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TECHNICAL UPDATE

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High quality milk powder unlocks better lifetime performance

Dr Jessica Cooke, Volac Milk Replacers Ltd.

Heifer calves reared on a concentrated whey protein-based milk replacer diet are younger at first calving and more fertile than those receiving lower quality milk protein in early life.

Dairy heifers at AFBI Hillsborough in Northern Ireland fed different milk protein-based diets as pre-weaned calves in 2018-19 have been monitored from birth up until their third calving.

According to Dr Jessica Cooke, the 2018-19 experimental study involved 80 Holstein Friesian calves fed four different milk replacers from birth until 56 days of age. The trial highlighted that well formulated, high quality milk replacers with either skim milk powder (at a high inclusion level) or concentrated whey protein as the major source of dairy protein both deliver comparable animal performance.

"This work clearly showed that the presence of skim – and therefore the clotting effect of casein – is not the fundamental element within a calf milk formula influencing optimum calf growth. There was no significant difference between the calf growth or health from the different milk replacer formulations. If the important milk components are processed correctly, both skim and whey proteins will be highly digestible by the high milk fed pre-weaned calf and will deliver good performance."

Importantly though, Dr Cooke stresses that good nutrition and calf performance is linked to more than just the type of dairy protein included in the finished milk formula.

"Important differences in amino acid and fatty acid profiles, amount of lactose, vitamins, minerals and trace elements, processing conditions and overall digestibility all contribute to calf performance," she says.

What's more, the data has confirmed that high quality pre-weaned calf nutrition favourably influences better lifetime productivity.

"What calves are fed pre-weaning certainly makes a difference as these heifers join the milking herd,"

Dr Cooke says.

"Although high quality, skim-based milk replacer fed calves and those fed a high quality, concentrated whey protein-based (CWP) pre-weaning diet will perform similarly in later life, some performance differences start to emerge when you compare calves fed concentrated whey protein such as Volac's Imunopro® with those fed a lower quality, simple whey powder-based (WP) milk replacer (see table 1).

"Not only were the CWP fed calves five days younger than their counterparts at first breeding, there were some fertility differences. For example, the CWP-fed group only required 1.4 services per heifer, while the WP-fed group required 2 services per heifer. First service conception rate was better too in the CWP fed group (60%) versus 50% in the WP fed group."

However, Dr Cooke says that a particularly important performance difference starts to emerge when you compare the age at first calving data.

"On average, the CWP-fed calves calved first at 729 days of age, whereas the WP-fed animals calved down at 751 days – 22 days later. What's more, 80% of the CWP-fed heifers had calved down by 24 months or age, as opposed to only 33% of the WP-fed heifers.

"With AHDB figures suggesting each day delay beyond 24 months AFC costs you £2.87, this performance difference alone is worth £63.14 per heifer. Or, to put it another way, a £3,157 cost to the dairy farm business every year for a 200-cow herd with a 25% annual replacement rate."

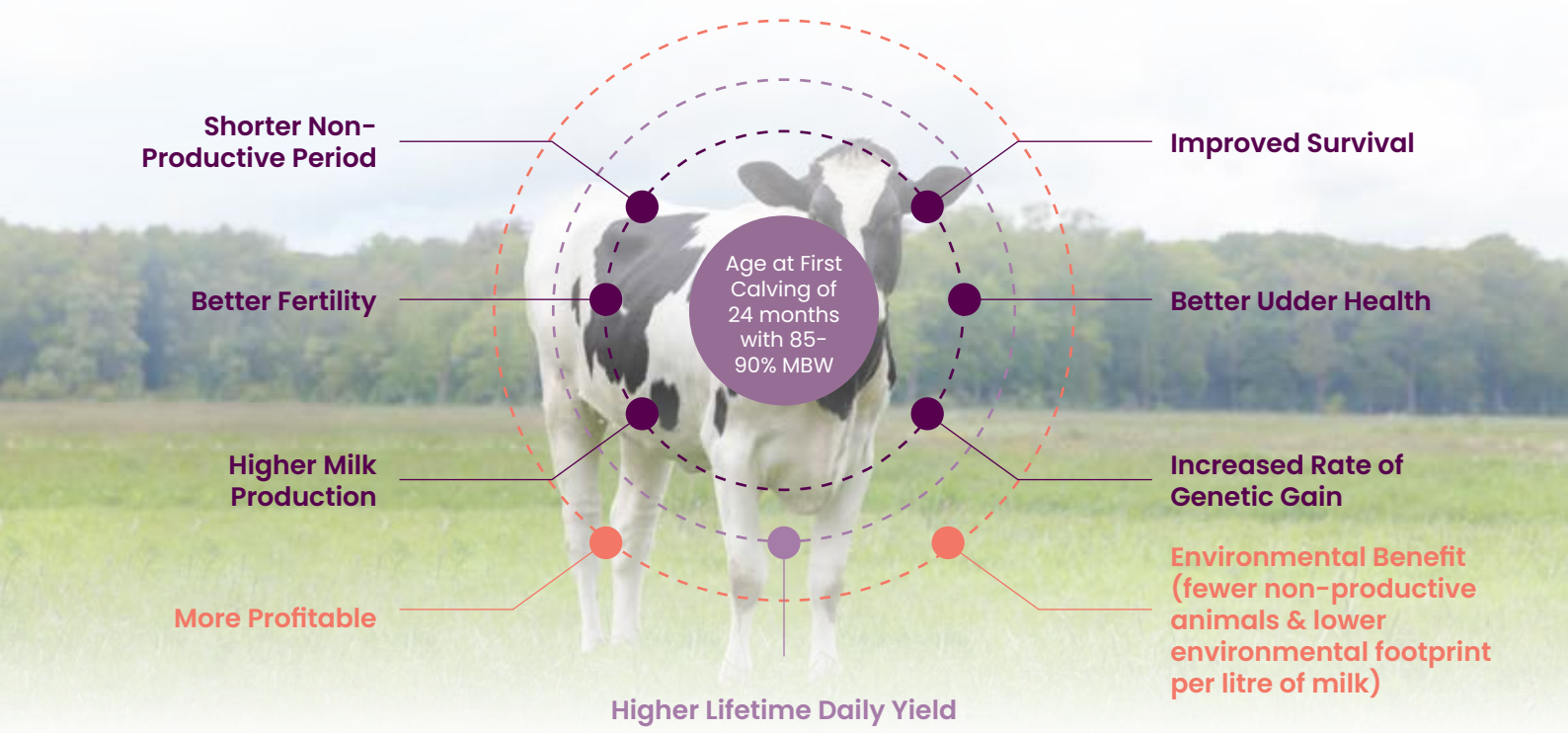
Dr Cooke says that this research confirms that high quality early life nutrition pays dividends and urges all calf rearers to be far more discerning over calf milk replacer choice for rearing their milking herd replacements.

"Always be cautious about how whey protein is described on the label when comparing milk replacer, and always ask a merchant or manufacturer to explain the differences. If favouring a skim-based calf milk replacer, always opt for a high (>40%) skim content" she stresses.

"Liquid whey from cheese production can be processed in a variety of ways, resulting in different types of whey, including whey powder, delactosed whey and concentrated whey protein.

"The different types of whey differ in both protein and lactose content. Concentrated whey protein typically contains 35% protein but whey powder only contains 12.5-13% protein. Consequently, it's important to realise that any whey powder in a finished milk formula will not contribute the same level of dairy protein to a calf compared with one based on concentrated whey protein, such as Volac's Imunopro®."

Maximising Lifetime Performance



Rearing heifers efficiently will allow them to have an age at first calving of 24 months, this is pivotal to maximising lifetime performance and has an impact on future profitability and the sustainability of your milking herd.

Processing issues

She adds that it's important to bear in mind too that the whey fraction of colostrum and whole milk contains valuable bioactive proteins (e.g. immunuglobulins and lactoferrin), which are not present in casein.

"These functional proteins are essential for calf health (supporting defence mechanisms) and influence the growth of the young animal.

"However, care must be taken to minimise the protein denaturation of these valuable bioactive proteins during manufacture. Data shows that at processing temperatures of 85°C, over 60% of whey proteins were denatured within 30 minutes, whilst at 65°C only 15% of proteins were denatured1.

"Fortunately, Volac's modern low temperature ultrafiltration process ensures that a high proportion of the naturally occurring immunoglobulins found in liquid whey are retained in the company's latest finished whey protein concentrate-based milk formulas," she says.

In summary, this means that when processed under carefully controlled conditions, both skim and whey protein concentrate-based milk replacers can deliver excellent calf performance – and better lifetime performance potential – but, on the other hand, poorly processed milk-derived protein (be it skim or whey) can have very poor digestibility and increase the risk of health issues.

"The key is to evaluate value for money carefully when purchasing a calf milk replacer. Look for a proven track record of performance and recognise that a precision-formulated product based on concentrated whey protein (e.g. Volac's Imunopro®) will provide everything the modern, high milk fed calf needs in early life – and improve lifetime performance," concludes Dr Cooke.

Table 1. Not all whey is the same

Calves fed milk replacer based on concentrated whey protein (CWP e.g. Imunopro®) were younger at first calving compared with those fed milk replacer with whey powder (WP) as the primary protein.

	Imunopro®	Whey powder
Number of heifers at first breeding	5	6
Services per conception	1.4	2.0
First service conception rate (%)	3/5 (60%)	3/6 (50%)
Age at first calving (days)	729	751 (+22 days)
% calved by 24 months	80%	33%

Don't forget...

Always ask your feed rep or manufacturer to explain the label on your milk replacer. Ingredients legally have to be listed in inclusion level order, so confirm your high quality protein source is number one.

All proteins are not the same, even if they are included at the same amount. The processing method of dairy protein is fundamental for the utilisation of amino acids by the calf.

Don't be afraid to ask questions about the origins of your milk replacer such as where do the raw materials come from and how is it manufactured?

Don't forget the bigger picture, saving on feed "now" can affect future productivity leading to a less efficient system.

It's more efficient to rear your replacement heifers well and maximise their lifetime performance and longevity, rather than constantly going through the recruitment process.

Reference
1. Richert SH, Morr CV & Cooney CM (1974). Effect of heat and other factors upon foaming properties of whey protein concentrates. Journal of Food Science 39.

FEED FOR GROWTH™

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Our personalised, technically validated support helps farmers to achieve outstanding outcomes.

Through strong, mutually successful partnerships, we champion an efficient, sustainable future for calf-rearing.

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