

VET LSD®

VETERINARY LIVESTOCK SURVIVAL DRENCH

Product Manual

HIGH on performance, survivability, and profit!



LIQUID CONCENTRATE

VETLSD[®]

VETERINARY LIVESTOCK SURVIVAL DRENCH

HIGH on performance, survivability, and profit!

The unique New Zealand animal supplement for
lambs/hoggets/ewes/rams/dairy cows/calves

Better reproductive performance
Improved stock health
Increased lamb survival

**FARMER
APPROVED**



VETERINARY FORMULATION
1ml concentrate contains

Vitamin A = 10,000iu
Vitamin D = 5,000iu
Vitamin E = 100iu
Vitamin C = 30mg
Selenium = 1mg
Chromium = 1mg
Elemental Iodine = 100mg

1 LITRE

500 EWE DOSES
100 COW DOSES

LSD[®]
LIMITED

MADE BY NEW ZEALAND

HIGH on performance, survivability, and profit!

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VETLSD®

VETERINARY LIVESTOCK SURVIVAL DRENCH



Introduction to Vet LSD®



VETERINARY LIVESTOCK SURVIVAL DRENCH

VetLSD® was first developed as a vitamin/trace element water soluble powder in 1998. It was developed because a need was seen for most of the ingredients but principally Iodine and Vitamin E, for ewes in late pregnancy. There were no commercial or affordable products available at that time that contained both.

The need for iodine was obvious with many lambs post mortemmed at the time showing sub clinical goitre. The evidence for Vit E on the other hand was less obvious and the post mortem lesions in new born lambs far more subtle. However the response to supplementation of ewes immediately prior to lambing, where Vit E deficiency suspected, was very obvious. This was a compelling argument to look further into a means of easily and cheaply diagnosing a likely deficiency in lambs by testing ewes prior to lambing.

In 1996 an investigation was carried out looking at the Vitamin E status of ewes and lambs in Marlborough (1). This investigation demonstrated that the Vitamin E status of lambs could be low in some flocks grazing hill country and low land pastures in Marlborough and that low Vitamin E status could affect lamb survivability, especially in the first days of life. It also showed that whilst the serum activity of CK in control lambs did not suggest clinical white muscle disease, which is normally associated with values in excess of 1000 iu/l (2, 3), a significant decrease in CK activity in lambs from ewes treated with Vitamin E prior to lambing did occur. This suggested that differences in cell membrane permeability was occurring during the experimental period, even in the face of adequate selenium status. The investigation did confirm that significant transplacental transfer of Vitamin E does occur and that an oral drench to ewes shortly before lambing could influence lamb Vitamin E levels some weeks later.



While there are a number of subtle post mortem changes in new born lambs indicating Vitamin E deficiency, being able to predict a potential Vitamin E deficiency in new born lambs is difficult, for several reasons. This includes the cost of analysis, the poor correlation between ewe serum levels pre-lamb and that of their newborn lambs (1), and the fact that the occurrence of a Vitamin E/Se deficiency in ewes and their newborn lambs is probably influenced by many factors apart from Vitamin E and Selenium status. These may include low pasture cobalt, low environmental temperatures and other non-specific stressors including shearing, a declining plane of nutrition during late pregnancy and high PUFA (poly-unsaturated fatty acid) concentrations in pasture or other feeds. Such factors may make a single reference range inappropriate for all management situations. The accepted value for serum vitamin E (α -tocopherol) in sheep reflecting adequacy is $4.6\mu\text{mol/l}$ (4). It has been observed however that Vitamin E-responsive clinical disease most commonly occurs in sheep with serum concentrations of α -tocopherol being less than $2.4\mu\text{mol/l}$ (5).

Therefore, while continuing to look into the incidence of Vit E deficiency and for a means of easily and cheaply diagnosing this, the demand for VetLSD® was increasing. This was because of very good anecdotal reports from many quarters and from a number of 'suck it and see' trials involving dairy calves and cows, hoggets on crops, and ewes prior to tupping as well as prior to lambing.



Formulation and how to give VetLSD®

VetLSD® is a unique formulation. Its stability both undiluted and after mixing with water is dependent on the balance of all the elements in the product.

Ingredients

Each 2 ml dose of concentrate contains:	
Vitamin A	5 mg (20,000iu)
Vitamin D	10,000 iu
Vitamin E	200 iu
Vitamin C	60mg
Selenium	2 mg
Elemental Iodine	200 mg
Chromium	2 mg



'High on performance, survivability, and profit!'

Whilst we had great results with the original VetLSD® powder we had always appreciated the drawbacks of a powder. Many of the components of any vitamin/trace element water soluble powder have the disadvantage of being unstable, especially when exposed to light and water.

As a result, once containers are opened or the powder is added to water they start to deteriorate rapidly. They can also be messy to mix, especially when part packs are used.

For these reasons three years were spent looking into the development and trialing of a soluble suspension. This formulation - VetLSD® Liquid has surpassed our expectations. VetLSD® Liquid is stable when mixed with water for at least 40 days. (Graph 1) Therefore once mixed with water it can be safely left in a backpack for some time. However it should be well shaken prior to use.

It is also stable when exposed to light and added to water troughs for at least 3 days (Graph 2). Stock can easily be treated by adding VetLSD® Liquid to water dispensing systems – Dosatrons etc. or added directly to water troughs. It will however tend to settle out in a water trough when there is no water movement. The occasional agitation may be necessary. Although the concentrate tends to become 'thicker' when cold, this can be remedied by warming the VetLSD® containers in hot water before mixing.

VetLSD® mixes readily with some anthelmintics, but users mix VetLSD® with any drench at their own risk and any mixed product should be used in one session and not stored. Do NOT mix with Closantel containing drenches.

Mode of Action

Vitamin E and Selenium

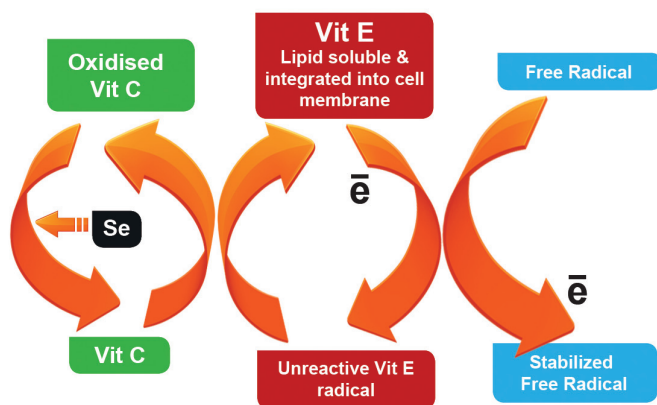
Vitamin E and Selenium are implicated in many cellular functions and have a role in fertility, the immune response and muscle function. One of the prime roles Vitamin E has is as an antioxidant inside the cell wall to prevent damage from cellular metabolism. With a diet that is low in Vitamin E; such as from hay, silage, brassicas and cereals, or rapidly growing spring pasture that can be high in polyunsaturated fatty acids, the requirement for Vitamin E is likely to be much higher than can be supplied from the normal diet. The stress associated with inadequate nutrition, inclement weather, shearing and other non specific stressors on top of pregnancy, birth and lactation can also increase the requirement for these nutrients.

Even where there is selenium supplementation, without adequate Vitamin E levels, free radical production from cellular metabolism will lead to muscle damage and deaths (20,21,22,23,24,25) or poor reproductive performance or a poor immune response to disease challenge. Trials with Vitamin E and selenium supplementation have demonstrated a positive influence on:

- Fertility in sheep and cattle (7, 9, 11, 12,)
- Lamb survival (7, 10, 13)
- Growth and resistance to disease (8, 4, 14, 15, 16, 17)

Vitamin A, D and C

Selenium and Vitamin E overlap in function with other nutrient antioxidants such as Vitamin C and Vitamin A. Vitamin C acts synergistically with Vitamin E and is important in the regeneration of Vitamin E.



Vitamins A and D, the other fat soluble vitamins present in VetLSD® are implicated in many aspects of bone growth and the regulation of calcium and phosphorus.

Vitamin A is present in fresh green feeds such as pasture, but low in dried or cured feeds such as hay. Vitamin D is produced in the body in the presence of sunlight. Both vitamins may be deficient or at low levels during the winter months where there is little fresh pasture and low sunlight hours.

Calves born to deficient cows are often weak, unthrifty, dull, and are more susceptible to scours and pneumonia.

Iodine

The need for iodine is well known, particularly when large volumes of brassicas are being fed as winter supplement or in areas that are iodine deficient. Iodine supplementation has been shown to improve both conception rates and perinatal lamb survival. (18, 19). The use of potassium iodide or a long acting iodine injection is a recognised treatment in these circumstances. VetLSD® will provide adequate supplementary levels when given on a monthly basis beginning pre-calving in cows or prior to tugging, at scanning and a month prior to lambing in ewes.

Chromium

Chromium is a micro-nutrient that is involved in the metabolism of glucose which is the prime energy source for cells. It has been called a "glucose tolerance factor" because it assists in the uptake of glucose and the partitioning of glucose to fat or muscle.

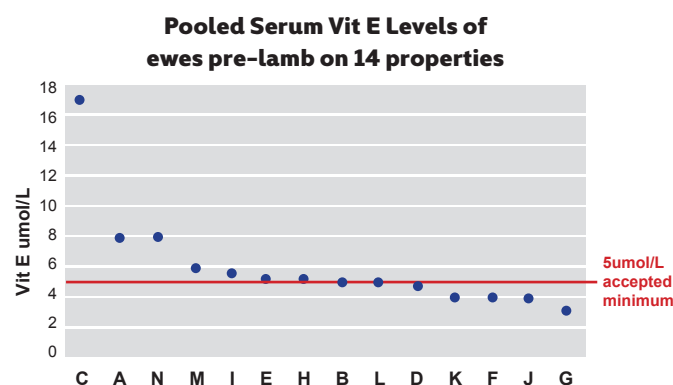
The energy partitioning effect of chromium has seen it being used as a supplement to increase protein deposition and reduce fat in both humans and animals. (26)

Trials have also shown that chromium can have an effect on the immune response and may improve somatic cell counts and udder health. The humoral and cell-mediated immune response can be positively affected by chromium supplementation. (27, 28, 29)

Evidence of Low Vit E and Iodine levels in stock

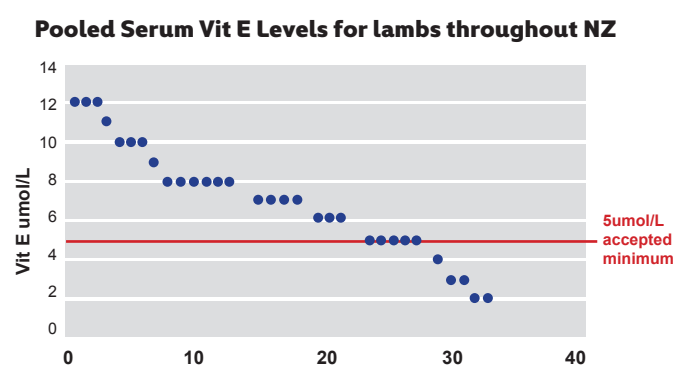
Ewes Pre-lamb

Serum samples were collected from ewes shortly prior to lambing on 14 different sheep farms in Marlborough in 2003. 5-6 bloods were collected per property and the samples pooled. Ewes on most properties at this time had low serum Vit E Levels with several below the accepted minimum level of 5umol/L.



2-4 Day Old Lambs

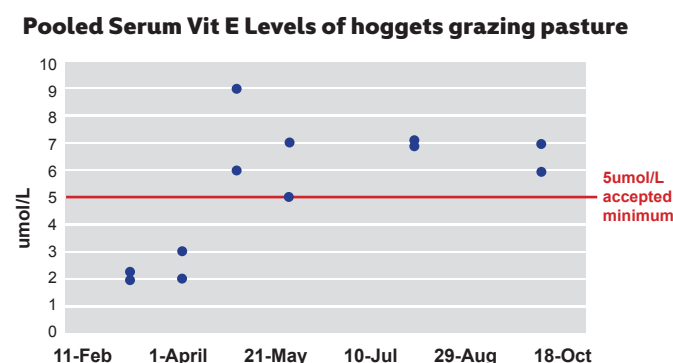
In 2003 five bloods were collected from lambs on 33 different properties throughout New Zealand. These were collected from 2-4 day old healthy lambs and the samples pooled for each property. Despite being fit and well fed lambs at least one third of the samples were 'low'.



Hoggets on pasture

In 2010 10 hoggets in a mob of hoggets were identified into 2 groups and bled at regular intervals from March until September.

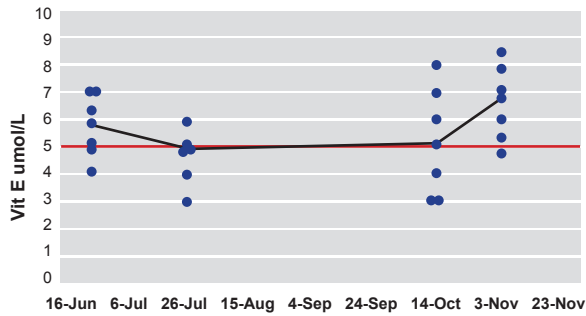
In this mob vitamin E levels were very low in the Autumn.



Rams and hoggets with WMD or reluctant to move and Vit E deficiency confirmed in Marlborough.

Tests done. Normal values	CPK <300 IU/L	Serum Se >98 nmol/L	Liver Se >450nmol/kg	Serum Vit E >5umol/L
Ram hoggets on hill pasture and vineyard grazing	17400	407	2310	3
3 week old lamb	>246,000		1170	3
Lambs at tailing with WMD			1730	2
Lambs on brassicas 1 week after weaning and shearing	128,000		876	4
Hoggets 1 month after into a vineyard	70,000		470	5
Unweaned lambs on Lucerne				2
Parasitized lambs at weaning on lucerne				4

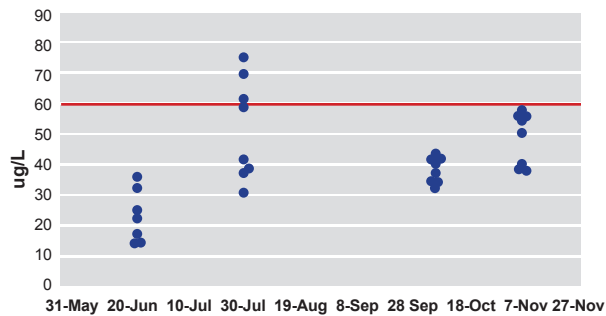
Serum Vit E of individual hinds on pasture in winter



Deer during the winter

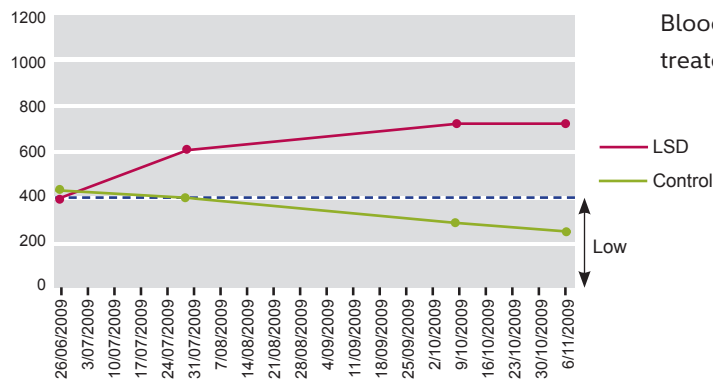
Because a herd in North Canterbury had had problems with high hind mortality during the winter a study was done in 2008 and 2009 to see what was happening with the blood levels of vitamin E, iodine, selenium and copper.

Serum Inorganic Iodine of individual Hinds on pasture



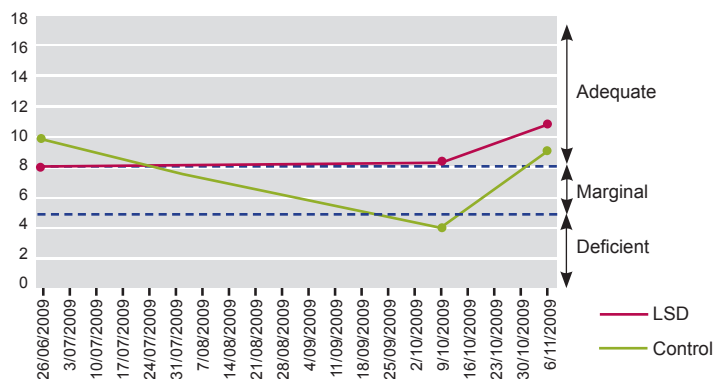
Both intake of Iodine and serum Vit E levels were low for a number of the hinds much of the time.

Blood/Serum Se (nmol/L)



Blood Copper and Selenium levels were elevated in LSD treated hinds.

Blood/Serum Copper



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Summaries of investigations and trials undertaken with VetLSD®

- Table 1.** Iodine Response Trial in North Canterbury. 2005. FITT funded Trial. Davidson BI.
- Table 2.** Scanning rate trial in Marlborough. (Unpublished) Anderson PVA 2005.
- Table 3.** OptiLamb Analysis of Marlborough flocks 1993-2007. (Ongoing and unpublished) Anderson PVA 2007
- Table 4.** Bobby Calf Growth Rate Trial. (Unpublished) Anderson PVA 2002
- Tables 5 & 6.** Effect of supplementation of lactating dairy cows with VetLSD® (6)
- Table 7.** Immune response of calves when vaccinated and supplemented with VetLSD®
- Table 8.** Immune response of lambs when vaccinated and supplemented with VetLSD®
- Graph 1.** Decay rates of VetLSD® (Vits ADE & Se) diluted in water and kept in a container (drench pack)
- Graph 2.** Decay rates of VetLSD® (Vitamin E and Iodine) in an open concrete water trough.

Trials using VetLSD®

VetLSD®, through supplementation of the minerals; selenium, iodine, chromium and fat soluble vitamins; A, D and E has been found, where a micronutrient deficiency is suspected, to have a beneficial effect on reproductive parameters such as calving spread and total number of cows calved within dairy herds, and in sheep flocks to have a positive effects on lamb losses between scanning and tailing, and ewe fertility. It has also been found to improve the growth rate of 'bobby' calves.

Table 1. FITT trial in North Canterbury. 2005.

Affect of three different treatments on scanning%, lambing %, tailing %, and thyroid wts.

HEATHFIELD	Scanning %	Lambing %	Losses	Thyroid weights	Body weights	Thyroid/Bdy wgt ratios
Potassium Iodide	119	72	40	1.2	3.50	0.33
Flexidine	120	70	41	1.1	3.77	0.28
LSD	125	86	31	1.6	4.08	0.40
Control	117	77	34	4.5	3.77	1.20

Table 2. Trial investigating the effect on scanning performance of a pre-tup drench of VetLSD®

439 2T ewes were drenched orally at tupping with 280mg Potassium Iodide while 332 were drenched with VetLSD®. Both groups scanned 116%. However there was trend towards a better early conception especially with the twin bearing ewes.

% of ewes conceiving in each cycle

	Iodine	LSD
1st cycle	70.1	72.5
2nd cycle	21.2	22
3rd cycle	8.7	5.5

% of twin bearing ewes conceiving in each cycle

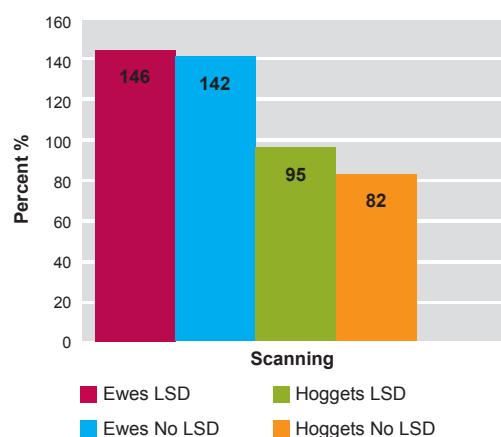
	Iodine	LSD
1st cycle	68.2	73.4
2nd cycle	23.9	21.9
3rd cycle	7.9	4.7

Table 3. OptiLamb Analysis of Marlborough flocks 1993-2007

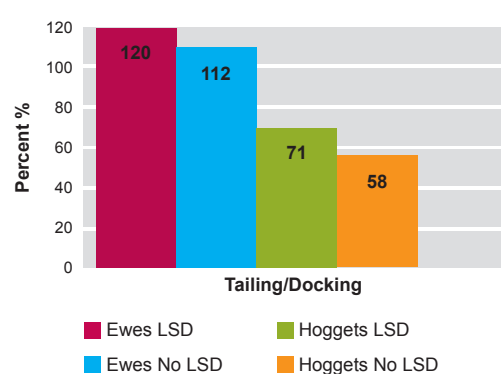
To date 80 flocks of all breeds have had their reproductive performance analysed by the OptiLamb programme. Some properties have had their performance analysed since 1993 when many first started scanning. Therefore these results are from 80 properties that have had their performance analysed yearly for nearly 20 years. OptiLamb is capable of doing a univariate analysis comparing the performance of all flocks in the years that they carry out one management factor with all flocks in the years that they do not. In this case the performance of flocks in the years that they used VetLSD® has been compared with all flocks when they have not used it.

	Scanning %	Tailing/Docking %	% Lamb loss
LSD (2T & MA)	146		18
No LSD (2T & MA)	142		21
LSD (Hoggets)	95		25
No LSD (Hoggets)	82		29

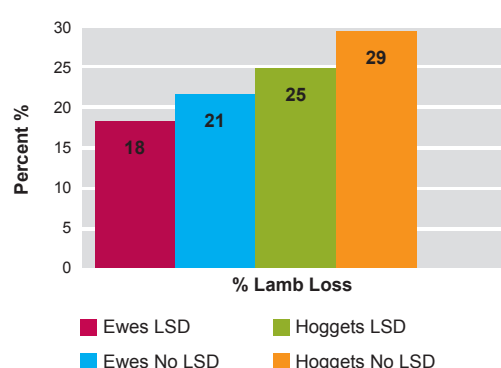
OptiLamb Analysis - Scanning % (1993 - 2006)



OptiLamb Analysis - Tailing/Docking % (1993 - 2006)



OptiLamb Analysis - Lamb Loss % (1993 - 2006)



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Summaries of investigations and trials undertaken with VetLSD[®] continued...

Table 4. Bobby calf trial Marlborough 2001

100 calves were in this trial. On arrival they were split into even groups of 10. The calves in the treatment groups were dosed with 10mls LSD[®] on arrival. This dose was repeated once weekly until weaning. The trial found that by 10-12 weeks the treated calves had on average gained an extra 3.2-kg over the controls. i.e. they gained an extra 56gm/day. It was observed that the treated animals "appeared healthier, were more lively and had less scours". It was also noticeable that all the treatment groups started on the hard feed earlier and consumed far more straw and meal.

Weight gain response to VetLSD[®] supplementation in Bobby Calves

	Week 1	Week 3	Week 8	Week 12	Gain	Dif. in LSD over Control	gm/d
LSD Gp A	39.8	46.8	64.5	85.1	45.3	4.4	
Control A	39	49.2	63.4	79.9	40.9		52
	Week 1	Week 3	Week 9	Week 11			
LSD Gp B	41.2	46.2	71	81.4	40.2	-2.4	
Contol B	39.1	45.1	71.2	81.7	42.6		-31
	Week 1	Week 3	Week 10				
LSD Gp C	36.7	41.7	74.8		38.1	6	
Control C	36.9	40.4	69		32.1		107
	Week 1	Week 3	Week 10				
LSD Gp D	38	44.6	77.3		39.3	4.8	
Control D	41.5	44.6	76		34.5		85
	Week 1	Week 3					
LSD Gp E	37.2	42.1			4.9	1.4	
Control E	38.5	42			3.5		66

Av =3.2kg

Av =56gm/d

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Growth Rate Calves Group C

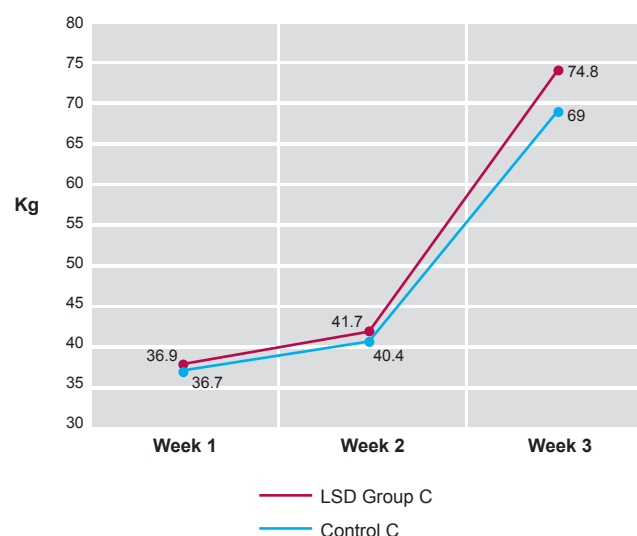


Table 5. Summary of supplementing dairy cows with VetLSD 2002-2003

Blenheim Trial 2002 - 2003		
Dairy herd - Treated precalving and a monthly intervals.		
	LSD	Control
Total	41	46
Total held to 1st service	29	25
% held to 1st service	71%	54%
Not in-calf	3	9
% Not in-calf	7%	19%
Total calving	37	35
Of those calving % held to 1st service	78%	71%

Table 6. Summary of supplementing dairy cows with VetLSD 2003-2004

Blenheim Trial Repeated 2003 - 2004						
	Control			Treated		
	No	No Total	%	No	No Total	%
Oestrus D21	92	99	92.9	90	94	95.7
Oestrus D28	97	99	98.0	92	94	97.9
Conceived to 1st Service	37	90	41.1	43	86	50.0
2nd Service	32	53	60.4	25	43	58.1
Pregnant D28	45	87	51.7	56	84	66.7
Pregnant D56	62	87	71.3	73	84	86.9
Not Pregnant (Final)	19	98	19.4	7	94	7.4
PSM to 1st Service (Days)	10	1		9	1	
PSM to conception (Days)	26	4		19	1	

Treatment significantly increased final pregnancy rate (92.6% treated v 80.8% controls) and the interval from the start of the seasonal breeding programme to conception was shorter for treatment than control cows (19 versus 26 days).

Summaries of investigations and trials undertaken with VetLSD[®] continued...

VetLSD[®] and Clostridial vaccine responses

Table 7.

Antibody response of 6 week old calves to Clostridial vaccination. LSD drenched calves vs controls

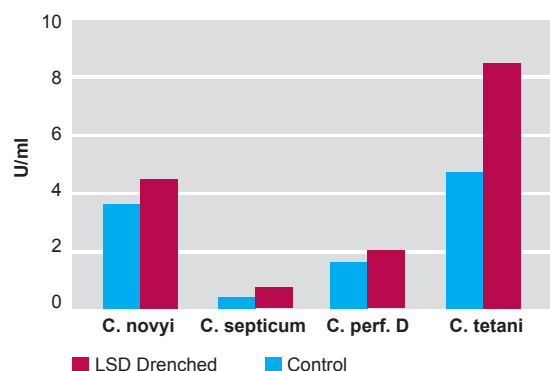
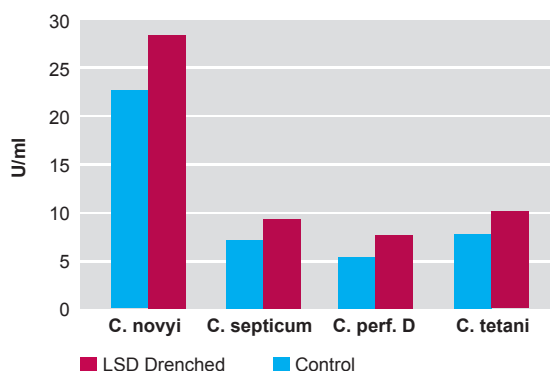


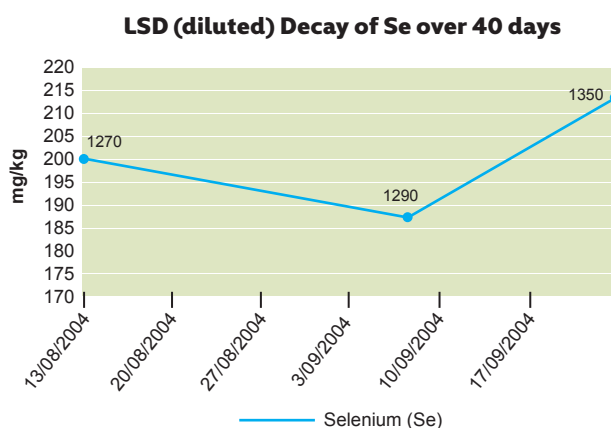
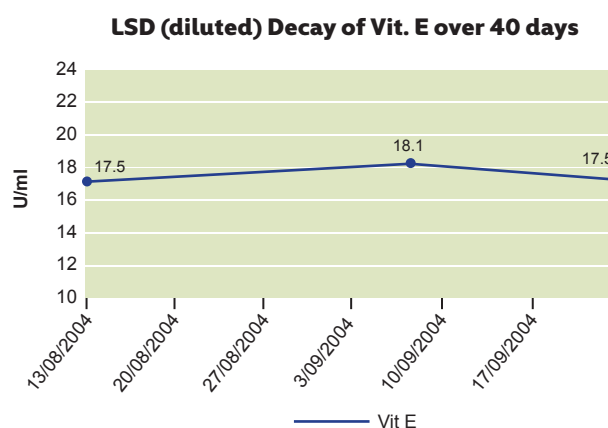
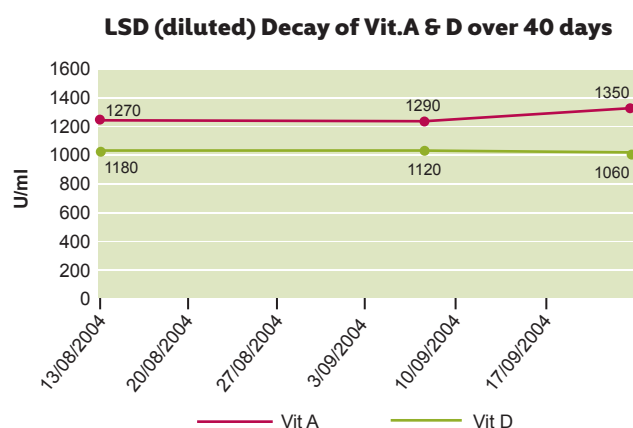
Table 8.

Antibody response of 12 week old weaned lambs to Clostridial vaccination. LSD drenched lambs vs controls



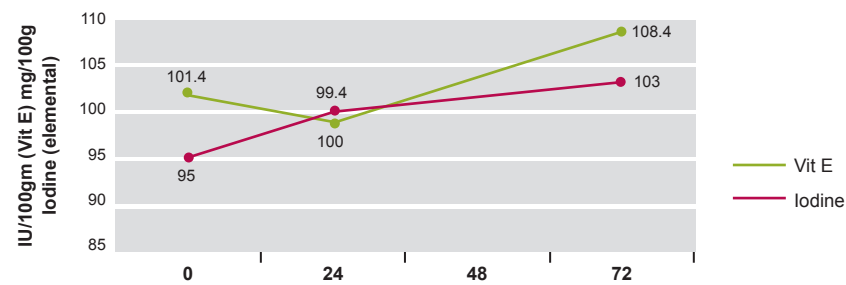
The antibody response of lambs and calves was greater for all components of the Clostridial vaccines when treated with VetLSD[®].

Graph 1. Decay rates of VetLSD[®] (Vits ADE & Se) diluted in water and kept in a container (drench pack)



Graph 2. Decay rates of VetLSD® (Vit E and Iodine) in an open concrete water trough

Iodine and Vit E levels of diluted LSD (water trough) - Decay rate (hrs)



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The unique New Zealand animal supplement for
lambs/hoggets/ewes/rams/dairy cows/calves

Better reproductive performance
Improved stock health
Increased lamb survival

**FARMER
APPROVED**



VETERINARY FORMULATION
1ml concentrate contains

Vitamin A = 10,000iu
Vitamin D = 5,000iu
Vitamin E = 100iu
Vitamin C = 30mg
Selenium = 1mg
Chromium = 1mg
Elemental Iodine = 100mg

1 LITRE

500 EWE DOSES
100 COW DOSES

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