

Milk formulation impacts on calf robustness

A salmonella out-break during a milk replacement experiment highlighted the significant impact different milk formulations can have on calf robustness, survival and recovery from disease.

The out-break occurred at the Poukawa calf rearing centre when Dr Paul Muir was conducting a dietary experiment comparing a traditional "curding" milk powder based CMR formulation with two whey and vegetable based "non-curding" CMR formulations.

The study was to examine the suitability of the vegetable and whey based powders under Kiwi calf rearing conditions.

In Europe where much of the non-curding formulations are sourced, calves

are at least 7-10 days old before they are on-sold from dairy farms, compared to only four days in New Zealand.

"We were not wanting to get into individual brand comparisons with this, so we had three different formulations made up each with similar energy levels, to commercial brands and comprising of 21% fat and 26% protein."

The first diet was a curding call milk replacer (CMR), based on whole milk powder and skim milk. The second was a non-curding CMR based on whey and vegetable proteins, while the third comprised of whey, soy and vegetable fat and half the protein was made up of vegetable component.

The study comprised of 240 Friesian bull calves put into three batches.

Six days into the study last spring

five calves were found dead and others quickly became infected. Up to two weeks of age 85% of the calves fed the traditional curding formula were healthy, compared to 61% on the first non-curding diet and only a third on the second non-curding diet.

Of the 160 calves fed the two non-curding formulas, 10% died and 12% were classed as "very sick". Only 1.25% died that were on the curding diet.

Dr Muir says the unintended outbreak of salmonella highlighted the resilience of calves to infection that had been fed the curding CMR.

A second study without any disease incidence involved 90 Hereford-cross heifer calves, and studied their weight gains under the CMR formulas.

The calves reared on the second non-

curded diet, high in vegetable fat and protein, were almost 10% lighter at 13 weeks than those on the other two diets.

The calves averaged 92.4kg, compared to 101.8kg for calves on a curding diet and 99kg for calves on the first non-curding whey diet.

A further study revealed calves reared on the non-curding diet as a finisher from two weeks to weaning had no significant differences in weight, gain or age at weaning.

"This suggested a non-curding diet is quite satisfactory for calves from two weeks on, and suggests a two-phase feeding regime feeding calves curding diet for the first two weeks followed by the lower cost non-curding powder for the remainder of their feeding period," said Dr Muir.

The results of his trial are supported by overseas research that suggests younger calves are unable to handle the influx of protein to their small intestine that occurs with non-curding powders.

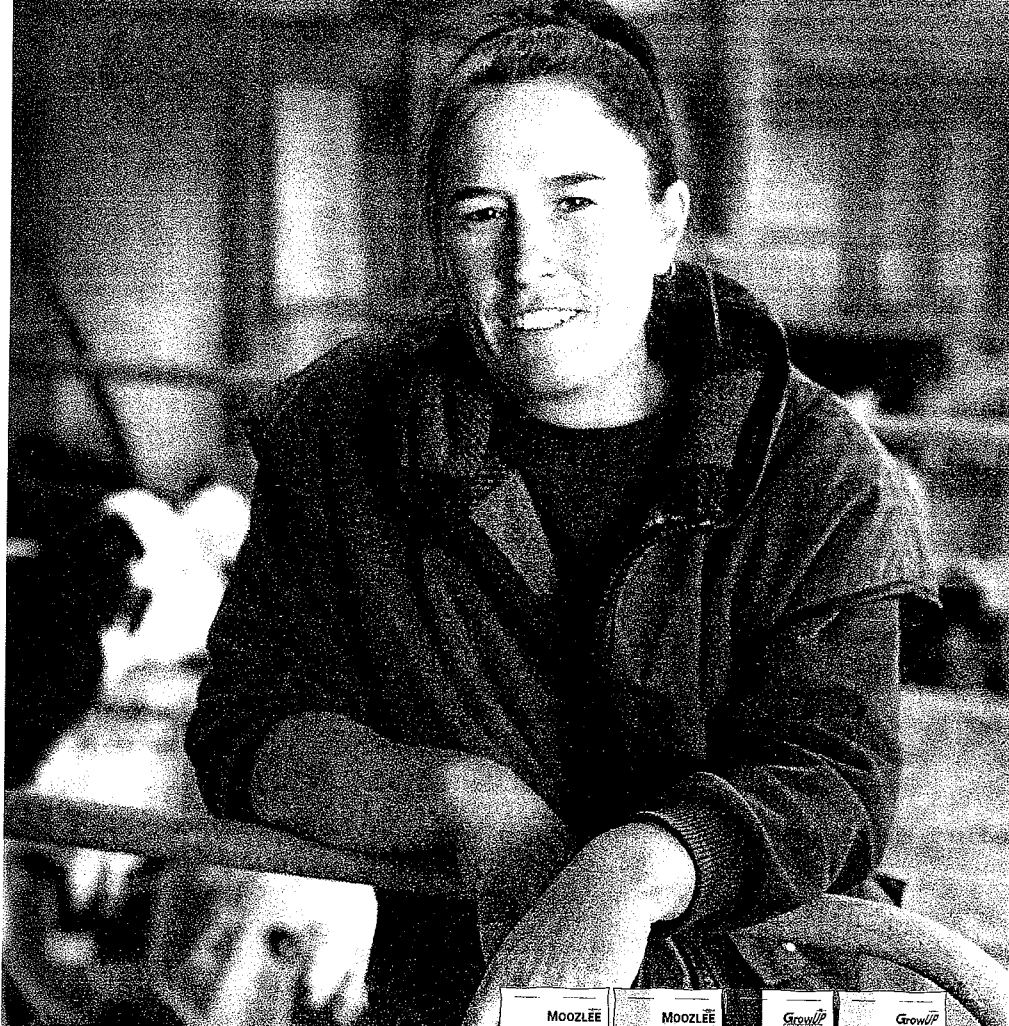
"Non-curding are okay after four days in the absence of any significant pathogen challenge, but when you get one, you get problems with resilience and recovery."

He believes the variations in disease challenge and different management may account for various anecdotal reports of the success or failure of commercial non-curding calf milk replacers.

A manufacturer of non-curding milk replacer has however questioned the validity of Muir's conclusions based on the experiments conducted at Poukawa.

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Natural cow's milk contains casein proteins, which curd in the calf's abomasums as it suckles.

This enables the milk to move slowly from the abomasum into the small intestine, and its nutrients to be gradually absorbed.

Traditional calf milk replacers (CMRs) have comprised of whole and skim milk powder, often unsuitable for export as human food ingredients.

These powders will curd inside the calf unless subject to very high heat treatment which damages the casein component. They are therefore known as curding CMRs.

High prices and alternative uses for skim milk powder have meant more overseas manufacturers have opted for lower cost milk proteins, in the form of whey proteins.

Other protein sources including vegetable protein sources from wheat and soy protein have also been used, tested and approved under Northern Hemisphere conditions.

Unlike curding CMRs these compounds do not curdle in abomasums, instead moving directly to the small intestine.

Recently non-curding CMRs have become available on the New Zealand market as an option for calf rearers to consider, often at lower price than traditional curding CMRs.



Dr Paul Muir.

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