Analysis of Vitamin a in the Carrot and Papaya Powder Incorporated Whey Beverages

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***Abstract*—The main objectives of the paper were to investigate the use of carrot and papaya powder in the production of functional whey based beverage. Whey contains over 90% of water. It also contains a high lactose content (75% of the dry matter), a low fat content, soluble milk proteins (i.e. about 20% of total milk proteins) and various minerals. It also contains other components such as citric acid and lactic acid, non-protein nitrogenous materials such as urea and uric acid and group B vitamins, mainly vitamin B1 (thiamine), vitamin B2 (riboflavin) and vitamin B6 (pyridoxine).Whey protein does not contain vitamin A, in order to improving the nutritional quality of whey carrot and papaya powder were fortified to develop whey beverages. Quality of developed whey carrot and whey papaya beverages was evaluated trough the sensory evaluation.For standardization of recipe 2 samples had done Sample A and Sample B, from that sample A has selected according to sensory evaluation. The Vitamin A composition of Sample A and Sample B were 18.5µg and 20µg respectively.**

***Index Terms*—Carrot,Papaya, Vitamin A and whey beverage**

I. INTRODUCTION

In recent years, there has been increasing consumer interest in functional foods containing biologically active substances with possible positive effects on the human body [Bazán et.al,2022]. In general, these types of products are described as functional foods. Additionally, the American Dietetic Association defines functional foods as “foods that are in the form of whole, fortified, enriched, or enhanced foods that provide functional advantages and health benefits beyond basic nutrition when consumed at an effective level on a regular basis” [American Dietetic Association,2004]. Functional foods includebaby food, cereals, meat products, various spreads, dairy products, and beverages. In addition, even fermented products

can be classified as functional foods [Aslam et al,2018]. Due to consumer demands for container contents, size, shape, and appearance, ease of distribution and better storage for refrigerated and shelf-stable products; and numerous opportunities to include desirable nutrients and bioactive compounds, beverages are by far the most active functional food category [Corbo, 2014].
Carrots (*Daucuscarota*) contain compounds that have been experimentally shown to have anticarcinogenic and immunoactive properties, as well as the ability to maintain an appropriate level of blood sugar, cholesterol, and blood pressure [da Silva Dias,2014]. Carrot powder is growing in popularity due to its balanced organoleptic and nutritional properties. The main benefits include a high content of carotenoids, a variety of vitamins (such as vitamins B1, B2, B6, B9, C, and K), fiber, and antioxidants [Amany,2012].

The carrot (*Daucacarota*) is one of the widely used vegetables. It is a good source of nutrients like carbohydrates, minerals, and vitamins as well as therapeutic compounds such as carotenoids (potent antioxidants). It helps to fulfil vitamin A deficiency, diminish cholesterol, lower the risk of arteriosclerosis, purification of blood, and constipation, prevention of the appearance of colon cancer, and combat diarrhea (Sharma et al., 2012).

Papaya (Carica papaya L.) is one of the important fruits of tropical and subtropical regions in the world. The fruit is rich in β-carotene, vitamin-A and C, iron, calcium, protein, carbo-hydrates, phosphorous and good source of energy (Gopalan et al., 1972).

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Whey can be considered a suitable new ingredient for the production of beverages because lactic acid bacteria (LAB) can metabolize it [García-Burgos, 2020]. Whey is produced as a by-product of the dairy industry. Furthermore, further use of whey could lead to a sustainable economy since up to 40% of whey is not processed, reducing environmental pollution. Whey is highly digestible and serves as a source of lactose, high-quality complete serum proteins, vitamins, and minerals (especially calcium, magnesium, and phosphorus) [Bandara, 2023]. Furthermore, whey can provide the human body with positive effects, including antioxidant activity, antihypertensive, antidiabetic, or antimicrobial properties, and is therefore considered a suitable ingredient for the production of functional foods [Barukčić et al, 2019].

Fruits and vegetable are highly perishable and are subjected to rapid post-harvest losses. Their value addition can enhance shelf life, new product development and finally commodity value in market. The present work was planned to prepare carrot and papaya powder based beverage with whey incorporation and evaluating sensory properties of a novel carrot and papaya powder enriched whey beverage

II. METHODOLOGY

Preparation of Carrot Powder

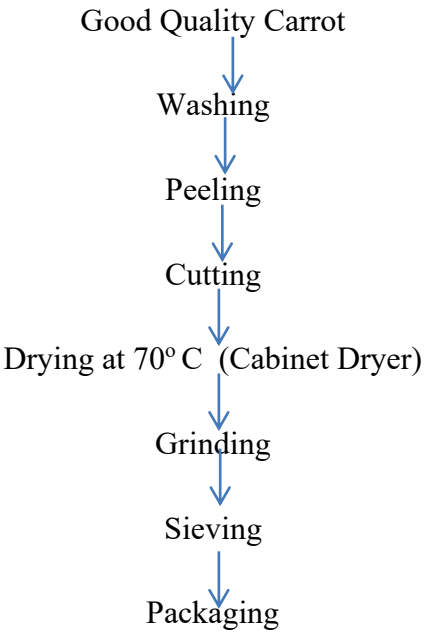

Figure 1
Preparation of Carrot Powder

Preparation of Papaya Powder

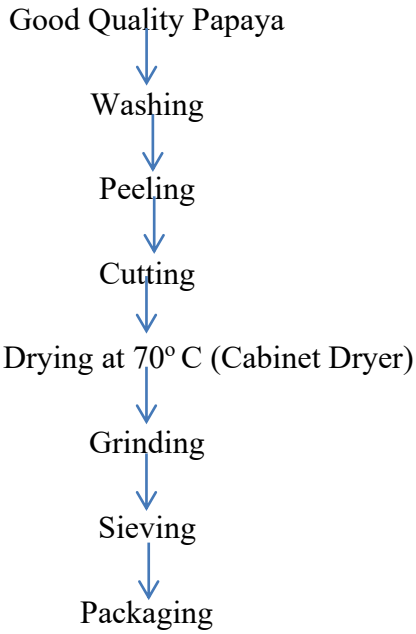

Figure 2 Preparation of Papaya Powder

Development of whey beverage using carrot and Papaya Powder

Table 1 Ingredients used for the Development of whey beverage using carrot and Papaya Powder

S.No	Ingredients	Control	Sample A	Sample B
1.	Milk Whey	100 ml	100 ml	100 ml
2.	Papaya Powder	-	5 gm	-
3.	Carrot Powder	-	-	5 gm
4.	Jaggary	10 gm	10 gm	10 gm

Preparation Process of whey beverage using carrot and Papaya Powder

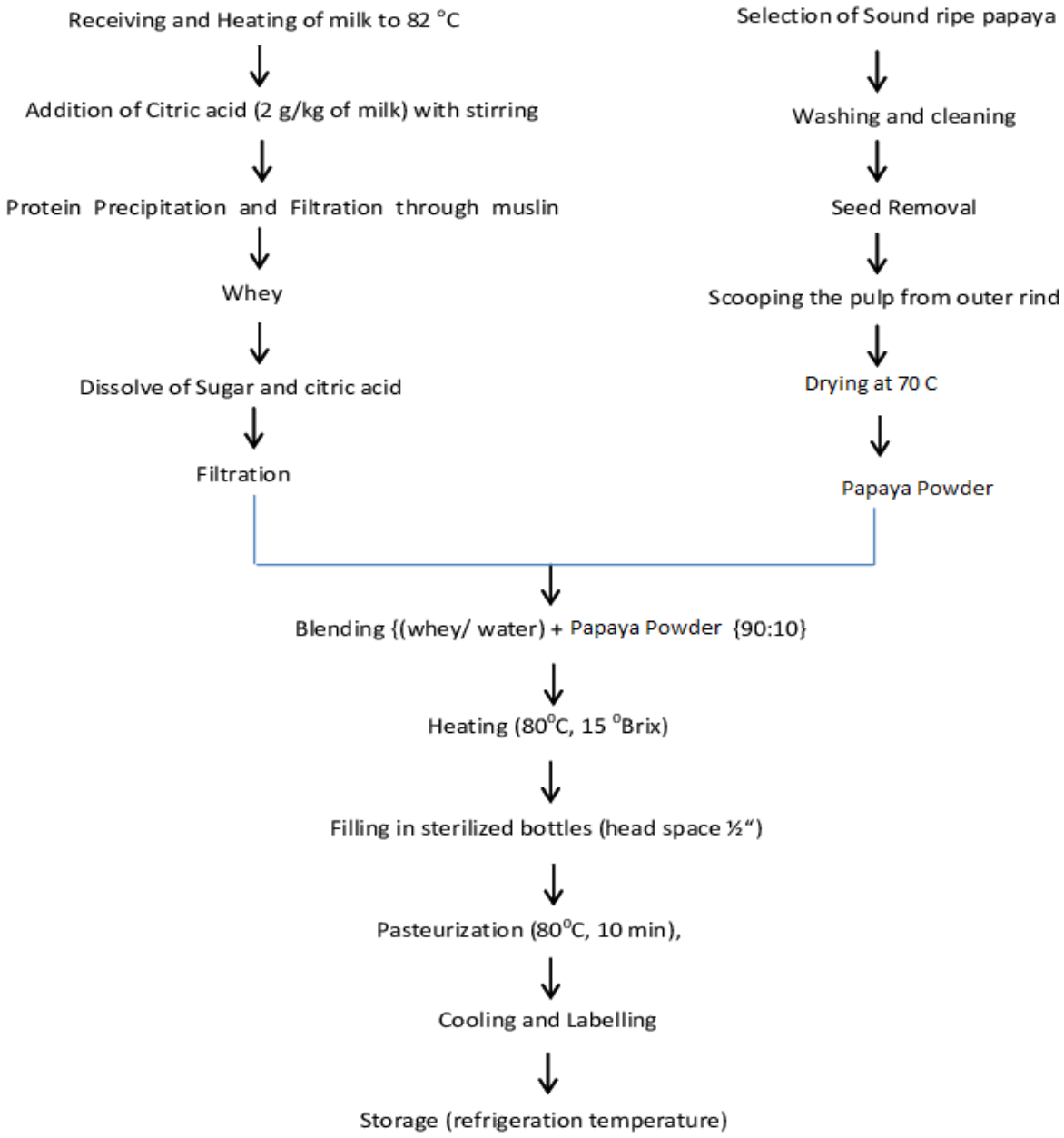

Figure 3 Preparation Process of whey beverage using carrot and Papaya Powder

Plate 1

Developed Whey Beverage using Carrot and Papaya Powder

SensoryEvaluation

The sensory attributes including appearance, texture, flavor (taste and aroma), aftertaste and overall acceptability, were evaluated by a semi trained panel, using a 5-point Hedonic scale with 1 representing the least score (dislike extremely) and 5 the highest score (like extremely)

Analysis of Vitamin A

The Vitamin A content of developed whey beverages was determined by spectrometrically. (AOAC,2011)

Plate 2 Analysis of Vitamin A

III. RESULT AND DISCUSSION

4Determination of Sensory Evaluation of Developed Whey Beverages

Table 2 Sensory Evaluation of Developed Whey Beverages

Sensory evaluation Particulars	Colour	Texture	Odour	Taste	Overall acceptability
Control	4.3±0.34	4.45±0.68	4.1±0.61	4.4±0.61	4.0±0.47
Sample A	3.85±0.62	4.35±0.52	4±0.78	4.25±0.54	4.3±0.58
Sample B	4±0.74	4.1±0.65	4.05±0.36	4.2±0.53	4.1±0.57

The above table 2 shows the mean score of colour, flavor, texture, taste and overall acceptability of the Developed Whey Beverages using carrot and Papaya powder. It was found that overall acceptability of sample A was 4.3. Therefore Papaya powder incorporated whey beverage was excellent mean score.

Estimation of Vitamin A

Table 3Estimation of Vitamin A

S.No	Nutrients	Sample A	Sample B
1.	Vitamin A	18.5µg	20µg

The above table-3 shows that the results of Vitamin A present in the samples. The amount of Vitamin A is high in sample B [20µg] when compared to Sample A.

IV. CONCLUSIONS

The results of the study recommend that adding fruits and vegetables to whey supplements could be a viable alternative for creating nutritious beverages with the best sensory qualities and can be recommended for consumption. The results of the study recommend that adding fruits and vegetables to whey supplements could be a viable alternative for creating nutritious beverages with the best sensory qualities and can be recommended for consumption. Further research can explore the antioxidant ability, microbiological characteristics, and commercial potential of the products.

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