reviewed in this article are aimed to find the best blends of the raw material to prepare the jelly. Thus, it is obvious to increase in extract of pectin by adding more water in the process of extraction that subsequently dilutes the concentration of TSS, acidity, ascorbic acid, reducing sugars, non-reducing sugar and total sugars and water soluble pectin in the extract.

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