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*Short Communication*

# MOISTURE CONTENT OF LOCAL COTTAGE CHEESE AND BUTTER IN WESTERN BHUTAN

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**ABSTRACT:** A study was conducted with the objectives to determine the moisture content of cottage cheese (popularly known as *datshi* in Bhutan) and butter available in the market and establish baseline data to facilitate systematic grading and standardization of quality of dairy products in the country. The study was carried out in the districts of Thimphu, Paro and Haa in western region of Bhutan. Samples were randomly collected from Milk Processing Units (MPUs), dairy sales counters, retail shops, roadside vendors, and weekend vegetable markets. Samples were collected from the month of April to June, 2017. The butter samples were collected from only two districts of Thimphu and Paro. All samples were subjected to laboratory analyses. The moisture content ranged between 60.24% and 71.24% with overall average moisture content of 66.69%. The moisture content in the butter samples ranged from 13.78% to 38.79% with the average moisture content of 21.64%. The study results suggest that the moisture content of cheese is within the acceptable range but the moisture content of butter is higher than the acceptable range.

**Keywords:** Butter; cottage cheese; dairy; *datshi*; milk.

## 1. INTRODUCTION

Cottage cheese is a high-moisture, un-ripened soft cheese made from skimmed milk. This cheese is also made from concentrated nonfat milk or reconstituted nonfat dry milk. Cottage cheese belongs to the class of natural, unripened, soft cheeses. Since it has a significantly lower fat content than most cheeses and is a good source of protein, it is a popular part of low-calorie diets.

In Bhutan, the local cottage cheese and butter are major dairy products and an important part of the Bhutanese diet. It is also a major source of protein. Local cottage cheese, popularly known as *datshi*, is produced using traditional processing equipment and knowledge. Production of *datshi* has increased from 2,300 MT in 2012 to 3,664.55 MT in 2016 (Livestock Statistics 2012 and 2016), which is associated with increase in milk production over the years. However, it is unclear whether the increase in cottage cheese production has also resulted in improvement in cheese quality. This is because the manufacturing practices remain mostly conventional or traditional. Additionally, the lack of standard guidelines for cheese production and grading leads to inconsistent supply and inferior quality of cheese in the markets.

Moisture content determines the quality of cheese. The international standards define cottage cheese as the product containing moisture not

exceeding 80% and milk fat not less than 4% (Chandhan 2003). According to the Prevention of Food Adulteration Act (PFA) 1976 and Codex standards for butter (*Codex STAN 279-1971*), the moisture content of butter should not exceed 16%. However, no detail analysis of *datshi* and butter has been conducted to assess their quality as well as understand the compositional parameters of these dairy products in Bhutan. Therefore, a study was conducted with the objectives to determine the moisture content of *datshi* and butter available in the market and establish baseline data to facilitate systematic grading and standardization of quality of dairy products in the country.

## 2. MATERIALS AND METHOD

### 2.1 Study areas and sampling

The study was conducted in the districts of Thimphu, Paro and Haa in western region of Bhutan. Samples were randomly collected from Milk Processing Units (MPUs), dairy sales counters, retail shops, roadside vendors, and weekend vegetable markets in Thimphu, Paro and Haa districts. Samples were collected from the month of April to June, 2017. Butter samples were collected from only two districts of Thimphu and Paro. The samples were stored in a cool box with an average temperature of 20°C. The samples were then transported to the National Food Testing Laboratory of Bhutan Agriculture and Food Regulatory Authority (BAFRA), Yusipang, Thimphu, for analysis. The moisture content was determined with the Oven Drying Method.

### 2.2 Sample preparation for laboratory analysis

*Datshi* samples were manually broken into small pieces and mixed properly, and a representative sample of 2-3 gms was placed in an empty dish ($W_1$) for the analysis. The dish with sample ($W_2$) was weighed and recorded. Thereafter, the sample was oven dried at 102°C for 2 hours (Official Methods of Analysis of AOAC International) till all the free moisture was evaporated. The dried samples were transferred to the desiccator for cooling. After cooling to room temperature, the dish with dried sample ($W_3$) was weighed and recorded again. Water removed was considered as the weight loss on drying and accordingly, percent moisture was calculated using the following formula.

$$\%\, moisture = \frac{W_3 - W_1}{W_2 - W_1} \times 100$$

Where, $W_1$= Weight of empty dish, $W_2$= Weight of dish with fresh sample, and $W_3$= Weight of dish with dried sample.

## 3. RESULTS AND DISCUSSION

### 3.1 Moisture content in datshi

Table 1 shows the average moisture content of *datshi* from three districts. The moisture content ranged between 60.24% and 71.24% with overall average moisture content of 66.69%. The overall average falls within the acceptable limits prescribed (Indian standards and Codex General Standards) for cheese. The Codex General standards for cheese (*CODEX STAN 283-1978)* states that moisture content of more than 67% can be termed as soft cheese with a fat content of less than 10%, if produced from skim milk while the Bureau of Indian standard (IS: 2785-1797) stipulates that the moisture content of soft cheese should be in the range of 48–70% with a maximum of 13% milk fat (for skim milk cheese). Based on the Codex Standard and Indian Standard, most of the *datshi* produced in three study districts can be classified under the soft type cheese or ripened/fresh cheese.

**Table 1:** Moisture content of *datshi* in three districts.

| District | N | Moisture content % | Standard Deviation |
|---|---|---|---|
| Haa | 8 | 67.61 | 2.4 |
| Paro | 9 | 66.25 | 3.2 |
| Thimphu | 15 | 66.46 | 2.7 |

### 3.2 Moisture content of butter

The moisture content in butter samples ranged from 13.78% to 38.79% with an average moisture content of 21.64%. The preliminary analysis of moisture composition of butter showed a higher than acceptable level of moisture. Based on the Prevention of Food Adulteration Act (PFA) 1976 and the Codex standards for butter (*Codex STAN 279-1971*), the upper limit of moisture content is set at 16%, but in this study, the average moisture content of butter samples was 21.64%. The high moisture content in butter reflects not only the poor quality but would also mean that it will favor microbial activity and reduce shelf life. Moisture rich foods are easily susceptible to microbial attack, resulting in deterioration of the product.

## 4. CONCLUSION AND RECOMMENDATION

Based on the results, most of the *datshi* delivered to the consumers in Thimphu, Paro and Haa districts can be graded as soft cheese as per the moisture content, however, the moisture content of butter is higher than the acceptable level. Therefore, there is a need to improve the quality of butter by reducing moisture content. Similar study needs to be extended to other parts of Bhutan, to facilitate

development of compositional standards to ensure quality of cheese and butter.

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