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### FORMULATION AND QUALITY EVALUATION OF BLACKCURRANT FLAVOURED VEGAN LASSI WITH COCONUT YOGURT

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#### ABSTRACT:

Lassi is developed by using coconut yogurt as dairy free alternative and infusing it with distinctive flavour of black currant. The aim of present study is to formulate a unique nutritious and flavourful nourishing beverage that resonates with consumers seeking unique flavour experiences and dietary inclusivity. Coconut yogurt serves as dairy free and nutritional alternative to traditional yogurt and suitable for individuals with lactose intolerance, dairy allergies and vegan lifestyle. Coconut yogurt contains no sugar and rich in healthy fats, particularly medium chain triglycerides (MCTs) which improves HDL levels in body, cognitive function, boosts cardiac health and this yogurt contains probiotic benefits includes aids in digestion, boosts immunity, reduces gastrointestinal issues etc. Black currants contain biologically active compounds such as anthocyanins, proanthocyanins, quercetin, myricetin, antioxidants, phenolic acids and appreciable vitamin-c content. It also possess anti-microbial, anti-cancerous and anti-inflammatory properties. Coconut yogurt, water, sugar powder and black currant flavours were used in different compositions to formulate coconut yogurt lassi and finalized product will then be subjected to physico-chemical evaluation, microbial analysis and sensory attributes. This study explores the innovative development of lassi, a traditional Indian yogurt based beverage.

**KEY WORDS:** Coconut yogurt, vegan, medium chain triglycerides, cardiac health, biologically active compounds

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## INTRODUCTION:

Now a day's contemporary food consumers demands that the food they consume be cost effective, palatable and nutritionally beneficial, based on their choice, 'Lassi' is a traditional South Asian yogurt based beverage. It holds a significant place in the culinary and cultural landscape of Indian subcontinent. It is a prominent product close to sweet stirred yogurt, has been used as energizing delicious drink (Nikhil Chorge et al., 2021). It offers prodigious nutritional advantages tailored for health and immune support (Anupama Saha et al., 2021).

Lassi is a great source of probiotics, which provides appreciable benefits to gut health and boosts immunity (P Pushpangadan et al., 2012). Due to presence of calcium it aids to bone health and other benefits includes best anti-ageing property, regulates blood pressure (Chef Vikas et al., 2020). Coconut yogurt is a fermented product obtained from coconut milk which is extracted from coconut meat. Coconut milk contains protein, fat, dietary fibers, calcium, iron, copper, folate, vitamin-C, selenium, magnesium (Belewu et al., 2010). Its yogurt have many beneficial properties contributing to health includes, aids to gut health, regulates cardiac health, fights against viruses and bacteria which are harmful to health and also contain healthy fatty acids which reduces LDL and improves HDL and enhances brain functions during Alzheimer's condition and eliminates excess abdominal fat (Naz H et al., 2023). The saturated fatty acids found in coconut primarily consist of short and medium chain triglycerides which undergo rapid conversion into energy via hepatic metabolism, rather than being deposited as adipose tissue in the body (Bibek Adhikari et al., 2018). The medium chain fatty acids abundant in coconut milk, particularly lauric acid exhibits anti-fungal, anti-microbial, anti-viral properties and contributes to arterial health and cleanliness (Banzon JA et al., 1990).

Black currant flavor is extracted from Black currant fruit specifically from its berries. It is typically obtained through some processes such as extraction, distillation, infusion, capturing the essence of fruit's unique taste profile. It has abundance of biologically active compounds including elevated concentrations of anthocyanins, proanthocyanins, quercetin, myricetin, phenolic acids, and isorhamnetin (R Karjalainen et al., 2008). These berries possess best beneficiary properties to health includes anti-inflammatory, anti-cancerous, anti-microbial properties (Michal Oczkowski 2021). This flavor attracts children due to its appetizing and enjoyable taste. The main aim of the present study is to formulate nutritious and savory vegan yogurt based beverage.

## MATERIALS AND METHODS:

**Raw materials:** Fresh coconut, yogurt starters, sugar, water and black currant flavor.

### Methods:

**Preparation of coconut milk:** To extract coconut milk, coconut shell was broken manually. The coconut flesh was separated from shell and cut into pieces with the help of a sharp knife. Pieces of coconut flesh was blended by adding required amount of water. Blended coconut mixture was filtered to eliminate the solid residue and collect plain coconut milk (Victor Ephraim Edem et al., 2016).

### Preparation of coconut yogurt:

Raw coconut milk was pasteurized at 60-80°C for 3-5 minutes and then it was cooled to inoculation temperature 37-40°C. Starter culture containing *Lactobacillus acidophilus*, *Streptococcus thermophilus* at a rate 2.5%. Inoculated milk was incubated at 40°C for 12hrs. Prepared coconut yogurt was stored in 4°C (Joel ndife et al 2014).

### Preparation of blackcurrant flavored lassi with coconut yogurt:

Inoculum of coconut yogurt was broken by whisking. 500ml of water, 150gms of sugar and 0.5ml of blackcurrant flavor were added and followed by perfect blending. Blackcurrant flavored lassi was stored in a 4°C cold temperature (Muhammad Shah Moazzem et al., 2018). The developed product was then subjected to sensorial evaluation along with control. Then physico-chemical analysis and microbial analysis were conducted to the optimized variant. The developed lassi was formulated in three different variations as given in the table no. 1.

**Table No. 1: Formulation of blackcurrant flavored coconut lassi and their variants:**

Ingredients	Variation-1	Variation-2	Variation-3
Coconut yogurt	500ml	500ml	500ml
Water	500ml	600ml	700ml
Sugar	100gm	150gm	200gm
Blackcurrant flavour	0.5ml	0.5ml	0.5ml

### Sensorial Analysis:

Sensorial evaluation of formulated variations along with control were taken according to 9 point hedonic scale (Table No. 2) of sensory attributes like taste, flavor, consistency, color and overall acceptability (Iwe M.O 2010). Formulated variation was optimized according to mean of highest score overall acceptability.

**Table No. 2: Nine Point Hedonic scale**

S.No	Score	Grade
1.	9	Like extremely
2.	8	Like Very much
3.	7	Like moderately
4.	6	Like slightly
5.	5	Neither like nor dislike
6.	4	Dislike slightly
7.	3	Dislike moderately
8.	2	Dislike very much
9.	1	Dislike extremely

### Physico-chemical Evaluation:

Physico chemical evaluation for optimized variation and control were conducted by considering (Igbabul, et al., 2014) and (FSSAI Manual methods) as references. Tests includes Moisture, pH, Fat, TSS, Acidity.

### Microbial Analysis:

Microbial analysis was conducted for optimized product and control for 10 days and tests includes total plate count; yeast and molds, coli forms according to (Padghan PV, et al.,

2015). The colonies were counted by using a digital colony counter and the result was expressed as colony forming unit per ml (cfu/ml).

## RESULTS AND DISCUSSION:

### Sensory Evaluation:

The formulated variations along with control were subjected to sensorial evaluation. The results of sensory evaluation of formulated variations and control were exhibited in the table no.3.

**Table No. 3: Sensorial evaluation of formulated lassi and control:**

S.No	SENSORY ATTRIBUTES	CONTROL	TRIAL 1	TRIAL 2	TRIAL 3
1.	Colour	9	8	9	9
2.	Consistency	9	8	8.5	8
3.	Flavour	8	8	9	7
4.	Taste	8	8	9	7
5.	Appearance	9	8	9	8.5
6.	Overall acceptability	9	8	9	8

The results of sensorial evaluation stated that the control got scored high overall acceptability and from the variations – V2 variation got scored highest mean overall acceptability on comparison with variation V1 and variation V3. Therefore according to the results of sensorial analysis it is concluded that variation V2 was optimized for further and subjected to physico-chemical analysis along with control.

### Physico-chemical analysis:

**Table no.4: Physico-chemical analysis of optimized lassi and control:**

Parameters	Control	Sample
Moisture	81.6%	79.9%
pH	4.5	5.0
Fat	6%	8.8%
TSS	11.5%	12.2%
Acidity	0.78%	0.65%

From the results shown in table no.4 clearly stated that moisture and acidity were less in optimized sample rather than control. Fat and TSS were found to be greater in optimized sample than control, high fat content of coconut milk is because of medium chain triglycerides [MCTs] which are easily digestible and gives energy without formation of adipose tissue. These results coincide with the results of study conducted by (Adegoke et al).

### Microbial analysis:

**Table No.5: Microbial analysis of optimized lassi and control**

S.no	Parameters	Control		Optimized sample	
		0 <sup>th</sup> Day	10 <sup>th</sup> Day	0 <sup>th</sup> Day	10 <sup>th</sup> Day
1.	Total plate count	-	5x10 <sup>3</sup>	-	3x10 <sup>3</sup>

2.	Yeast and mold count	-	$6 \times 10^3$	-	$4 \times 10^3$
3.	Total coli forms	-	-	-	-

The results of microbial analysis shown in table no.5, which clearly states that microbial growth was less in optimized sample than in control. The reason may be due to presence of bioactive and antimicrobial agents in it that acts as antioxidants and increases shelf life of optimized sample. These results correlate with the results of study conducted by (Omola et al 2014).

### CONCLUSION:

The results of the present study concluded that the use of coconut yogurt for the preparation of lassi enriched the nutritive qualities of lassi which increases vitamin-c, minerals, medium chain triglycerides [MCTs] which helps to reduce obesity. It is rich in electrolytes, improves skin surface and keeps gut healthy. Three different variations were formulated, among them the most accepted variation was V2 which was almost nearer to control. Results concluded that optimized [V2] coconut yogurt based lassi having satisfactory sensory attributes which includes taste, flavor, color, consistency, and shelf life for 10 days at 5°C. Finally it can be concluded that coconut yogurt based lassi is a nutritive refreshing drink which can provide for those suffering from lactose intolerance, dairy allergies and follows vegan lifestyle. It also serves as immunity booster.

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