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THE ART

— OF —

TESTING AND DISTINGUISHING

BETWEEN

Genuine and Bogus
Butter.

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THE ART
OF
TESTING AND DISTINGUISHING
BETWEEN
GENUINE *&* BOGUS BUTTER

WITH
CONCISE AND SIMPLE RULES,

*Used in the Process and with the Apparatus
of the Inventor and Author,*

LORENZO FAGERSTEN.

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WHAT IS BOGUS BUTTER?

§ 1. Bogus butter is *raw lard* or *raw tallow* deprived of its offensive smell by means of acids or alkalies, and generally churned with milk in order to acquire, by chemical decomposition, a bogus butter-flavor.

§ 2. Explanation of the process:

“The sugar of milk is split up into lactic acid, and part of the lactic acid is converted into butyric acid (bogus-flavor). The process being accompanied by *putrid fermentation*, and the development of myriads of microscopic infusoria or organisms of vegetable and animal origin,” closely allied to the germs supposed to be the cause of infectious diseases.

Authorities: M. Pasteur, Frémy, Boutron, Pelouze, Gelis and Schützenberger.

§ 3. *Living organisms.*

1. Sour fermentation.

FERMENTUM LACTICUM.

2. Rancid fermentation.

BACILLUS BUTYLICUS.

3. Putrid fermentation. After H. C. Bastian.

PHASES IN THE LIFE-HISTORY OF MONADS AND AMŒBÆ.

- a, a.* Monads in different stages of growth.
- b, b.* Similar Monads which have lost or retracted their flagella.
- c, c.* Monads about to be transformed into Amœbæ.
- d, d.* Resulting Amœbæ in active and motionless stages.
- e, f, g, h.* Stages by which motionless Amœbæ become encysted.
- i, k, l, m.* Stages by which other Amœbæ become resolved into Bacteria.

BACTERIA GROWING INTO VIBRIONES, LEPTOTHRIX, AND SPIRILLUM.

a, a. Different kinds of *Bacteria* and *Vibriones*.

b, b, and *c.* Different kinds of *Leptothrix* filaments.

d, d. Rudimentary *Spirilla*, some of which were ultimately seen to give rise to Fungus-mycelia.

e, e. *Torula*-like *Bacteria* developing into Fungus-mycelia.

Result of a Microscopical Examination of Bogus Butter.

Illustrated in *The Western Rural*.

“These organisms move forward by sliding. Their body remains rigid or undulates slightly; they balance themselves on end, and agitate their extremities; they are often bent.”

“These singular organisms are reproduced by fission.”

Authority: M. Pasteur.

§ 4. When deodorization is accomplished by alkalies, the lye used gelatinizes the animal membranes and skins surrounding the lard or tallow into a glue. Soap is formed. White specks of alkali and protein-compounds adhere to the sides, and a coarse alkaline powder sinks to the bottom of the tube.

When the object of the bogus-butter mixer has been obtained, the corruption of the originally transparent lard or tallow is manifested *optically* by the ropy and turbid opaqueness of the product.

§ 5. When *raw lard* or *raw tallow* is deodorized by mineral acids, oxidation takes place.

Generally, part of the hydrogen of the fat is displaced by nitrogen, chlorine or sulphur of the acids, and, under favorable conditions, the fat is deprived of part of its carbon, which unites with oxygen into oxalic acid.

Authority: Dr. F. Beilstein, St. Petersburg.

The *optical* effect is, in the main, the same as mentioned in § 4, but the melted fat now assumes a reddish tint; skins and membranes adhere to the sides of the tube as greyish mucilage, or sink to the bottom like lumps of jelly. Water deposit *always* strongly acid.

§ 6. *Raw lard* or *raw tallow* cannot be churned or mixed with genuine butter without the changes taking place mentioned in § 2, as a temperature from 80° to 100° would have to be maintained for a sufficient time to animate the mixture.

§ 7. Bogus butter when made has reached the limit of its acidity; any further change in its composition is to putrefaction.

§ 8. Genuine butter is a mixture of neutral fats—glycerides—which may be divided into two sub-classes :

SUB-CLASS 1.

High in carbon, melts at a high temperature, and non-volatile. Fat becomes transparent at 150° or over. (Fall butter.)

SUB-CLASS 2.

Low in carbon, melts at a low temperature, volatile and fragrant. Fat becomes transparent between 95° to 105° . (Grass butter.) No free fatty acids being present.

Grass butter is rich in fats of sub-class 2, and will not keep so well as fall butter, which consists, mainly, of fats of sub-class 1.

§ 9. Bogus butter is a corruption of *raw lard* or *raw tallow* in the form of chlorine, sulpho or nitro-derivatives, mixed with *free organic* and *mineral acids*, *animal skins*—sometimes gelatinized into glue—and *undergoing the process of lactic, butyric and putrid fermentation*.

Opaque at any temperature below 212° :

Is Bogus Butter Wholesome?

§ 10. “*Lactic acid* causes irritation of the bowels, and is productive of rheumatic pains.”

Oxalic acid. “The certainty and rapidity of its action has caused it to be largely used for suicidal purposes.”

Authority: The Dispensatory of U. S. of A. 1884.

The effects of *ferments*, *bacteria* and *infusoria* in general is too well known to require any repetition, and the possibility of the presence of *trichinae* and *tape-worm eggs* is equally well established.

TAILED BLADDER-WORM, OR THE LARVAL FORM OF A TAPE-WORM.

The larval form of the tape-worm infesting man, occurs among hogs.

OVARY OF A TAPE-WORM, MAGNIFIED 100 TIMES.

Mineral acids, alkalies, glue, stearic acid, soap and skins cannot properly be classed among condiments.

§ 11. Any chemical analysis of fats is incomplete unless qualified by optics and microscopy.

To Distinguish Genuine Butter from Bogus Compounds.

Fill the tin vessel with water, insert the glass tube, and put on the cover. Place the apparatus on a stove or upon the wire screen on the top of a lamp chimney. When the water is luke warm (not above 95°) fill the tube with sample to be tested, so as to reach the 10 c. c. mark when melted. Gradually heat the water until *a curd appears*,

then remove the apparatus from the source of heat, and let stand for *ten minutes*. After *ten minutes* examine the tube, when the contents will correspond to one of the following four classes.

Avoid heating the water to a higher temperature than directed.

CLASS 1. GENUINE BUTTER.

Fat—Transparent—The degrees on the tube plainly visible through the liquid fat.

Cheese—3 c. c. or over, white flakes.

Water—None in well-made butter — to $\frac{2}{5}$ c. c.

NOTE.—The curding point for grass butter is from 95° to 105° . For fall butter, about 150° or over.

CLASS 2. BOGUS BUTTER.

Fat—Opaque, turbid, ropy.

Cheese—None to 1 c. c.; seldom more.

Glue—(Gelatinized skins) Sticking to the sides of the tube, and swimming in the water like lumps of jelly. If gray, acids have been used. If white, alkalies.

Water—Always present; contains lactic and generally, mineral acids.

Soap—(See supplementary tests.)

CLASS 3. REPACKED BUTTER.

Old, washed, worked over, re-salted, and re-colored.

Fat—Translucent, cloudy.

Cheese—From 3 c. c. and over; sometimes 5 c. c. Lumpy appearance. The increase in bulk is caused by absorption of water on being washed.

Water—Generally present. Contains lactic acid.

CLASS 4. CHEESE-BUTTER,

Or curded caseine and fat.

Made from churning sour milk with cream or a melted fat at a temperature of from 80° to 95° , or from churning sweet milk with a “rennet solution” or a mineral acid, either with or without fat.

Fat—Sometimes transparent, generally translucent or opaque. Depends on the kind of fat added to the milk.

Cheese—No curd can form, as the curd was already formed in the process of churning, which is manifested at the melting point of the mixture. When the fat melts, the contents of the tube appear honeycombed from top to bottom, and when the fat is completely melted, the honeycombed structure of cheese collapses and sinks to the bottom.

VARIATIONS IN CLASS 1.

SIGNS.

Fat—Transparent.
Cheese—Settling below 3 c. c. before ten minutes.

Fat—Slightly cloudy.
Cheese—Lumpy appearance.
Glutinous specks adhering to the sides of the tube.

Fat—Extremely brilliant.
Cheese—Irregularly distributed all through the tube.
Milky spots adhering to the sides.

Fat—Transparent.
Cheese—4 to 5 c. c. appearing as soon as the butter melts.

Fat—Brilliant.
Cheese—3 c. c., extremely fine flakes, appearing several degrees above the melting point of the fat.

DEDUCTIONS.

Butter made from cream of sour milk.

Butter washed and worked at too high a temperature.

Butter fresh and unsalted.

Butter made from cream containing a large amount of sour milk.

Ripe, well-made butter, of a delicate, sharp taste; the result of the conversion of its *small percentage* of lactice acid into butyric acid, without any decomposition of the fat. Generally met with in the autumn.

REMARKS.

My method is practical, infallible, and more reliable than any chemical analysis.

Genuine butter is *always transparent* if removed from the source of heat at the *curding point* of the sample under consideration.

The *curding point* varies from 95° to 150° or over, and is ascertained by raising the tube at intervals until the *curd appears*.

The keeping qualities of genuine butter, other conditions being equal, improves with the higher melting point, which advances as the composition of the butter approaches sub-class 1. See § 8.

In *genuine butter*, *cheese* occurs in the *soluble* form as caseine-soda, which is decomposed at a variable temperature, but always above the melting point of the butter, and then precipitated as a *curd*.

In *all bogus compounds*, *cheese*, if present, occurs in the *insoluble* form—similar to the hard boiled white of eggs—and appears as soon as the fat begins to melt. This feature of the test cannot be surmounted by the *ignorant* class at present occupied in butter adulteration. It is the result of the *high temperature*, the *organic or mineral acids* or the *rennet solution* employed in the process. It is evident that *genuine butter* must appear *clear and transparent* as soon as the *cheese* is eliminated as a *curd*. That *bogus butter* remains *opaque* after the precipitation of the *cheese* is an *incontrovertible evidence of the corruption of the compound*, a proof that it contains *soap and glue*, and that a *mineral acid*, an *alkali* or *putrid fermentation* has accomplished this result.

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The cheese has then the appearance of a compressed wad of cotton, or the hard-boiled white of eggs.

If the coagulation of the milk was caused by “rennet,” and no foreign fat was used, there can be no objection to “cheese-butter” when sold on its merits.

“Cheese-butter” will not keep; a few hours is sufficient for chemical decomposition to set in. As this decomposition can be prevented by chemicals, and as *cotton-seed oil*, *lard* and *tallow* can be substituted for butter, a bogus article prepared as described is likely, at any time, to appear in the market.

To Find the Proportion of Genuine Butter in the Bogus Article.

Count the $\frac{1}{5}$ c. c. of cheese deposit.

1. Deduct $\frac{2}{5}$ degrees from the total if a gelatinous deposit is found in the water, and multiply the rest by $6\frac{2}{3}$.

2. If there is no gelatinous deposit, deduct only $\frac{1}{5}$ c. c.

1. *Example* : Suppose cheese shows $\frac{4}{5}$ degrees of 1 c. c., deduct $\frac{2}{5}$ leaves $\frac{2}{5}$ by $6\frac{2}{3}$, equals $13\frac{1}{3}$ % of pure butter. Or,

2. $\frac{4}{5}$ less $\frac{1}{5}$ leaves $\frac{3}{5}$ by $6\frac{2}{3}$, equals 20 % of genuine butter.

As there is no cheese in lard and tallow, the cheese, if any, in bogus butter is derived from churning with milk, or from genuine butter. In example 1 part of the cheese was derived from churning with milk. The error never exceeds 5 %.

General rule for all three classes to ascertain the comparative acidity of the samples.

Add $\frac{1}{2}$ c. c. of a *violet* solution of litmus before filling the tube with sample to be tested, and proceed as directed. The change in color from violet to red or pink shows the degree of acidity.

How to Make a Violet Solution of Litmus.

A grain of litmus to a thimbleful of water will produce the desired color in a few minutes.

CLASS 2.

Heat the water to boiling. If, after ten minutes, the fat becomes clear, the opaqueness was caused by water and glue; but if the fat remains opaque, the changes mentioned in § 2 and 5 have taken place, and the fat has undergone a partial saponification. This is made apparent by letting the tube containing the bogus compound remain for several hours in the apparatus, at a maintained temperature a few degrees above the congealing point of the fat.