Solmin Feedtech Minerals is in the Solmin folder.

On all farms, pasture analyses show that mineral supplements are needed for optimum animal health. Solmin, a salt based nine elements one, is the best by far. See Minerals.

Hydroponic green feed from grain for droughts

'Hydroponic Fodder' finds photos and examples

In droughts spread barley seed on short grass and water with effluent tank to get green feed and more than feeding grain provides.

Seaweed, kelp, etc.

Don't feed or fertilise with seaweeds in any form because they are all high in heavy metals and too expensive for their mineral content. None are organic, even if labelled so, because the land above them may not be organic and even if it is, tides move sea water everywhere. Salt is cheaper per element of goodness and when applied to pastures as a fertiliser in LimePlus or with Phosphate Nutrient Planner, softens hard, high potassium grasses, feeds soils and its microbes and the earthworms.

Farms on coasts, especially where the prevailing wind is from the sea, get sea spray so Na levels are usually higher in their pastures, but will not be enough for animals or soils or to soften high potassium (K) grasses, so up to 50 kg per hectare of coarse agricultural salt per annum may be necessary. On a coast less may be OK, but more than 50 kg per hectare will be a waste because it will leach faster than the pasture can absorb it.

See the two Salt chapters.

Palm Kernel Extract (PKE)

Overstocked farmers and drought sufferers have found PKE a saviour. It comes from making palm oil in south east Asia, mainly Malaysia. A decade ago, before New Zealand and Australia started buying PKE, much of it was just dumped or burned, so whether dairy farmers buy it or not will make no difference to the expansion of palm oil plantations, for which the greenies are blaming New Zealand dairying. Fonterra should publicise this and expose the ignorance of the greenies, some of whom are vegans out to ruin the animal industries, and bring up mineral and vitamin deficient children with large starch filled tummies, and lacking in brain power. The far brighter Asians are crying out for more animal protein while the anaemic vegetarians spread inaccuracies about exaggerated problems of red meat. They should go to east Africa and see the agile people who live on mostly meat, blood and milk.

Compared with grazing pastures and grazing forage crops, buying supplements used to be very expensive. However, as the price of dairying land increased, the advantages of buying supplements in droughts improved, but profit doesn't increase unless the payout is high. When pasture quantity is lacking because of overstocking, drought or flood, feeding 2 kg of PKE per cow per day, if it costs less than 5% of the milk price, with some maize silage and pasture, makes a balanced feed, but with lush pasture only, it doesn't. So if the milk price is $7 per kg of milk solids, 5% is 35 cents a kilogram of bought feed, or $350 for 1,000 kg.

Those on high-input farming at 2012 milk prices are losing money and I know some are going broke. One lost $244,000 in 2008 until I saved them and in 2009 they lost nothing. In 2010 they netted $200,000, thanks to milking 50 fewer cows, buying less feed and increased milk production from cows almost fully fed on pasture. Their 2011 profit was $300,000.

One in the 2013 drought season, reduced cow numbers by 10% and stopped feeding bought feeds and the milk dropped only a little, but his profit went way up because the remaining cows got more pasture.

The software program 'Pasture Silage Hay Crop & Nitrogen Costs' shows that the cost of growing pasture, before the inclusion of land value, is about 7 cents per kg of dry matter, but the high price of bare land, at 8% of $35,000 per hectare, increases the cost to 25 cents fed, or $250 per tonne of feed.

Know about PKE before feeding it

I don't approve of PKE, but some farmers will feed it, so it is important that they know how best to

do so.

There have been ill health and deaths from feeding excesses of the highly toxic PKE. Google for 'Palm Kernel + cattle deaths' to see some. Losing six cows and their production takes a lot to replace. One farmer lost 20 cows from milk fever, something which should not happen. Calciumboroglucenate injections didn't save them because the milk fever was a triple whammy on top of PKE-caused copper and manganese toxicity.

When starting to feed it, do so after the cows have had a feed of pasture, and increase the quantity gradually over 10 days, starting with half a kg per cow per day, to allow the rumen to adjust. Some suggest starting with 1 kg per day, but some cows eat rapidly and get 2, or even 3, kg, while initially others may eat none. Too much, too quickly, to hungry animals on an empty rumen can be a killer, while some promoting it say that adding PKE to the diet of cows need not be done gradually.

Fine-cut silage fed on an empty stomach is also hard to regurgitate, so should also be done after some pasture has been eaten, and under fence lines to prevent walking over it, and to reduce waste. Some farmers feed the supplements in bins after milking, when the rumen is empty. This reduces cud chewing, which means less saliva and poorer digestion, and less milk. Also, bins cause uneven consumption.

The extremely high iron, phosphorus, copper and manganese levels mean that PKE should not be fed in too large a quantity, or for too long a period. An article published in Gribbles Veterinary Newsletter, Labtalk, highlighted the potential for cattle to develop copper toxicity. The copper content in PKE is 20 mg per kg of dry matter, which is twice the optimum for cattle, and has built up in the liver of Waikato cows to 3,000 nmol per kg, which is more than three times the optimum figure of 900 nmol per kg.

Manganese can be as high as 340 ppm in PKE, which is eleven times higher than the optimum in New Zealand pasture, where it is mostly already too high, especially if wet or if soils lack calcium which 90% do. Parts of the UK and USA are low in manganese, so mineral mixes designed there and fed in New Zealand stress cows and milkers. This happened to a Tauhei farmer and his cows. I fixed it in a week by changing his feeding minerals containing manganese to the DeLaval Solminix which contains the 9 minerals deficient in NZ, but no manganese.

TABLE 3. MINERAL CONTENTS OF PALM KERNEL CAKE

Calcium (%)	0.21 – 0.34
Phosphorus (%)	0.48 – 0.71
Magnesium (%)	0.16 – 0.33
Potassium (%)	0.76 – 0.93
Sulphur (%)	0.19 – 0.23
Copper (ppm)	20.5 – 28.9
Zinc (ppm)	40.5 – 50.0
Iron (ppm)	835 – 6130
Manganese (ppm)	132 – 340
Molybdenum (ppm)	0.70 – 0.79
Selenium (ppm)	0.23 – 0.30

A Morrinsville herd had the problem of three times the copper and manganese levels in livers due to 5 to 6 kg of PKE being fed for months, so its ill effects caused cows to die of mild milk fever or other ailments months later, when they should not have died. This double negative effect occurs in farming. One is facial eczema affected cows dying of mild milk fever or bloat, despite being treated correctly. There is absolutey no excuse for facial eczema today - or since 1970 when I first wrote about correct amounts of lime and its synergisms in soils preventing facial eczema. Read Animal Health > Facial eczema and Elements > Calcium.)

PKE is dusty and gritty, so ample water is necessary. Feeding the PKE away from the water supply encourages cows to move for water and not keep gorging PKE for too long, but doing this is no guarantee that some won't kill themselves, as has happened on some farms - especially if short of other feeds. Googling for 'PKE cow deaths' found it has happened in New Zealand and overseas.

Why do some die?

PKE is a variable product, sometimes containing soil. Over-consumption can occur from bins where all can't access it at the same time, so some eat too much. One of my best dairy farmer clients feeds it much more satisfactorily on the clean short pasture under fence lines with no problems and negligible waste.

Keep palm kernel dry, because mould sickness problems, causing mycotoxins, have occurred on a number of farms. If kept dry, it can be stored for a few months in cool conditions. If moist it can go mouldy, and should be disposed of, because feeding mould can be disastrous to lungs.

In 2007 some PKE was rejected by cows, even after they had been on it for a while. The PKE concerned was darker than usual, so could have previously heated from being too moist, so was mouldy.

Too much tapioca mixed with PKE by mistake killed some with acute ruminal acidosis, because the tapioca was not introduced gradually, and has very low starch and sugars.

When feeding any supplement, ensure that all get equal quantities, to avoid excess illnesses and the cows that eat more achieving high herd test figures.

Feeding it in farm dairies is best, provided cows are not being starved, so have empty rumens. It can cause the very serious dust problem, which can be reduced by mixing water or diluted molasses with it just before feeding.

Virus infection, mineral irregularities, especially low or excess iodine and/or low or excess selenium. Recently I found that feeding PKE which is dry and dusty and with its very high manganese level, increases the incidence of catarrh and lung problems.

Feed Value

PKE has 14 to 16% crude protein, 11 MJ ME per kg and 90% DM, with very low starch and sugars. Most of the energy comes from the oil, protein and digestible fibre, so cows are unlikely to show any signs of acidosis, but digestive problems can occur, even if changed to it gradually. Excess P, Cu and Mn can build up in the liver if more than 3 kg per cow is fed for too many months. A maximum of 2 kg is safest, but impossible to control when feeding in troughs where only some can access the PKE so some get who knows how much and some get none.

Mixing 10% of rolled barley with PKE improves the feed value, increases carbohydrates and improves its flow. If barley is unavailable, look into the cost benefits of feeding maize grain meal, which causes no animal health problems on its own, unless fed at more than 3 kg per cow per day. Feeding 2 kg of PKE **with** 2 kg of maize meal to hungry cows lacking roughage can cause severe digestive problems.

The best and most profitable feeds are correctly limed and fertilised pastures with, if necessary, limited pasture silage or limited maize silage and hay - always with an optimum soluble mineral mix of ten needed elements in the drinking water.

Over-stocking costs you, your cows and your pastures. Because of it, PKE sometimes has to be bought. See Dairying > Profit.

The above was sent to New Zealand's Straight Furrow and the Waikato Times, but not published, I presume because get frequent large colour PKE advertisements.

This problem of not getting the correct information is another of the those with which farmers have to live, i.e., commercialism and greed, rather than service to the farming industry on whose back they ride.

Get your animal stocking rate correct by using the 'Dairy cow numbers for max profit' spreadsheet so you don't have to buy expensive non-profit making feeds in dry spells. If you see that you'll need more feed, cull low producers and aim early to buy silage before it's all sold, but check the quality. Pasture silage has double the feed value of maize silage, so is worth a lot more per tonne.

Ruminants are not made to digest grains, which, if fed at more than two kg per day or less for many years, ruins their stomachs. Junk feeds like PKE and bad concentrates do more damage more quickly.

Feeding manganese in minerals can cause dreadful health problems. See Elements > Manganese, and the Human Health one, and in Testimonials.