

**ENHANCE THE QUALITY OF GHEE BY ADDING STARTER
CULTURE FOR THE SEPARATED CREAM**



BY

K.S.C Jayasanka



FTC 114



Project Report
Library - EUSL

FACULTY OF TECHNOLOGY

EASTERN UNIVERSITY

SRI LANKA

2023

ABSTRACT

There for food diversification for the ghee, is necessary to improve consumer preference and increased consumption of ghee. The aim of this study was to identify the suitable starter culture for prepare cultured ghee with respect to the physiochemical parameters, sensory attributes and microbiological properties. These experimental design was completely randomized design. Comparison was done between three starter cultures and normal ghee sample was use as control. Commercial starter cultures delvo FVV 211, Chr Hansen YoFlex® SLB 3.0, Sacco KD2 were used as other treatments. There are two stage sensory attributes was identified. Fist one is done at the end production of ghee samples and second one was done for the ghee related food product (ghee biscuits). For Ghee samples sensory evaluation, the parameters such as color, Oder, taste, external appearance, texture, viscosity and overall acceptability. Similarly, for the second sensory evaluation ghee biscuits samples were used and the parameters such as color, Oder, taste, external appearance, texture, mouth feeling and overall acceptability like sensory attributes were evaluated Physicochemical parameters was measured three days intervals until 21 days. Micro biological parameters were analyzed at three stages. Those are separated cream (1st stage), fermented cream (2nd Stage) and cultured ghee (3rdstage). Cultured Ghee samples were analyzed for physicochemical and sensory properties during room temperature storage. The physicochemical (Titratable Acidity, pH, Free Fatty Acids, Viscosity, Total Solid) and sensory characteristics for the Cultured Ghee (color, odder, taste, External appearance, texture, Viscosity and overall acceptability) and for the Cultured Ghee Biscuits (color, odder, taste, External appearance, texture, and overall acceptability) were analyzed.

During storage, the protein and moisture content were not significantly ($p < 0.05$) decreased. pH content was significantly decreased in all the treatments. Titratable acidity was significantly increased all the samples, In FFA without KD2 fermented sample, other all samples were significantly decreased and KD2 fermented sample was significantly increased. Viscosity was significantly decreased in all the samples. Total Solids was significantly increased in all the samples.

Organoleptic properties were done at two stages for Cultured Ghee and Cultured Ghee Biscuits. Cultured Ghee Results of organoleptic characteristics revealed Delvo 211 has given a highly acceptable color compared to other treatments. In this study Delvo 211, SLB and KD2 show highly acceptable color, viscosity, odour compared to control treatment and the study show low acceptable for control treatment. Ghee biscuits sensory evaluation Results indicated that KD2 has given a highly acceptable color, odour, taste, external appearance, texture, viscosity and overall acceptability compared to other treatments. Finally, it could be concluded that the Cultured Ghee is enhanced the physio-chemical properties of ghee and KD2 cultured Ghee provide good results for Ghee related products.

CONTENT

	Page No
Abstract.....	i
ACKNOWLEDGEMENT	iii
LIST OF TABLES.....	viii
LIST OF ABBREVIATION.....	x
CHAPTER 1	1
Introduction.....	1
CHAPTER 2	3
LITERATURE REVIEW	3
2.1 Milk.....	3
2.1.1 Milk production, consumption	3
2.1.2 Milk composition.....	3
2.2 Cream (Separated from whole milk).....	7
2.3 Starter Culture	8
2.3.1 Properties of Lactic Acid Bacteria.....	8
2.3.2 Effect of starter culture on the fermented products	9
2.3.3 Role of starter culture on fermented food production	10
2.3.4 Lactic acid bacteria as starter cultures	11
2.3.5 Commercial starter cultures on fermentation	13
2.3.6 Factors affecting the role starter cultures	14

2.3.7 Effect different starter cultures on sensory properties, chemical and microbiological properties on fermented foods.....	15
2.4 Fermentation.....	16
2.4.1 History of fermentation	18
2.4.2 Benefit of fermented dairy products.....	18
2.4.3 Theory of Fermentation	19
2.5 Ghee	20
2.5.1 Ghee composition.....	20
2.5.2 Ghee and its benefits.....	22
2.5.3 Uses of ghee in Sri Lanka.....	23
2.6 Ghee biscuits	23
2.6.1 Biscuits	23
2.6.2 Fat role in cookies.....	24
CHAPTER 3	26
MATERIALS AND METHODS.....	26
3.1 Experimental location and Study Area.....	26
3.2 Materials.....	26
3.2.1 Cow milk	26
3.2.2 Starter Culture Addition	26
3.3 Evaluation of the cow milk to separate the cream	29
3.3.1 Determination of the keeping quality of milk	29
3.3.2 Determination of heat treatment resistance ability of milk	30

3.3.3 Determination of the adulterants of the milk.....	31
3.3.4 Determination of Fat content – (Gerber method)	31
3.3.5 Determination of the density of the milk-Lactometer reading (specific gravity).....	32
3.3.6 Determination of solid nonfat content in the milk.....	32
3.3.7 Determination of acidity in milk sample	32
3.3.8 Determination of pH in milk sample	32
3.4 Pasteurization the milk and Separation of milk cream for the experiment	33
3.5 Evaluation of the separated milk cream to ghee experiment	33
3.5.1 Determination of Fat in separated milk cream	33
3.5.2 Determination of pH in Cream sample	33
3.5.3 Determination of acidity in Cream sample.....	33
3.6 Cultured ghee process	34
3.6.1 Preparation of cultured Skim milk.....	34
3.7 Treatment Framework	35
3.8 Sensory evaluation for cultured Ghee	36
3.9 Sensory evaluation for cultured Ghee Biscuits	36
3.10 Chemical property evaluation of cultured Ghee	36
3.10.1 PH	36
3.10.2 Percent Titratable Acidity measurement	37
3.10.3 Free Fatty Acid test.....	37
3.10.4 Viscosity measuring	37

3.10.5 TS (Total Solids)	37
3.11 Microbiological analysis	38
3.11.1 Determination of yeast and mold count of samples	38
3.11.2 TCC – (Total Colony Counts)	39
3.11.3 Determination of the presence of coliform	39
3.12 Statistical Analysis	40
CHAPTER 4	41
RESULTS AND DISCUSSION	41
4.1 Qualitative and quantitative analysis of raw milk for cream separation	41
4.2 Physiochemical property evaluation of Ghee.....	42
4.2.1 Titratable Acidity variation in Ghee during storage period.....	43
4.2.2 pH Variation in Ghee during the Storage Period.....	43
4.2.3 Free Fatty Acid Variation in Ghee during the Storage Period	45
4.2.4 Viscosity Variation in Ghee during the Storage Period	46
4.2.5 Total Solids Variation in Ghee during the Storage Period	47
4.4 Microbiological properties evaluation of Cultured Ghee.....	49
4.5 Sensory property evaluation of Cultured Ghee	50
CHAPTER 5	54
CONCLUSION.....	54
REFERENCES	55

LIST OF TABLES

	Page No
Table 2.1 Nutritional value for Ghee per 100g	21
Table 2.2 Fat & Fatty Acid of Ghee per 100g	21
Table 2.3 Other non-Fat Nutrients of Ghee	22
Table 3.1 Used starter cultures and its amounts.....	28
Table 3.2 The starter cultures used for the production of cultured Ghee	28
Table 3.3 Colour variation and the quality of the milk with the Resazurin dye reduction test.....	30
Table 4.1 The quantitative and qualitative analysis of the cow milk used for curd preparation	41
Table 4.2: Treatments with starter cultures.....	42
Table 4.3: The changes in the pH and Titratable Acidity (%) variation during the storage of Ghee	44
Table 4.4: The changes in the FFA (%) during the storage of Ghee	45
Table 4.5: The changes in Viscosity (%) and Total Solids (%) variation during the storage of Ghee	47

LIST OF FIGURES

	Page No
Figure 3. 1 LYOFAST KD2(SACCO)	26
Figure 3. 2 DELVO 211 YOG.....	27
Figure 3. 3 YoFlex® SLB 3.0.....	27
Figure 3. 4 Cultured Ghee Process	34
Figure 3. 5 Preparation of Cultured Skim milk.....	35
Figure 4. 1 The yeast and mould, TCC count of cultured ghee cream stage	49
Figure 4. 2 TCC count of Fermented cream stage	50
Figure 4. 3 Distribution of the sensory attributes of cultured Ghee.....	52
Figure 4. 4 Distribution of the sensory attributes of Cultured Ghee Biscuits.....	53