

The aroma and flavour of butter are due to the presence of the six last, (Butyric, Caproic, Caprylin, Rutin, Butin and Myristin) probably to their incipient decomposition: while rancidity is excess of decomposition, butyric and formic acids being among the principal products, giving bad taste and odour.

This decomposition is hastened on by the presence of casein acting as food to the butyric and other bacilli, so that butter which has been washed in the granular stage to remove the casein keeps longer and never becomes so rank in flavour as the unwashed. Six per cent of the fatty acids, which are set free in decomposition from the glycerin with which they are combined, are soluble in water, and thus rancidity may be partly removed by reducing the butter to small particles and washing it again. The fatty acids can also be distilled off.

#### COMPARISON OF BUTTER WITH MARGARINE.

	Butter	Margarine
Melting Point.....	29-35°C	34-40°C
Solidifying Point.....	20-30°C	18-38°C
Specific gravity at 60 °F.....	.926-.929	.915
" " 100 °F.....	.911 and over	.903-.906
Per cent of Fatty acids soluble.....	5-7	1-2

Butter fat exists as tiny drops or globules suspended in the serum of the milk, this serum being a solution of saccharine and albuminous substances. (It is a debated point whether the butter globules are enclosed inside a skin of casein or not). One pound of milk yielding 4 per cent must contain 40,000,000,000 of them. The largest fat globules in cream are .0005 to .0006 in. in diameter and the smallest 1/100th of this. The size diminishes from the time of calving. The size varies according to the breed of the cow. For instance the Jersey cream globules are .00019 in. in diameter, and the Ayrshire cream globules are .00014 in. in diameter on an average.

Large globules can be most easily churned.

Size of globule	can be churned in
.000225 in.	13 minutes
.00019 "	30 minutes
.00018 "	34 minutes

Large globules, then, are therefore best for butter making (as Jersey) and the smaller one for cheese (as Ayrshire) the larger ones also rise more readily into cream; the smaller ones never rise, and thus make an even and rich cheese.

#### AVERAGE BUTTER YIELD FROM SWEET AND SOUR CREAM.

	Sweet	Sour
Minutes churning	32.00	29.00
Butter per 100 lbs cream lbs	14.38	17.11
Per cent gain	—	18.98

#### COMPARISON WITH CREAM ARTIFICIALLY SOURED WITH .25 PER CENT OF LACTIC ACID (4 C<sub>3</sub> H<sub>6</sub> O<sub>3</sub>)

	Sweet	Acidified	Sour
Minutes churning	35	40.00	32.00
Butter per 100 lbs	14.85	17.19	13.54
Per cent grain over sweet cream		15.75	27.54

#### RIPENING CREAM

Time required	Temperature (°F)
12 hrs	65° to 70°
24 "	60°
72 "	45°