

Analysis of Butter Sample for the Estimation of their Composition

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Butter is a dairy product made by churning fresh or fermented cream or milk. It consist of butterfat water and milk protein .Different principle involved in separating these constituent during analysis of different butter samples. The principles involved in the estimation of moisture, fat, salt and curd are evaporation, selective solubility, volumetric analysis and filtration respectively. The various constituent of butter play important role in its property. The variation in amount of any of these constituents may result in the variation of the property of butter itself. Salt present in the butter plays no vital role in its moisture content but it causes the surface tension of butter to decrease and thus making it spread able. The curd in the butter is finely divided particle which holds small particle of water in suspension, thus preventing it from sputtering. Hence, if more amount of curd is present in butter it will retain more moisture. Trans fat and saturated fat significantly increases the risk of coronary heart diseases.

Key words – Butter, Fat, Salt, Moisture, Curd.

Introduction :

Butter is a dairy product made by churning cream or milk. It is most frequently made from cow milk and other mammals including sheep, goats, buffaloes and yaks. Butter is an emulsion which remains a solid when refrigerated but softens at room temperature and melts at 32-35°C. The density of butter is 911kg/m³. Various constituent of butter play different role in its property. Fat is the most important and major constituent of butter. Mainly two types of fats are present in it, namely saturated fat and Tran's fat. Saturated fat can be stacked them in a closely packed arrangement, so they can be typically solid at room temperature. Tran's fat may still stack like saturated fat and are not susceptible to metabolism as other fats. Salt present in butter play no vital role but reduce surface tension to make it spread able. Curd present in it holds small particle of water in suspension thus preventing from spluttering. The moisture content according to the butter plaintiff may range from 8 to 17.5%. Limited consumption of fat play vital role in maintaining healthy skin, hair and insulating body organ. It also serves as energy store for the body containing about 37.8 kilo joule per gram of fat. But excessive use of fat, Tran's fat and saturated fat increases the risk of coronary heart diseases.

Experiment :

I. Determination of moisture

The butter sample was taken in a beaker and kept at water bath and stirred constantly until the sample softens. About 10 grams of above prepared samples was weighed in an aluminum beaker and then heated gently with continued stirring until the foaming ceased and curd at the bottom turns slightly brown. The beaker content was weighed and the moisture percentage of sample was calculated from loss in weight.

Observation :

Butter	Wt. of beaker	Wt. of beaker + 10g butter	Wt. of beaker + dried sample	Loss in wt.	% of moisture= Loss in wt. / (10 x 100)
Sudha	37.6	47.6	46.8	0.8	8%
Amul	38.0	48.0	47.7	0.3	3%
Nutralite	40.7	50.7	49.7	1.0	1%

II. Determination of fat

50 ml of petroleum ether was added to the dried sample obtained during the determination of moisture and stirred slowly and then set aside for about 4 minutes. The ether with dissolved fat was decanted without disturbing any settled residue. This process was

repeated 2-3 times taking 25 ml of petroleum ether. The decanted beaker was warmed continually till the residue became free from solvent and appeared powdery. It was then cooled, dried, weighed and percentage of fat was calculated from loss in weight.

Observation :

Butter	Wt. of sample Obtained in I(A)	Wt. of residue Obtained in II (B)	Loss in wt.	% of fat = Loss in weight / 10x100
Sudha	46.8	38.8	8.0	80%
Amul	47.7	39.8	7.9	79%
Nutralite	49.7	41.7	6.9	69%

III. Determination of salt

About 25 ml of distilled water was poured in the beaker containing fat free residue obtained in II. The beaker containing solution was rotated to dissolve the salt. Then it was transferred in 250ml volumetric flask, diluted till the mark and mixed thoroughly. 10ml aliquot of this solution was pipette out and transferred in a clean conical flask and 3-5 drops of potassium chromate was added to it. It was titrated slowly drop wise against standard 0.1N silver nitrate solution with shaking until faint reddish brown colour end point was obtained. This process was repeated for 2-3 concurrent readings.

Observation :

Butter	Vol. of Solution used	Burette reading			Con-current reading	Indi-cator used
		Initial	Final	Diff.		
Sudha	10 ml	1.5	2.9	1.4	1.4	Potassium chromate
	10 ml	3.0	4.4	1.4		
	10 ml	5.0	6.4	1.4		

Same process was repeated for the other butter samples using the calculation:-

1ml of 0.1 N AgNO₃ = 0.00585 gram of NaCl
 Percentage of salt = $0.00585 \times V_1 \times N_1 \times V_2 / A \times 100/W$
 Where,

- V = Volume of AgNO₃ solution
- N = Normality of AgNO₃ solution
- V = Volume of solution which diluted in the volumetric flask

- A = Aliquot pipette for the titration solution
- W = Weight of butter taken originally in moisture determination

Observation table for all samples :

Butter	Vol. of sol ⁿ used	Concurrent readings	% of salt
Sudha	10ml	1.4	0.20475%
Amul	10ml	1.6	0.234%
Nutralite	10ml	1.3	0.1755%

IV. Determination of curd

The percentage of curd was usually determined by deducing the total of percentage of moisture, fat, and salt from 100.

Calculation

Percentage of curd = 100 – (% Moisture + % Fat + % Salt)

Conclusion :

The percentage of different constituent of butter was close to the actual percentage of different constituent in the corresponding butter and we found that the maximum percentage of moisture, fat, salt and curd is present in the Nutralite, Sudha, Amul and Nutralite butter respectively.

Butter	% Moisture	% Fat	% Salt	% Curd
Sudha	8	80	0.2045	11.795
Amul	3	79	0.234	17.66
Nutralite	10	69	0.1755	20.824

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