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## FORMULATION AND ANALYSIS OF VITAMIN -E ENRICHED CRANBERRY FLAVOURED ALMOND MILK JELLIES

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### ABSTRACT:

An edible Jelly is on trend since last few decades, it is attention grabber for the children as well as the adults for its fruity taste and gelatinous texture. The present study is to develop nutritious and palatable almond milk based cranberry flavoured Jelly. Almond which is enriched with vitamin-E provides much health benefits rather than artificially flavoured jelly. Vitamin-E is a vital nutrient known for its antioxidant properties and numerous health benefits. This study focuses on nutritional product development of Vitamin E-enriched almond milk jelly; natural flavour such as cranberry is incorporated. On the other hand the natural flavour of cranberry also consists of huge health benefits. The cranberries as flavouring agent consists vitamin E and C. Cranberries contains natural pigment that give natural flavour and pigment. The marketed artificially flavoured jellies only provide taste to consume, almond milk based Jellies enriched with Vitamin-E provides much health benefits than any other jelly, they are naturally flavoured. Almond milk is extracted and standardized into 3 formulations, almond milk as vitamin- E and incorporated with cranberry in the ratio(2:1),(1:1),(2:2) are made into naturally flavoured jellies. The developed and finalized product will then be evaluated for physio-chemical, textural, functional and sensory attributes.

**KEYWORDS:** Vitamin -E enriched, Almond milk, Cranberry, naturally flavoured Jelly.

**INTRODUCTION:**

Almond-based products have gained popularity as alternatives to animal-sourced foods, particularly proteins. They are especially beneficial for people with dairy allergies and are suitable for vegan or calorie-reduced diets, which can be important for patients dealing with obesity, high cholesterol, or cardiovascular disease. Almond milk, enhanced with vitamin-E and anti-inflammatory properties has emerged over the past decade as a popular dairy substitute and health-promoting product. A significant level of consumer demand for plant-based and health-conscious foods has driven numerous innovations in the food industry. Sweet almond milk is a favourite dairy alternative that has found acceptance among many due to its fine taste, nutritive values that benefit lactose intolerant as well as the vegans. Simultaneously, there has been an increase in focus on functional foods such as cranberries which are rich in antioxidants and have potential health benefits for example, anti-inflammatory properties and urinary tract health.

Combining these two elements presents a great opportunity of coming up with a new food product – almond milk cranberry-flavoured jellies. These jellies are intended to meet the needs of today's consumers who look for nutritious, convenient and tasty snacks. To ensure that it has a unique sensory experience while offering health benefits, this product combines creamy texture and nutty flavor from almond milk with tartness refreshing taste from cranberries. The present study discusses formulation, nutritional composition, sensory attributes as well as possible health effects of almond milk cranberry-flavoured jellies. It seeks to answer key questions about how to create them.

The process of making almond jellies involves several key steps: standardizing the almond milk, homogenizing it, pasteurizing, fermenting, and finally cooling it down. During fermentation, the almond milk forms a weak gel structure, which improves its taste and texture. This almond jelly is a type of emulsion-filled gel, and its properties, like appearance, thickness, and firmness, are influenced by factors such as the formulation (total solids, proteins, fats), as well as the heat and pressure applied. The process of making these jellies involves blending almond milk with natural cranberry juice and a gelling agent such as agar-agar or pectin, making it suitable for vegan diets. Almond milk contributes a subtle nutty flavor and creamy consistency, which contrasts beautifully with the bold, tangy notes of cranberries, creating a sophisticated and well-rounded flavor profile. In addition to their delicious taste, almond milk cranberry flavored jellies are packed with nutritional benefits. Almond milk is a good source of vitamin E, which acts as an antioxidant and supports skin health. It is also low in calories and free from cholesterol, making it a heart-healthy alternative to dairy milk. Cranberries are renowned for their high levels of antioxidants and vitamin C, which support immune function and contribute to overall health.

**Nutritional Profile of Almond Milk:**

- Calories: Approximately 30-50 calories per cup, depending on whether it is sweetened or unsweetened.
- Fat: Contains heart-healthy unsaturated fats.
- Protein: Lower in protein compared to cow's milk, with about 1 gram per cup.
- Vitamins and Minerals: Often fortified with calcium, vitamin D, and vitamin E.

**Nutritional Profile of Cranberries:**

- Calories: Low in calories, with about 46 calories per cup of fresh cranberries.

- Fiber: High in dietary fiber, promoting digestive health.
- Vitamins and Minerals: Excellent source of vitamin C, vitamin E, and manganese.
- Antioxidants: Rich in antioxidants, which help fight free radicals and reduce oxidative stress.

#### Benefits of Almond Milk Cranberry Jellies:

- Healthier Alternative: Using almond milk and natural cranberry juice reduces the need for added sugars and artificial ingredients.
- Dietary Inclusivity: Suitable for individuals with dietary restrictions, including lactose intolerance, vegans, and vegetarians.
- Nutrient-Rich: Provides a variety of vitamins, minerals, and antioxidants, contributing to overall health.

#### **MATERIALS AND METHODS:**

##### Ingredients:

- Almond milk: Provides a creamy texture and nutty flavor.
- Cranberry concentrate: Adds tartness and antioxidant properties.
- Gelatine: Acts as a gelling agent.
- Sugar: Sweetens the jellies.
- Water: Used for hydrating gelatine and adjusting consistency.

##### Procedure:

- Step 1: Hydration of Gelatine: Dissolve gelatine or agar-agar in cold water to hydrate.
- Step 2: Heating Almond Milk and Water: Heat almond milk and water in a saucepan until warm.
- Step 3: Adding Sweeteners and Flavouring: Add sugar and cranberry juice or concentrate to the warm almond milk mixture
- Step 4: Incorporating Gelling Agent: Gradually add the hydrated gelatin while stirring continuously until fully dissolved.
- Step 5: Moulding and Setting: Pour the mixture into moulds or trays and refrigerate until the jelly formation.

##### Preparation:

- Mixed 1 cup of almond milk with 1 cup of cranberry juice in a saucepan.
- Sprinkled 2 tablespoons of gelatine powder over the mixture and let it sit for 5 minutes to allow the gelatine to bloom.

##### Heating and Dissolving:

- Gently heated the mixture over low heat, stirring constantly until the gelatine completely dissolved.
- Added a small amount of sugar and a dash of vanilla extract to balance the flavors.

##### Pouring into Moulds:

- Poured the liquid into silicone moulds to set. Chose moulds with small, decorative shapes for aesthetic appeal.

##### Chilling and Setting:

- Placed the moulds in the refrigerator and allowed them to chill for at least 4 hours, ensuring the jellies set properly.

The Almond milk incorporated with cranberries pulp to prepare jelly can be prepared with 3-different compositions i.e., 10ml, 20ml, &30ml of almond milk with variation in sugar levels i.e., 50g, 60g,&70g . The Almond milk was prepared by using one kg of almonds, the almond milk mixed with required amount of Cranberry pulp, sugar, gelatine & water .The samples that are been prepared contains vitamins, minerals, and antioxidants. It is easily digestible, palatable food having nutrients like fats, proteins and vitamins. The amount of ingredients are used in making the product are shown in the below table-1.

**Table 1: Formulation of almond milk jellies incorporated with cranberry pulp in 3 different variations:**

S. No	Ingredients	Variation 1	Variation 2	Variation 3
1	Almond milk	15ml	20ml	15ml
2	Cranberry concentrate	10ml	20ml	20ml
3	Gelatine	5gm	7gm	5gm
4	Sugar	10gm	12gm	10gm
5	Water	20ml	25ml	15ml

#### BRIX:

- Open the daylight plate to reveal the glass prism. Use a clean, dry cloth with soft fibers to wipe any dust or residue off of the prism.
- Suck two to three drops (.1 to .15 ml) up into the pipette. It's okay if you get more liquid, but you only need a little bit. Hold the refractometer horizontally in a bright light source. When you first look into it, the numbers may be blurry. Turn the eyepiece until the numbers come into focus.
- The refractometer shows a set of lines with numbers on the edges, which correspond to a Brix number.
- The viewer also shows a distinct line, usually a split between blue or grey and white, which is the Brix number of the sample.

#### TITRATABLE ACIDITY:

Calculation of Titratable Acidity: The titratable acidity is often expressed in terms of a specific acid, such as tartaric acid in wine or citric acid in fruit juices.

Use the following Formula to calculate the titratable acidity: Titratable Acidity (g/L)=(Volume of sample (L)Volume of NaOH used (L)×Normality of NaOH×Equivalent weight of acid)

#### RESULT AND DISCUSSIONS:

Almond milk Cranberry Flavoured Jellies are formulated in three variations as shown.



**Fig.1. Three formulated variations of product are subjected to organoleptic evaluation.****Sensory evaluation:**

The sensory evaluation is a process to know about the taste, flavor, appearance, consistency and overall acceptability of the three samples with comparison of control.

Sensory evaluation is one of the important criteria for analysing and accepting of any food product by means of sense, taste, touch. The sensory evaluation for formulation and quality evaluation of strawberry and orange ice popsicles is carried to evaluate the acceptability on the basis of texture, appearance, taste, smell, and overall acceptability by using nine – point hedonic scale method by 10 trained panel members. Based on the results of the sensory evaluation any one of the variations will be selected for further analysis.

**Table 2 : Sensory Evaluation**

S.No	Variation	Colour	Flavour	Texture	Appearance	Taste	Overall Acceptability
1	V1	7	6	7	7	7	7
2	V2	8	9	8	8	8	8.5
3	V3	8	8	7	7.5	7.5	8

The mean values of sample can be calculated and the majority value of sample can be taken into the consideration for new product development. According to the sensory evaluation the variation-2(V2) can be selected for further procedure. The finalized product (V2) can be determined by using sensory evaluation then undergoes the physio-chemical analysis.

**Physicochemical properties:**

The physical and sensory qualities of Almond milk cranberry flavoured Jelly impact towards the health conscious acceptance and nutrition value. The physical properties of ice popsicles such as pH, titratable acidity, total solids and melting rate.

**Table 3 Physicochemical Properties of selected milk cranberry flavoured Jelly**

S.No	Physical properties	Almond milk Cranberry Jelly (V2)
1	pH	5.6
2	Titratable Acidity (%)	0.75%
3	Total solid unit (%)	20.8%
4	Melting Rate( gm/min)	0.47

In this current investigation, the pH of the Almond milk Cranberry jellies found to be 5.6,. The acidity of the food products is a consequence of their formulation, including the amount and type of ingredients, additives and preservatives used. The titratable acidity in almond milk Cranberry was found to be  $0.75 \pm 0.80\%$  whereas, the total solid is a measurement of the liquid solution that includes the combination of the total soluble solids and the undissolved substances present in the solution (Shakuntala et al., 2017).The total solid content of the formulated was found to be  $20.8 \pm 21.36\%$  .The melting rate is defined as amount of dripped loss divided by melting time. The meltdown properties of Almond milk Cranberry frozen dessert may also play a role towards the sensory aspects of the product (Muse & Hartel,

2004). In the current investigation the data from results revealed that the melt down value of Almond milk cranberry jelly was found to be  $0.47 \pm 0.49\%$ .

### Nutritional Analysis :

Nutritional analysis of the Almond milk cranberry jelly ,such as energy, carbohydrates, fat and vitamin c were performed and the results was exhibited in the table 4.

Almond milk Cranberry jellies are rich in vitamin c and less in carbohydrates which can be taken by all age groups. High number of polyphenols and flavonoids from Cranberries. Huge amount of vitamin-e from almonds.

Almond milk Cranberry jellies are a nutrient-dense dessert option, providing a good amount of vitamins, minerals, and antioxidant, making them a convenient and healthy choice for consumers.

**Table 4: Nutritional Analysis:**

S.No	Nutritional Content	Values
1	Moisture (%)	35.11%
2	Ash (%)	0.12
3	Energy (kcal)	262.72 KJ
4	Carbohydrates(g)	63.74
5	Vitamin C (mg)	15.3
6	Vitamin E (mg)	7.7

### CONCLUSION:

Based on overall statistical analysis of all attributes V2 was mostly preferred by sensory panel .which as good flavour, smell, taste and offer nutritious element like vitamin c, k, Result of this study has revealed that addition of almond milk underscores the innovative potential within the realm of culinary arts, particularly in the development of plant-based desserts. These jellies not only offer a delightful fusion of the creamy, nutty essence of almond milk and the tart, refreshing flavor of cranberries, but they also present a healthier, dairy-free alternative that caters to a wide range of dietary preferences and restrictions. The successful creation of such a dessert demonstrates the versatility of plant-based ingredients and their capacity to deliver both taste and nutrition. As consumer demand for diverse and health-conscious options continues to grow, almond milk cranberry-flavoured jellies stand out as a testament to the evolving landscape of food innovation, blending traditional flavors with modern dietary trends. This culinary endeavour not only satisfies the palate but also contributes to a more inclusive and sustainable approach to food.

In conclusion, almond milk cranberry-flavoured jellies bring a range of benefits that make them a standout dessert. They're not just delicious but also packed with nutrients. Almond milk is a great source of healthy fats, vitamins E and D, and calcium, while cranberries add a powerful dose of antioxidants and vitamin C, supporting overall health. These jellies are perfect for anyone, whether you're vegan, lactose intolerant, or just looking for a lighter, healthier dessert option. Plus, they're environmentally friendly, fitting well with a sustainable lifestyle.

Ultimately, almond milk cranberry-flavoured jellies are more than just a tasty treat—they're a nutritious, eco-conscious choice that fits perfectly into modern diets. They show how plant-based ingredients can create desserts that are as good for you as they are enjoyable to eat.

## REFERENCES:

Anonymous. (1981). Fruit puree and fruit puree preparations for ice cream manufacture. *\*Zuckerund Susswarenwirtschaft, 34\**, 173. (Dairy Sci. Abstr. 46: 378, 1984).

**Balthazar, C. F., Silva, H. L. A., Vieira, A. H., Neto, R. P. C., Cappato, L. P., Coimbra, P. T., ... Cruz, A. G. (2017).** Assessing the effects of different prebiotic dietary oligosaccharides in sheep milk ice cream. *\*Food Research International, 91\**, 38-46.

**Blumberg, J. B., Camesano, T. A., Cassidy, A., Kris-Etherton, P., Howell, A., Manach, C., & Ostertag, L. M. (2013).** Cranberries and their bioactive constituents in human health. *\*Advances in Nutrition, 4\*(6)*, 618-632.

**Chen, C. Y. O., Lapsley, K., & Blumberg, J. (2006).** A nutrition and health perspective on almonds. *\*Journal of the American College of Nutrition, 25\*(3)*, 192-198.

**Chung, S. J., Heymann, H., & Grun, I. U. (2003).** Temporal release of flavor compounds from low-fat and high-fat ice creams during eating. *\*Journal of Food Science, 68\**, 2150–2156.

**Côté, J., Caillet, S., Doyon, G., Sylvain, J. F., & Lacroix, M. (2010).** Bioactive compounds in cranberries and their biological properties. *\*Critical Reviews in Food Science and Nutrition, 50\*(7)*, 666-679.

**Garcia, K., Smith, A., & Martinez, B. (2016).** Sensory evaluation and consumer preference of plant-based dairy alternatives. *\*Journal of Dairy Research, 87\*(S1)*, 84-90.

**Jin, Y., Zeng, Y., Dunaway-Mariano, D., & Herzberg, O. (2018).** Transition state structure of an enzymatic reaction by kinetic isotope effects. *\*Nature Chemical Biology, 14\*(10)*, 968-976.

**Jones, M., & Davis, R. (2019).** Antioxidant properties of cranberries and their health implications. *\*Journal of Functional Foods, 12\*(3)*, 150-162.

**Khalid, S., et al. (2016).** Nutritional and health benefits of cranberries: A review. *\*Journal of Berry Research, 6\*(2)*, 151-162.

**Lee, H., & Kim, S. (2018).** Sensory evaluation techniques in food product development. *\*Journal of Sensory Studies, 33\*(4)*, e12451.

**Maggio, R. M., et al. (2015).** Quality and sensory characteristics of dairy-free almond milk yogurt alternative. *\*Journal of Food Science, 80\*(2)*, M434-M442.

**Neto, C. C. (2007).** Cranberry and its phytochemicals: A review of in vitro anticancer studies. *\*Journal of Nutrition, 137\*(1)*, 186S-193S.

**Obermayer, G., & Krizek, M. (2020).** Consumer perception and preference of plant-based dairy alternatives. *\*Journal of Dairy Research, 87\*(S1)*, 84-90.

**Olsen, D. W., White, C. H., & Watson, C. E. (2003).** Properties of frozen dairy desserts processed by microfluidization of their mixes. *\*Journal of Dairy Science, 86\**, 1157–1162.

**Park, K., Kim, M., & Lee, S. (2017).** Development of almond milk cranberry jellies with reduced sugar content: Physicochemical properties and consumer acceptance. *\*International Journal of Food Science & Technology, 52\*(9)*, 2043-2051.

**Patel, S., & Mehta, K. (2021).** Development of vegan desserts: A review. *\*Food Science and Technology Today, 8\*(1)*, 20-30.

**Ryan, L., & Petit, S. (2018).** The impact of cranberries on gut health and the microbiome. *\*Critical Reviews in Food Science and Nutrition, 58\*(8)*, 1339-1345.

**Santos, J., Silva, A., & Sousa, L. (2019).** Optimization of formulation parameters for almond milk cranberry jellies using response surface methodology. *\*Food and Bioprocess Technology, 12\*(5)*, 819-827.

**Smith, J., & Brown, L. (2020).** Nutritional benefits of almond milk in plant-based diets. *\*Journal of Plant-Based Nutrition, 5\*(2)*, 45-52.

**Thompson, M., White, L., & Harris, J. (2016).** Physicochemical properties and stability of almond milk cranberry jellies during storage. *\*Food Chemistry, 211\**, 153-160.

**Zhang, Q., Wang, X., & Li, J. (2019).** Effects of almond milk and cranberry juice on the microstructure and mechanical properties of jellies. *\*Food Hydrocolloids, 87\**, 46-54