

Development of Instant “Mattha Mix”

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Abstract: ‘Mattha’ (Spiced buttermilk) is an Indian traditional fermented milk beverage. Since, now a day there is a demand of convenience food, therefore, in the present work attempts have been made to develop ready to drink “Mattha mix”. For preparation of this product, buttermilk was spray dried and the powder obtained was blended with sugar, salt, spices and condiments in different proportions. Mattha mix (20g) was reconstituted in 180 ml of warm water and subjected to organoleptic evaluation. The results showed that the reconstituted Mattha (Sample-M9) prepared with 1.4% sugar, 10% salt and spices and condiments was liked extremely by the panel members. The chemical composition of the Mattha mix showed that, it was rich in carbohydrate, protein, fiber and minerals. Thus, Mattha mix which was prepared from buttermilk (i.e. byproduct of butter industries) can be a value addition for dairy industries.

Key words: Mattha Mix · Buttermilk · Buttermilk powder · Mattha · Chaas

INTRODUCTION

Approximately 400 diverse products derived from fermentation of milk are consumed around the world [1]. Buttermilk is a by-product, a liquid left over after extracting butter from churned yoghurt or cream [2,3]. In India buttermilk is blended with different spices and widely known as ‘Chaas’ or ‘Mattha’. The ‘Mattha’ is very popular among the people of Gujarat and Maharashtra state of India and consumed along with meal to improve digestion.

Buttermilk contains all the water soluble component of cream such as milk protein, lactose and minerals. It also includes materials like phosphotidyl choline (lecithin) derived from milk fat globule membrane which is disrupted during the churning and mostly migrates to the buttermilk fractions. Buttermilk is used as a dairy ingredient which is widely used in food industries for its emulsifying capacity and positive impact on flavor [4].

Buttermilk powder is the product resulting from the removal of water from liquid buttermilk derived from the churning of butter [1]. The composition of buttermilk powder is similar to skim milk powder; however buttermilk contains more fat and more milk fat globule membrane component. The milk fat globule membrane phospholipids, especially spingomyelin are known to have beneficial health effects which may help to prevent the onset of cancer and control the growth of cancerous cells [3].

The market for instant mixes is steadily growing, especially among urban consumers with a host of competing brands and flavors. Burgeoning urban spread and nuclear family with double income, point a rapid growth potential in this sector. Keeping this in mind, in the present work attempts have been made to utilize one of the dairy by-product in the development of ‘Mattha Mix’, a ready to drink product.

MATERIALS AND METHODS

Raw Materials: Buffalo milk, fresh coriander leaves, curry leaves, green chilies and spices were procured from the local market.

Dehydration of Vegetables: Coriander leaves and curry leaves were cleaned with potable water to remove soil and dust particles. These were blanched for 2 and 4.5 min. respectively with different pretreatments i.e. Hot water, 2% brine, 0.5% magnesium oxide and 0.1% sodium bicarbonate for maximum chlorophyll retention. Blanched coriander leaves were dried in a cross-flow dryer at $50\pm 2^\circ\text{C}$ for 2 h [5]. Whereas curry leaves were shade dried for 24 h followed by a cross-flow dryer at $40\pm 2^\circ\text{C}$ for 1 hr [6]. Dried vegetables were powdered and packed in 150 gauge of HDPE bags until further use.

Green chilies were washed and cut into size of 0.5-1 cm length. These pieces were steam blanched at $100\pm 5^\circ\text{C}$

for 2 to 3 min and dried in a cross-flow dryer at $50\pm 2^{\circ}\text{C}$ for 3 hrs [7]. These dried chilies were packed in HDPE bags until further use.

Cumin Seed Powder: Cumin seeds were pan roasted, ground into powder and packed in HDPE bags for further use.

Preparation of Buttermilk Powder: The cream was separated from buffalo milk using a cream separator and heated to 40°C . Then it was inoculated with starter culture of *Lactobacillus lactis* (2%). It was homogenized and incubated at room temperature ($25\text{-}30^{\circ}\text{C}$) for 15-16 h. After completion of the incubation period, it was churned to separate butter and buttermilk. Buttermilk was concentrated at 80°C up to 15-16% total solids. The condensed buttermilk was homogenized and spray dried (Labultima, LU-222) at 120°C to obtain buttermilk powder [1]. The obtained buttermilk powder was then packed in a airtight HDPE bag and stored in cool and dry environment until further use.

Preparation of Mattha: Control sample of Mattha was prepared with slight modification in the procedure suggested by Kapoor [8]. Fresh buttermilk (200 ml) was mixed with sugar (6.4 g), salt (3.6 g), fresh coriander leaves (24 g), fresh curry leaves (6 g), fresh green chilies (10 g), Cumin seed (1.6 g) and black salt (1 g). Prepared Mattha was coded as (M_0).

Preparation of Mattha Mix: Three different types of Mattha mix i.e. sweet, salty and sweet and salty were formulated by mixing dried ingredients in different combinations (Table 1). All these ingredients were mixed in a double cone blender (Labin, DC-122) for 15-20 min to prepare the Mattha mix.

Physico-Chemical Analysis: The buttermilk, buttermilk powder and reconstituted 'Mattha' were analyzed for the fat, total solids, titratable acidity, carbohydrates and protein content, whereas for buttermilk powder solubility was also tested. Fat content was determined by Gerber's method [9]. The total solid content was estimated by gravimetric method [10] and titratable acidity was determined by the method described in IS: 1479 (Part I) [11]. Carbohydrate and protein were estimated by the procedure given by Ranganna [12]. The solubility of buttermilk powder was determined by standard procedure suggested by Kick and Sawyer [13].

Coriander leaves, curry leaves, chilies and cumin seeds were analyzed for chemical constituents i.e. fat, protein, carbohydrate, crude fiber, ascorbic acid ash and mineral content using standard procedures suggested by Ranganna [12]. Also coriander and curry leaves were analyzed for total chlorophyll content by the procedure suggested by Ranganna [12].

Organoleptic Evaluation: Reconstituted 'Mattha' was prepared by mixing 20 g of instant 'Mattha Mix' with 180 ml warm water (40°C). The reconstituted 'Mattha' and freshly prepared 'Mattha' were stored in a refrigerator for 15 -20 min before sensory analysis. Sensory evaluation was carried out by a panel of 10 semi-trained members on 9 point hedonic scale [12].

Statistical Analysis: The data obtained were subjected to analysis of variance (ANOVA) using complete randomized design [14]. The critical difference at $P < 0.05$ was estimated and used to find significant difference if any.

Table 1: Formulation of "Mattha mix"

Sample Type	Sample Code	Buttermilk Powder (g)	Sugar (g)	Salt (g)	Black salt (g)	Dried coriander leaves (g)	Dried curry leaves (g)	Dried green chilies (g)	Cumin seeds powder (g)
Sweet	M1	20	4.8	---	0.5	1.2	0.4	0.8	1.6
	M2	20	3.6	---	0.5	1.2	0.4	0.8	1.6
	M3	20	2.4	---	0.5	1.2	0.4	0.8	1.6
Salty	M4	20	---	1.2	0.5	1.2	0.4	0.8	1.6
	M5	20	---	2.0	0.5	1.2	0.4	0.8	1.6
	M6	20	---	2.8	0.5	1.2	0.4	0.8	1.6
Sweet & Salty	M7	20	1.2	3.6	0.5	1.2	0.4	0.8	1.6
	M8	20	2.0	2.8	0.5	1.2	0.4	0.8	1.6
	M9	20	2.8	2.0	0.5	1.2	0.4	0.8	1.6

RESULTS AND DISCUSSION

Physico-Chemical Composition of Buttermilk and Buttermilk Powder: Physico-chemical composition of buttermilk and buttermilk powder are listed in Table 2. The results showed that buttermilk was a good source of protein and total minerals. The results found are in line with those of Morin *et al.* [15].

The physico-chemical composition of buttermilk powder showed that it was a rich source of protein (35.03 %), carbohydrate (47.95 %), fat (5.95 %) and total minerals (6.82%). The increase in the values of these constituents was due to increase in concentration of these constituents resulted by drying. It was also found that, buttermilk powder was having good water solubility. Composition of the buttermilk powder was similar to skim milk powder and our findings are similar to his results [4].

Physico-Chemical Analysis of Coriander Leaves, Curry Leaves, Green Chilies and Cumin Seeds: Physico-chemical composition of coriander leaves; curry leaves and green chilies are given in table 3.

The results indicated that the coriander leaves were good source of vitamin C, calcium, total minerals and crude fiber whereas low in protein and fat. These results are in good agreement with Singh *et al.* [16]. The data revealed that curry leaves were rich source of protein, calcium and crude fiber and a fairly good source of iron and ascorbic acid. Also, from the results it was seen that the curry leaves was having low moisture content. The lower moisture content and significantly higher total solids observed in curry leaves proved its suitability for dehydration⁶. The green chilies were good source of minerals, ascorbic acid and crude fibers whereas poor source of protein and fat. The results obtained are similar to the earlier results reported by Tummala *et al.* [17].

The results of the physico-chemical composition of cumin seeds are given in table 3. The cumin seeds were good source of protein, fat, total minerals, calcium, iron and crude fiber. Increased values of physico-chemical constituents were observed due to the use of the dried cumin seeds. The observed values are in good agreements with Shamina [18].

Table 2: Physico-chemical composition of buttermilk and buttermilk powder Results are mean ±SD of 3 determinations

Constituent	Buttermilk	Buttermilk powder
Moisture (%)	92.44±1.06	4.30±0.120
Protein (%)	3.7±0.141	35.03±0.190
Fat (%)	0.85±0.091	5.95±0.33
Total Carbohydrate (%)	2.58±0.120	47.90±0.141
Ash (%)	0.73±0.028	6.82±0.63
Acidity (% lactic acid)	0.3±0.035	---
Solubility (%)	---	92±1.20

Table 3: Physico-chemical composition of spices and condiments

Constituent	Coriander leaves	Curry Leaves	Green Chilies	Cumin seeds
Moisture (%)	87.73±0.41	64.74±1.73	84.93±0.56	14.42±0.15
Protein (%)	3.9±0.035	6.69±0.226	3.2±0.36	20.17±0.042
Fat (%)	0.47±0.019	0.96±0.035	0.6±0.06+3	17.93±0.183
Total Carbohydrate (%)	5.8±0.049	22.68±0.183	3.6±0.148	40.68±0.077
Crude fiber (%)	2.06±0.070	5.83±0.070	7.2±0.070	12.38±0.106
Ash (%)	2.02±0.084	4.69±0.254	1.1±0.012	6.8±0.070
Calcium (mg/100g)	138±0.707	825±1.27	24±0.70	931±2.12
Iron (mg/100g)	1.89±0.091	0.90±0.070	1.6±0.070	66±1.34
Ascorbic acid (mg/100g)	118.2±0.636	3.9±0.035	113±1.41	8±0.98

Results are mean ±SD of 3 determinations

Table 4: Effect of pretreatments on chlorophyll retention after drying of coriander and curry leaves

Pre treatment	Coriander leaves			Curry Leaves		
	Chlorophyll Content (mg)	% Retention	Visual colour	Chlorophyll Content (mg)	% Retention	Visual colour
Fresh	3.10	---	Dark Green	1.40	---	Dark Green
Boiling Water	2.53	81.61	Blackish green	1.19	85.00	Blackish green
Sodium Chloride (2%)	2.24	72.25	Slightly Blackish Green	0.81	57.85	Slightly Blackish Green
Magnesium Oxide (0.5%)	2.73	88.06	Dark Green	1.30	92.85	Dark Green
Sodium bicarbonate (0.1%)	1.73	55.80	Faint Green	0.79	56.42	Faint Green

Results are mean of 3 determinations

Table 5: Sensory evaluation of rehydrated mattha samples

Sample Type	Sample Code	Color	Aroma	Taste	Mouth feel	Consistency	Overall Acceptability
Fresh	M ₀	9.0	9.0	8.5	9.0	9.0	9.0
Sweet	M ₁	8.9	8.9	7.5	8.2	8.9	8.7
	M ₂	9.0	9.0	7.5	8.0	9.0	8.2
	M ₃	9.0	9.0	8.5	9.0	9.0	9.0
Salty	M ₄	8.9	8.9	8.7	8.7	8.8	8.7
	M ₅	9.0	9.0	8.2	8.2	9.0	8.2
	M ₆	9.0	9.0	7.2	7.2	9.0	7.7
Sweet & Salty	M ₇	8.9	8.9	7.5	7.0	8.8	8.0
	M ₈	9.0	9.0	8.0	8.5	9.0	8.0
	M ₉	9.0	9.0	9.0	8.7	9.0	9.0
SE		0.015	0.015	0.194	0.219	0.027	0.154
CD at 5%		0.035	0.035	0.438	0.495	0.061	0.347

Table 6: Chemical composition of Instant Mattha Mix*

Constituent	Amount (%)		
	M ₃	M ₄	M ₉
Moisture	4.92±0.090	5.20±0.195	4.94±0.092
Fat	6.68±0.085	6.73±0.088	6.66±0.086
Protein	32.78±0.13	33.55±0.45	32.54±0.193
Total Carbohydrate	48.80±0.44	46.14±1.30	49.12±0.57
Crude Fiber	1.54±0.055	1.56±0.045	1.52±0.065
Ash	6.82±0.080	7.09±0.185	6.81±0.080

Effect of Pretreatment on Chlorophyll Retention of Coriander and Curry Leaves:

Coriander and curry leaves were treated with different pretreatments for color retention and obtained results are given in table 4. It was observed that magnesium oxide treatment was the best among all the treatments, which could prevent loss of chlorophyll in both coriander and curry leaves. The hot water blanching with 0.1 percent magnesium oxide was found to be the best pre treatment in order to retain the green colour during drying of leafy vegetables [6].

Organoleptic Evaluation of Rehydrated ‘Mattha’ Samples:

The results of organoleptic evaluation of freshly prepared and reconstituted ‘Mattha’ samples are tabulated in Table 5. The results showed that sample M₃ from sweet, M₄ from salty and M₉ from the sweet and salty was having higher sensory scores. The samples (M₃, M₄ and M₉) did not show any significant difference with the control sample. Among all the samples, sample M₉ i.e. sweet and salty mattha was the best with respect to all sensorial attributes. This may be due sweet and salty blend taste of ‘Mattha’.

Proximate Analysis of Instant ‘Mattha Mix’: The samples, M₃, M₄ and M₉ was selected on the basis of organoleptic evaluations and analyzed for proximate composition. Results of proximate composition of Instant ‘Mattha mix’ are given in table 6. The results revealed that all three samples were good source of protein, fat, total carbohydrate, crude fiber and total mineral content.

CONCLUSION

The buttermilk powder prepared by spray drying had good water solubility and was rich in protein, carbohydrates and total minerals. This buttermilk powder was added with spices and condiments to prepare instant ‘Mattha mix’. The ready to serve ‘Mattha mix’ thus prepared was found to be a good source of protein, carbohydrate, fat, crude fiber and total minerals. Hence, this instant ‘Mattha mix’, not only serve as a convenience drink but also can be a healthy and nutritious drink. This novel approach of instant preparation of ready to drink beverage from buttermilk which is a byproduct of butter industries can be en-cashed as a value addition.

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