

Review of Dairy Market Indicators

Summary of changes

Background

We publish market indicators for the dairy sector to provide broad, general estimates of market returns. They are not intended to be correct for every plant, but instead aim to be indicative of the industry. The value of market indicators is a basis for identifying trends and to use them for more precise purposes goes beyond the limits of their scope and accuracy.

- **AMPE** (Actual Milk Price Equivalent) is an indicator of the factory gate value of a litre of milk used for butter and skimmed milk powder (SMP),
- **MCVE** (Milk for Cheese Value Equivalent) assesses returns from mild Cheddar and whey powder and whey butter.

The indicators are reviewed every 3 years, with the last major review carried out in 2014, and a light-touch review undertaken in 2017. At that time, it was decided to leave the indicators unchanged, but to undertake a further review in 2020.

This review was undertaken internally within AHDB, with input from industry experts and processors to ensure suggested changes reflect reality. The review does not look to assess all elements of the calculations, but focuses on the following key parts:

- Compositional quality of the milk and subsequent impact on milk yields,
- Changes in labour and energy costs and their impact on the cost elements of the indicators,
- Cost of lactose powder for standardising SMP,
- Value of butter milk powder (BMP) compared with SMP.

Summary of changes

The following changes are being made:

Previous position	Updated position
Conversion factors are based on a standard milk composition of 4% fat, 3.3% protein.	Conversion factors will be based on a standard milk composition of 4.10% fat and 3.35% protein.
As a result yields were (litres per tonne):	As a result yields become (litres per tonne):
- Butter 20,273	- Butter 19,900
- SMP 10,720	- SMP 10,600
- BMP 217,740	- BMP 203,600
- Cheddar 9,300	- Cheddar 9,100
- Whey powder 17,000	- Whey powder 16,700
- Whey butter 218,000	- Whey butter 205,000

Previous position	Updated position
<p>Costs are based on 2014 assessments. SMP cost excludes lactose cost, which is covered separately below. Costs are (£'s per tonne):</p> <ul style="list-style-type: none"> - Butter £237 - SMP £352 - BMP £352 - Cheddar £322 - Whey powder £340 - Whey butter £237 	<p>Costs have been adjusted for movement in the cost of energy and labour. SMP cost excludes lactose cost, which is covered separately below. Costs are (£'s per tonne):</p> <ul style="list-style-type: none"> - Butter £244 - SMP £365 - BMP £365 - Cheddar £330 - Whey powder £341 - Whey butter £244
<p>AMPE measures standardised SMP including the addition of lactose powder at the rate of 78kg per tonne of SMP. The cost for lactose at the time was around £1,000 per tonne, giving an additional cost of £78 per tonne of SMP.</p>	<p>Lactose powder prices have varied significantly over the last 6 years. It has been decided to use USDA lactose powder prices in the monthly calculation based on the prices quoted in the month, and converted to sterling. We have also included a cost of €140/tonne as the EU import tariff to bring lactose powder in from the US. This will be updated from 1 January 2021 to represent the relevant UK import tariff.</p> <p>Lactose addition is assumed to be 85kg per tonne of SMP, which is up slightly on the 2014 number to reflect the higher level of protein in the milk.</p>
<p>Assumption that BMP price is £103 below SMP price.</p>	<p>No change</p>
<p>Assumption that whey butter is £300 below AHDB published butter prices.</p>	<p>No change</p>
<p>AMPE and MCVE are 'factory-gate' measures that <u>do not</u> include costs for transport/distribution to the retailer/customer.</p>	<p>No change</p>
<p>Profit margin is not included in either indicator.</p>	<p>No change</p>

Future considerations

The review has highlighted a number of areas of potential future adjustment. Some of these can only be determined once the Brexit trade position has become clear:

1. Whey value

The MCVE calculation continues to use an EU whey powder price to determine the value of whey. In the UK, very little whey is now turned into whey powder, however obtaining reliable prices for other whey derivatives is challenging. Using the EU whey powder price does bring a future trading risk. Currently, under a no-deal scenario, there would be tariffs on whey powder traded between the UK and EU. That means the quoted EU whey powder price would not be a representative price for whey powder values in the UK. Adjusting the whey powder price to reflect the EU import tariff of €70 per tonne would reduce our MCVE indicator value by around 0.38ppt¹.

2. Lactose powder

We are using the USDA price for lactose powder, and by using a non-UK price for lactose powder we need to ensure it is representative for the UK. Up until 31 December 2020 the import tariff for bringing lactose powder into the UK from the US is the EU import tariff of €140/tonne. From 1 January 2021 we will need to include the relevant UK import tariff for lactose powder, which may alter the cost in our AMPE calculation. The no-deal UK import tariff for lactose powder is currently put at £110 per tonne, which is on a par with the current EU tariff (subject to exchange rates).

3. Butter milk powder (BMP)

The UK does not quote BMP prices, so we are reliant on non-UK sources to get an indication of market values compared with SMP prices. We could consider using quoted prices each month to represent the value of BMP, rather than using a simple adjustment to SMP prices, but this has not been adopted at this time.

4. Whey butter

Similarly, for whey butter, we have no reliable data source for regular whey butter prices, so rely on a simple deduction compared with our own butter prices.

5. Energy sources

The majority of dairy factories have moved away from heavy fuel oil for their main energy source, and have invested in various alternatives including anaerobic digestion and wood burning. We have adjusted the energy costs based on electricity and gas prices, but there will be a time in the future when the energy costs need a full overhaul to remain representative.

6. Labour productivity and efficiency savings

Labour costs have been adjusted based on quoted labour costs per hour. This adjustment does not take into consideration any change in labour hours required as a result of efficiency improvements or automation. However, it could equally move the other way to adhere to social distancing measures, or to meet additional customer requirements. A benchmarking exercise should be undertaken in a few years' time to ensure the costs remain representative.

¹ Based on an exchange rate of £1=€1.1302

Review and amendments

AMPE and MCVE continue to be based on the same principles as those adopted after the 2014 review. Namely;

- AMPE is based on the return for butter, BMP and SMP, less the cost of buying in lactose powder for protein standardised. The BMP is not standardised and is accounted for separately.

$$\text{AMPE} = \text{Butter value} + \text{BMP value} + \text{SMP value} - \text{Lactose powder cost}$$

$$\text{Values for each product} = (\text{Market price} - \text{processing cost}) / \text{Conversion factor}$$

- MCVE is based on the return for mild cheddar, whey butter and whey powder.

$$\text{MCVE} = \text{cheese value} + \text{whey butter value} + \text{whey powder value}$$

$$\text{Values for each product} = (\text{Market price} - \text{processing cost}) / \text{Conversion factor}$$

The conversion factors have been updated using a mass balance approach, and using the butterfat and protein UK averages for the last 3 years. The results for each year have been weighted using a 50:30:20² average. These averages come out at 4.10% butterfat and 3.35% protein.

Solids not fat (SNF) in milk is calculated based on the assumption that 38.2% of the SNF is protein (giving 8.77%).

Costs have been updated using the following:

- Labour costs³ - ONS index ILCH_C1 - manufacturing labour cost per hour for food products, beverages and tobacco.
- Energy costs⁴ - Electricity (all consumers' average) and gas (all consumers' average) prices from gov.uk in pence per kWh.

² 50% of 2019/20, 30% of 2018/19 and 20% of 2017/18 annual averages

³

<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/indexoflabourcostsperhourilchnonseasonallyadjusted>

⁴ <https://www.gov.uk/government/statistical-data-sets/prices-of-fuels-purchased-by-manufacturing-industry>

The above costs have been indexed so that 2014 is 100, and then the costs from the 2014 review have been updated in line with the new indices for 2019. Those adjustments come out at:

- Labour costs index 108
- Electricity cost index 127
- Gas cost index 85

It is assumed that any inflationary increases in other costs have been offset by efficiency gains.

Lactose powder prices have varied significantly over the last 6 years. It has been decided to use USDA lactose powder prices in the monthly calculation based on the quoted prices in the month, and converted to sterling using the average exchange rate for the month. We have also included a cost of €140/tonne as the EU import tariff to bring lactose powder in from the US. This will be updated from 1 January 2021 to represent the relevant UK import tariff.

Lactose addition has been amended to 85kg per tonne of SMP, to reflect the higher protein in milk and therefore the higher level of lactose addition that would still be possible to achieve protein in SMP of 34%.

The new cost breakdown is given below:

UK costs (£'s per tonne or product)

UK	Butter	SMP	BMP	Cheddar	Whey Powder
Energy	43	138	138	50	134
Labour	70	70	70	75	70
Raw mat	21	21	21	61	21
Chem, water, waste	10	25	25	12	25
Maintenance	20	25	25	25	25
Storage	20	6	6	30	6
Depreciation	30	50	50	42	
General/admin	30	30	30	35	60
Total	244	365	365	330	341

Excl. lactose cost

Energy assumptions split:

Electricity	50%	50%	50%	50%	30%
Gas	50%	50%	50%	50%	70%

Please note, as in the 2014 review, the depreciation cost is included in general/admin for whey powder.

AMPE

Estimate of calculation, based on May 2020 market prices:

Butter value, ppl = $(2,600 - 244) \times 100 / 19,900 = 11.84\text{ppl}$

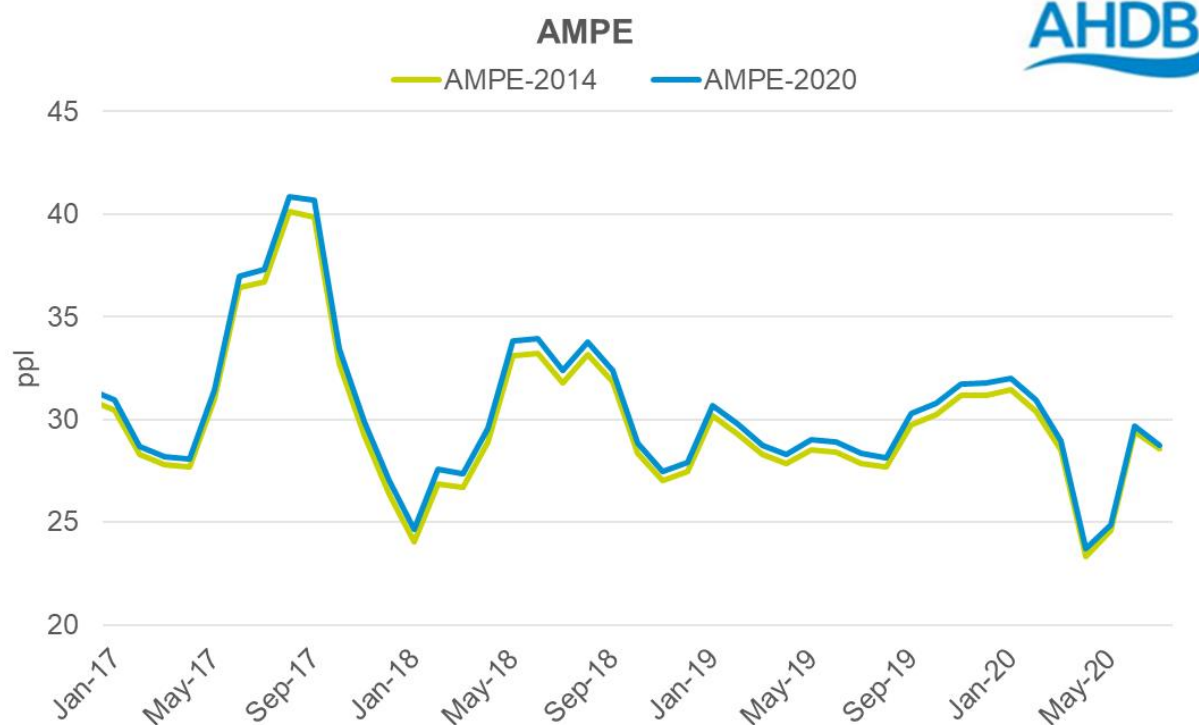
BMP value, ppl = $(1,750 - 103 - 365) \times 100 / 203,600 = 0.63\text{ppl}$

SMP value, ppl = $(1,750 - 365) \times 100 / 10,600 = 13.07\text{ppl}$

Lactose cost, ppl = $845 \times 8.5\% \times 100 / 10,600 = 0.68\text{ppl}$

So the updated AMPE value = $11.84 + 0.63 + 13.07 - 0.68 = \mathbf{24.86\text{ppl}}$

This compares with the May 2020 published AMPE figure of **24.56ppl**



Source: AHDB

Comparison of elements of current & updated AMPE formula

Element	AMPE 2014 formula	AMPE 2020 formula
Market prices	<p>Uses AHDB wholesale survey indicative prices for the month.</p> <p>BMP price estimated using a £103/t discount to SMP.</p>	<p>Unchanged using AHDB wholesale survey indicative prices for the month.</p> <p>BMP price⁵ estimated using a £103/t discount to SMP.</p>
Conversion factors	<p>Conversion factors are based on a standard milk composition of 4% fat, 3.3% protein.</p> <p>As a result yields were (litres per tonne):</p> <ul style="list-style-type: none"> - Butter 20,273 - SMP 10,720 - BMP 217,740 	<p>Conversion factors will be based on a standard milk composition of 4.10% fat and 3.35% protein.</p> <p>As a result yields become (litres per tonne):</p> <ul style="list-style-type: none"> - Butter 19,900 - SMP 10,600 - BMP 203,600
Costs - Processing:	<p>Costs are based on 2014 assessments being: £'s per tonne of product:</p> <ul style="list-style-type: none"> - Butter £237 - SMP £352 - (plus lactose £78) - BMP £352 	<p>Costs have been adjusted for movement in the cost of energy and labour. Costs are now £'s per tonne of product:</p> <ul style="list-style-type: none"> - Butter £244 - SMP £365 - (plus lactose – see below) - BMP £365
Total processing costs	5.34ppl (including lactose cost of 0.73ppl)	4.90ppl (excluding lactose cost)
Lactose cost	Based on a fixed lactose cost of £78 per tonne of SMP.	<p>Uses USDA lactose powder prices in the month, converted to sterling plus import tariff and assumes addition rate of 85kg per tonne of SMP.</p> <p>If no lactose powder price is available in the month, then the previous month's price will be used.</p>

⁵ For much of the last few years the Global Dairy Trade (GDT) has recorded a premium for BMP compared with SMP, partly due to the low SMP prices as a result of EU SMP stocks. However, it has been decided to keep the discount unchanged at £103 per tonne, because GDT results for the last 12 months (to June 2020) are showing a discount once again.

MCVE

Estimate of calculation, based on May 2020 market prices:

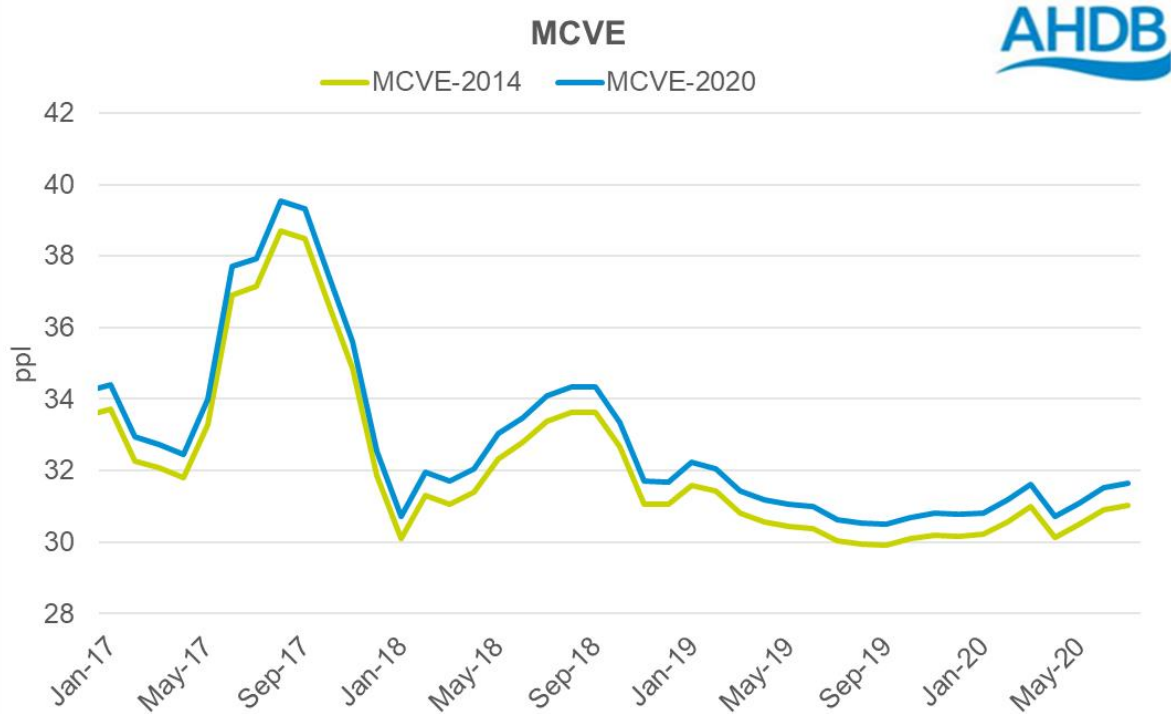
Cheese value, ppl = $(2,900 - 330) \times 100 / 9,100 = 28.24\text{ppl}$

Whey butter value, ppl = $(2,300 - 244) \times 100 / 205,000 = 1.00\text{ppl}$

Whey powder value, ppl = $(650 - 341) \times 100 / 16,700 = 1.85\text{ppl}$

So the updated MCVE value = $28.24 + 1.00 + 1.85 = 31.09\text{ppl}$

This compares with the May 2020 published MCVE figure of **30.49ppl**



Source: AHDB

Current and updated MCVE values (ppl)

Element	MCVE 2014 formula	MCVE 2020 formula
Market prices	<p>Uses AHDB wholesale survey indicative price for mild cheddar and butter in the month. Assumes whey butter is at a £300 per tonne discount to quoted butter price. Whey powder price is based on the EU's MMO weekly whey powder price, converted to sterling using the exchange rate for the period.</p>	<p>Uses AHDB wholesale survey indicative price for mild cheddar and butter in the month. Assumes whey butter is at a £300 per tonne discount to quoted butter price. Whey powder price is based on the EU's MMO weekly whey powder price, converted to sterling using the exchange rate for the period.</p>
Conversion factors	<p>Conversion factors are based on a standard milk composition of 4% fat, 3.3% protein.</p> <p>As a result yields were (litres per tonne):</p> <ul style="list-style-type: none"> - Cheddar 9,300 - Whey powder 17,000 - Whey butter 218,000 	<p>Conversion factors will be based on a standard milk composition of 4.10% fat and 3.35% protein.</p> <p>As a result yields become (litres per tonne):</p> <ul style="list-style-type: none"> - Cheddar 9,100 - Whey powder 16,700 - Whey butter 205,000
Costs - Processing:	<p>Costs are based on 2014 assessments being: £'s per tonne of product:</p> <ul style="list-style-type: none"> - Cheddar £322 - Whey powder £340 - Whey butter £237 	<p>Costs have been adjusted for movement in the cost of energy and labour. Costs are now £'s per tonne of product:</p> <ul style="list-style-type: none"> - Cheddar £330 - Whey powder £341 - Whey butter £244
Total MCVE processing costs	5.57ppl	5.79ppl