

Development of High Fiber Vegan Smoothie Enrich with Omega-3 and Dry Fruits

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Abstract: A study of coconut smoothie was carried out to develop this product with enrich of omega -3 and other nutrition like vitamin E and vitamin B6 from walnut; copper, selenium and vitamin K from dates at acceptance level with high fiber. Coconut (*Cocos nucifera*) is the stone of the drupes borne by the coconut palm. Coconut milk may be considered as a substitute for cow milk. It may be used by the people who are lactose intolerant. Milk smoothie was prepared in laboratory using coconut milk and dry fruits with oats. Different three samples were formulated taking milk, walnut, dates and oats at three different factors through Design of Experiment technique. The interaction effect of all the three T1(80:20), T2(50:50), T3(30:70) samples was studied. Using different interaction coefficient, an equation of omega 3 enriched smoothie formulation was determined. The equation is the model for development of new milk smoothie based product. The chemical analysis of best product showed calcium, protein, omega-3 and fiber enrichment from dates and coconut milk extract. Coconut milk, a generic term for the binary compound extract of the solid coconut reproductive structure, plays a very important role within the cuisines of other product similarly as alternative elements of the planet in good source.

Keywords: Coconut Milk, Dry Fruits, Oats, Corn Starch

I. INTRODUCTION

A smoothie usually contains a liquid base drink, farm merchandise, like milk, yogurt, frozen dessert or farm cheese. Smoothies will assist you lose excess weight while not skipping any meals. Coconut is known as the “wonder food” and is regarded as perfect diet because it contains almost all essential nutrients needed by the human body. In addition, natural fibres can be used in composite materials to reduce weight, increase strength and are also very safe. These materials have good physical and mechanical properties, have good environmental benefits, and have a low cost. Since coconut milk ($\text{pH} \approx 6$) is taken into account a low-acid food, it's necessary that the canning method is performed in a very retort higher than 80°C , before cooling and labeling. Coconutmilk is marginally lower in calories than other dairy milk choices, doesn't contain protein. It does be that as it may have somewhat morefat than cow's milk and more immersed fat than other plant-based milk choices, due to the high fat substance of coconut. Coconut milk contains medium-chain triglycerides (MCTs), which have help with weight loss. Coconuts contain a lipid called lauric acid that can support the immune system. lauric acid has antimicrobial and anti-inflammatory properties. lauric acid effectively inhibited the growth of *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Mycobacterium tuberculosis*because of lauric acid coconut milk smoothie does not have any preservatives.

Addition of walnut is a main ingredient of omega-3 in plant base material. they're an upscale offer of energy and contain

many helpful nutrients, minerals, antioxidants, and vitamins. Walnuts are a wonderful supply of many vitamins and minerals. These embrace copper, folic acid, phosphorus, vitamin B6, manganese, and E.

Oat has been recognised as a healthful and nutrient cereal containing high concentration of soluble fiber and dense nutrients. Oats have several distinctive chemical properties, potential health advantages, agricultural challenges and nutrition-policy opportunities. Inspite of the multiple clinical evidence of coconut milk, walnut, date and oat, people are still unaware about its nutritional value.

Table 1: Nutrition value of ingredients

Nutrients	Coconut milk	Walnut	Date	Oat
Calories (Kcal)	156	618	282	389
Protein (g)	1.68	24.1	2.5	5
Carbs (g)	9.96	9.9	75	31
Fiber (g)	0	1.9	1.3	30
Vitamin B6 (%)	6	8	10	5
Calcium (mg)	16	61	13	15
Magnesium (mg)	23	201	30	44
Iron (mg)	0.3	0.9	15	26

The current investigation was expected to use coconut milk with other ingredients which is rich in health benefits in the production of vegan smoothie with following goals to decided

1. To develop high fiber vegan smoothie from coconut milk with enrichment of dry fruits and oat.
2. To see the impact of walnut, date and oat at three distinct fixations on product and physiochemical attributes and shelf life of them.

II. MATERIAL AND METHOD

Instruments	Glass wares	Chemical	Other requirements
Incubator	Conical flask	Lactic acid	Distilled water
Autoclave	Measuring cylinder	0.1 NaOH	Coconut
Weighing balance	Beakers	phenolphthalein	Walnut
Laminar air flow	Glass bottle	ammonium	Date
refrigerator	Test tube	NH3	Icing sugar
pH meter	Pipettes	HCL	Oat
Refractometer	Micro pipette	Sulphuric acid	Corn starch

Blender	Spreader	Agar	Plastic measure cup
Electric mixture	Glass jar	Sodium hydroxide	
Knife	Thermometer	Hydrochloric acid	
Boiling water bath	Test tube stand	Boric acid	
	Centrifuge tube		
	Muslin cloth		
	Cup border		
	Durham's tube		
	Sieve		

Raw material procurement

The raw coconut fruit were brought from local market of waghodiya, Vadodara. Sugar, walnut, date, corn starch and oat were procured from a superstore of waghodiya, Vadodara city, Gujarat. Potable water and utensils were used from lab of Parul University, waghodiya, Vadodara, Gujarat throughout the study.

Extraction and preparation of coconut milk

In order to make coconut milk, the coconut heads were dehulled and the meat was separated. The meat was made totally clean and grated perfectly by an electrical mixer (Phillips Mixer Grinder 3 Jar 750W) and placed in an exceedingly bowl wherever a 1½ cup of drinking water was added extra and mix it well in mixture then left for ten minutes. The milk was then extracted. The extract was later filtered with muslin clothe and squeezed so as to acquire an Advances in clear whitish emulsion. The obtained filtered term as coconut milk.

Vegan smoothie preparation

The extract was obtained in new clean bowl. The corn flours thickening agent was prepared by heating with addition of water at 82 to 85 degree C. After this, date and walnut were chopped and took icing sugar and oat to mix in the product. After the preparation of all this basic material these were mixed together with a different ratio of date, oat and walnut to check the best taste, flavor, color, appearances and texture of a product. Control coconut milk smoothie was prepared without any dry fruits and oats. The mixture was prepared according to different proportions with coconut milk, shown in bellow Table No. 2.

Table 2: Different proportion in ratio (5) of ingredient

Sample code	Walnut	Date	oat
T1	70	30	0
T2	0	0	100
T3	30	20	50

III. DETERMINATION OF PHYSIOCHEMICAL PROPERTIES

1. Ash content:

For ash determinations, 5 ml milk samples were evaporated to dryness on a steam bath and ignited in a muffle furnace at 525 degree C until the ash was carbon free. The ash was cooled in a desiccator, weighed, and calculated as % ash. The analysis of ash content in foods is just the burning away of organic

content, going away inorganic minerals. This helps confirm the quantity and kind of minerals in food; necessary as a result of the quantity of minerals will confirm physicochemical properties of foods, also as retard the expansion of microorganisms. Ash content was calculated as follow:

$$\text{Ash content (\%)} = (W_1 / W_2) * 100$$

Where:

W1 = Weight of sample after drying

W2 = Weight of sample before drying

2. Protein content:

For the protein determination, the Kjeldahl method was used to estimate the nitrogen content of an example. Digestion of smoothie sample with sulfuric acid in the presence of a catalyst (Kjeldahl tablet CUSO₄), digested sample was poured in a volumetric flask, then distillation (diluted in distilled water) and titration against 2% boric acid and 3 drops of indicator of the liberated ammonia (10 ml of 40% NaOH). Calculation of the nitrogen content, Multiplication of the result by the conventional factor 6.25 to obtain the crude protein content. Protein content calculated as following equation:

$$N (\%) = (T * 0.20 * 20 * 0.014 / W) * 100$$

Where:

Protein content = N (%) * 6.25

T = titration figure

W = weight of the original sample

3. TSS (total suspended solid):

TSS was determined by the sample was filtered through pre-weight filter. The sample was placed into oven at 70 degree C overnight. Cooled in desiccator and weighed quickly. TSS is calculated by following equation:

$$\text{Total solids (\%)} = (W_1 * 100) / W_0$$

Where:

W1 = Weight of sample after drying

W2 = Weight of sample before drying

4. PH

For checking pH of smoothie sample, the refrigerated milk is pouring into different glass. Milk is allowed to reach room temp. without heating or re-pasteurising. Immerse the glass electrode into the liquid to be examined. Turn off knobs and do pH checking and note. Record the pH of the solution used to standardized the meter and electrodes at end of a set of measurement.

5. Moisture content:

Milk products is often determined by gravimetric oven drying at 102±2°C until an approximate constant mass is reached. For the calculation following method is used:

$$\text{Moisture (\%)} = \frac{(M_1 - M_2) * 100}{C(C(M_1 - M))}$$

Where:

M = Mass in g of empty glass wear

M1 = Initial mass in g of glass wear + material taken for analysis

M2 = Final mass

IV. SENSORY EVALUATION

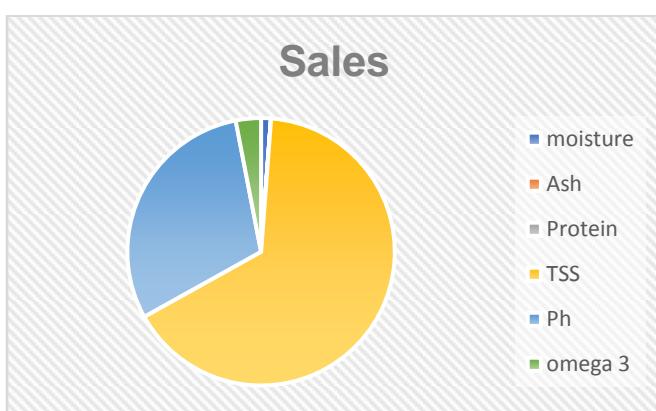
Smoothie was evaluated for different sensory attributes by a group of 10 panellists. In this evaluation taken attributes such

as taste, texture, odour, appearances and flavour. Over all samples were assessed by nine-point hedonic scale.

V. RESULT AND DISCUSSIONS

A. Physio-chemical analysis of selected sample after sensory evaluation

Parameter	Value
Moisture (%)	58.62 ± 0.26
Ash (%)	0.50 ± 0.35
Protein (%)	0.44 ± 0.12
TSS (%)	12.7 ± 25.3
pH	6.9
Omega-3	0.7



B. Microbiological analysis of sample:

Coconut milk contained low levels of viable microorganisms (3,100–13,000 or 6,600/g). Bacterial counts of these products changed during storage for 40–90 days at either 21 or 35°C. No increase in population took place at 35°C for 25 days. It might get affect if moisture level gets high or even low then particular %.

CONCLUSION

The present investigation was undertaken for “Development of high fiber vegan smoothie enrich with omega-3 and dry fruits” for proximate, sensory and physio-chemical properties. This is possible to make vegan smoothie from coconut milk extraction for ready to serve drink incorporated with good amount of minerals and fiber. The introduction of new type of beverage added into market with high quality rich nutrition might improve socio-economic status of the country by enhancing the export trades. All different concentration of date, walnut and oat. Sample 3 which has 50% oats and 50% dry fruits were found as to be more acceptable along with othersample. Sample 3 was standardized contains with 0.25 % moisture contain, 0.30 % ash contain, 0.25 % protein, 17.3 % TSS, 6.9 pH and 0.7% omega 3. The prepared nutrition rich vegan smoothie was provided rich amount of nutrition and energy along with good source of omega 3 and fiber to human body to be healthy. Where, coconut milk rich in vitamin A, vitamin B1, calcium, iron and other essential nutrition. Date gives enough amount of fiber and calories to body. Which helps in cardiovascular system. Walnut is best source of omega 3 in plant base food, along with other nutrition it is beneficial to the brain system and metabolism. Oats are the wide nutrition as gives high amount of fiber which gives digestive system clear and healthy. As well as it gives good weight gain even help in weight loss.

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