

擠乳機裝置乳質感測元件之好處 On-line Sensor to Detect Milk Quality

台灣奧利安公司酪農事業部
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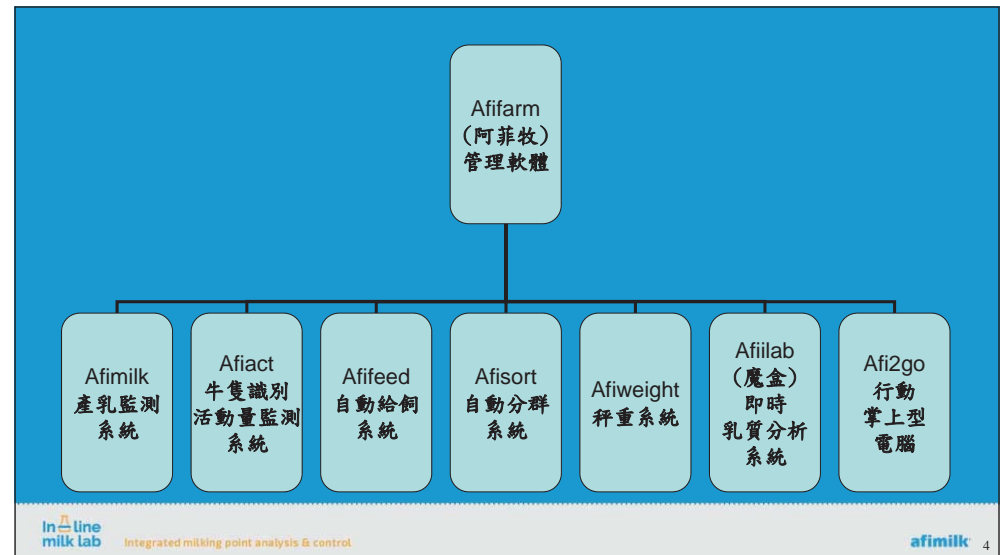
台灣奧利安產業股份有限公司

酪農事業部 蔡易緯

主要產品：

ORION擠乳機(魚骨、賽馬、箱式)
afimilk 牧場飼養管理系統(WAİKATO圓盤擠乳機)
JAY LOR 日糧混合攪拌機 TMR
義大利製 HVLS大型吊扇
日本生乳抗生素快篩試紙

afimilk (阿菲金)來自以色列的乳牛數據管理分析專家，於1977年開始投入數據化管理軟體及數據收集硬體的開發，為全世界第一家投入資訊化數據化管理乳牛牧場的先驅，現今於全球六十餘國的客戶在使用afimilk的設備及軟體。



afilab 在線即時乳成份分析儀(魔盒)

優勢

- 安裝於擠乳室
- 無需增大擠乳機真空泵尺寸
- 無需採樣
- 牛奶流動無障礙
- 內部無耗材，無需添加濟
- 自動校正
- 全群及個體化數據收集
- 異常狀態警報提醒(早期發現，早期處治，降低損失)
- 血乳，中止擠乳
- 高、低品質生乳分流
- 每天每次擠奶就能獲取相關數據

afilab 在線即時乳成份分析儀(魔盒)

收集數據內容

- 乳脂
- 乳蛋白
- 乳糖
- 總固形物
- 尿素
- 血乳
- 體細胞，其中體細胞又可分成四個階層
 - a. 體細胞 < 20萬/毫升
 - b. 體細胞在20萬-40萬/毫升
 - c. 體細胞在40萬-80萬/毫升
 - d. 體細胞 > 80萬/毫升



In-Line Milk Lab 線上牛奶實驗室-魔盒

Integrated milking point analysis & control

乳質成份分析管理系統



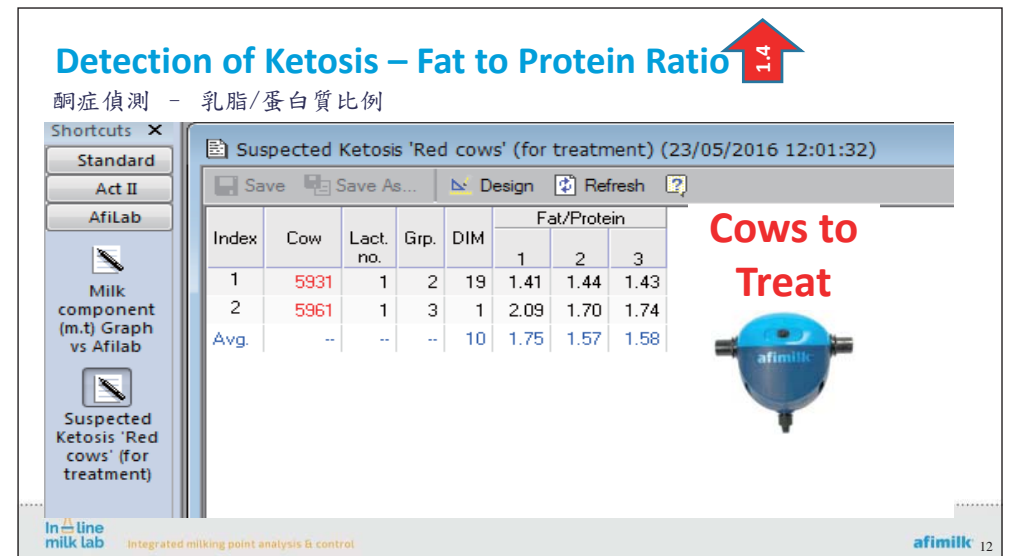
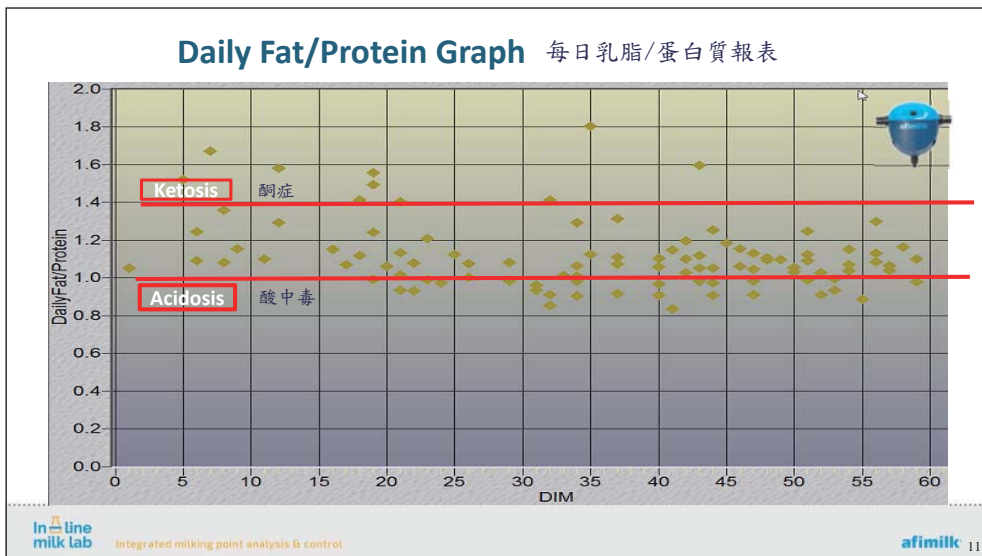
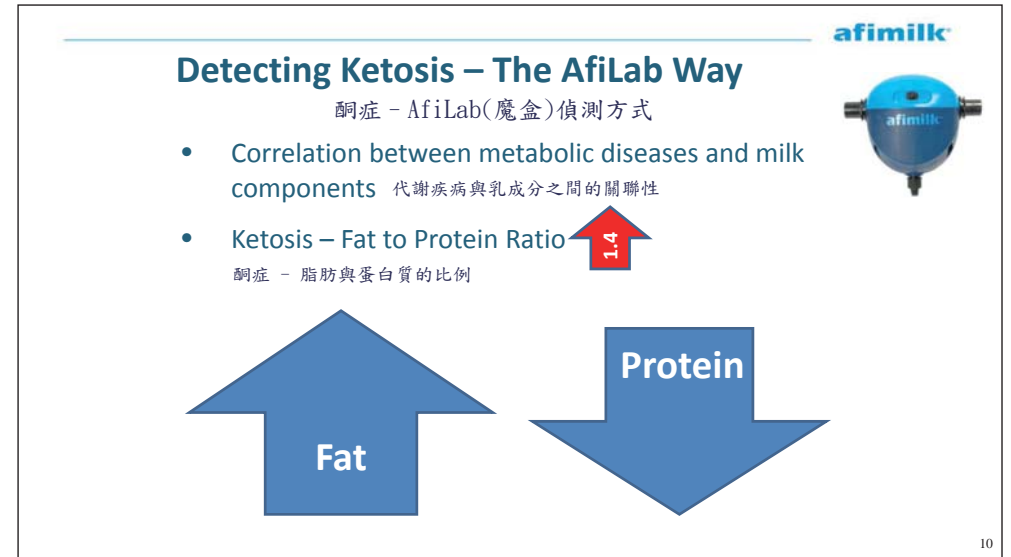
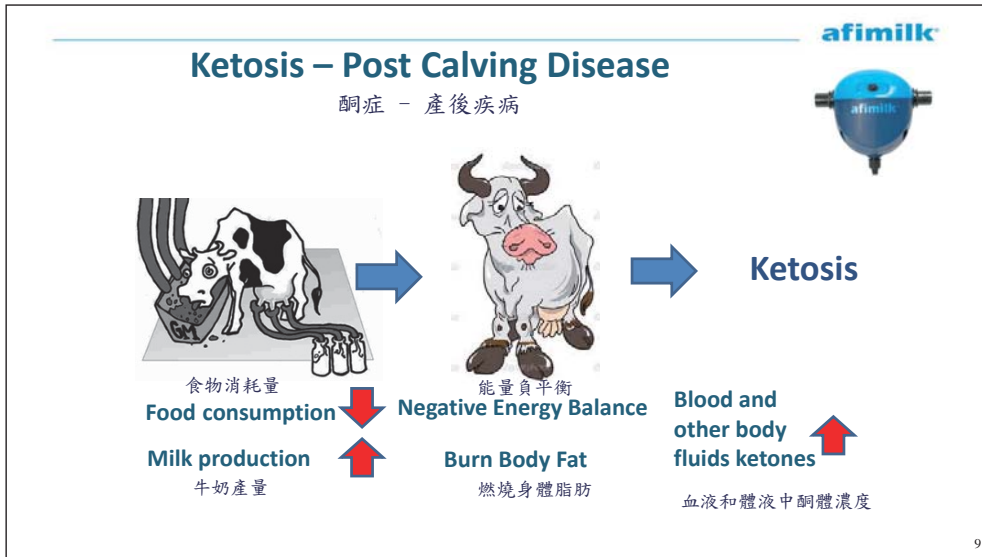
Improved Health 改善健康



Timely identification of changes in milk yield and solids (Fat, Protein ,Lactose) enables early detection of health problems. On line Blood Detection (stop milking).

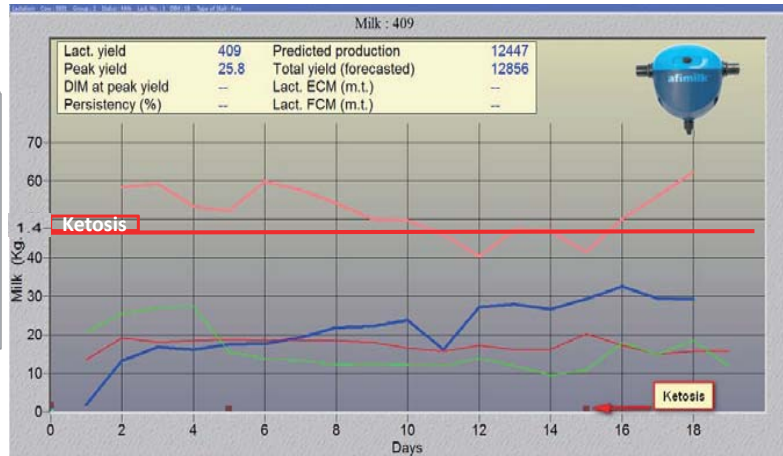
及時監測奶量和乳成分(脂肪,蛋白質,乳糖)的變化,及早發現健康問題。

線上血奶偵測功能(立即停止擠奶)。



• Cow 5931

- Milk
- Milk Prediction
- Events
- ECM (m.t.)
- FCM (m.t.)
- Conductivity
- Milking Time
- Heat Indicator
- Activity
- BCS
- Fat
- Fat/Protein
- ECM
- FCM
- Blood
- SCC
- Fat (m.t.)
- Lactose



IMPROVED HEALTH - KETOSIS DETECTION 改善健康 - 酮症檢測

Damage associated with Negative Energy Balance (NEB) / ketosis 負能量平衡 (NEB) / 酮症相關的損失

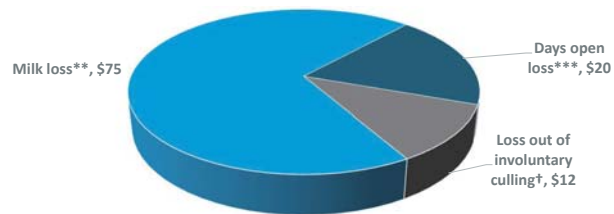
- 20%-50% of your herd is likely to suffer of NEB* 20%-50%的牛群很可能有NEB
- Average yearly loss >\$/€ 100 per cow in herd 牛群平均年損失>NT\$4000/每頭
- Yearly milk loss alone is estimated at 220-260 Liter per ketosis cow 據估計, 酮症乳牛每年損失的奶量約220~260公升。
- Early detection without Afilab is challenging 沒有魔盒系統, 早期檢測是具有挑戰性的。

Over 85% detection with Afilab

魔盒-超過85%的偵測率

Ketosis damage 酮症的損失

Average loss associated with ketosis per cow in herd (\$/€) 平均損失成本\$\$\$ / 每頭



* 4 herds (NY and WI) 1717 cow tested (McArt, 2011), Duffield (2001)

** Negative energy balance in randomly selected Israeli dairy herds (2008-2014), Oded Nir

*** Walsh et al. (2007) JDS

† The costs of common diseases of dairy cattle (2008), Charles Guard, DVM, PhD San Diego



IMPROVED HEALTH - KETOSIS DETECTION 改善健康 - 酮症檢測

Early detection of ketosis for healthier cows 早期監測代謝疾病/酮症、酸中毒



- Providing alerts for fat-to-protein ratio above a level indicating the need for treatment against ketosis 提供脂肪與蛋白質比例高於水平的警報, 挑出需要治療以避免酮症的牛隻。
- Early detection and treatment of ketosis results in a well-managed energy balance status 早期檢測及治療酮症, 以致達到良好的能量平衡狀態。
- Allows voluntary/smart culling, ensuring the future of the herd 能夠做到自願/精明的淘汰, 確保牛群未來。

COST
\$1.8
billion
in USA
annually



IMPROVED HEALTH - MASTITIS DETECTION 改善健康 - 乳房炎偵測

Mastitis detection for minimizing damages of udder disease 乳房炎偵測功能-將乳房疾病損失最小化



- Effective only with accurate detection 準確的監測結果才能達到最高效率
- Afimilk In-Line Milk Lab - the only accurate solution 阿菲金線上乳質實驗室(魔盒系統)-業界最準確的解決方案

\$130 saving per cow/year with Afimilk*

*Gelb et. al

Mastitis Detection Report 乳房炎偵測報表

Index	Cow	Gip.	DIM	Lact. no.	Daily yield	Daily yield %	Prod. Rate %			Conductivity %			Lactose dev. %		
							1	2	3	1	2	3	1	2	3
1	14628	18	15	4	152.7	22	-15	-39	4	2	9	0	1	-19	
2	34816	17	15	1	45.0	15	-16	51	39	19	30	18	0	2	-7
3	28601	20	17	6	113.5	-3	16	-29	10	4	18	-3	23	1	-4
4	35186	15	21	1	63.5	14	-8	-83	1	10	19	30	0	-8	-3
5	35408	17	21	1	29.7	-18	-87	-21	8	9	0	35	-44	-100	-30
6	2270	20	22	3	128.3	5	1	5	13	21	19	6	1	3	2
7	35157	17	25	1	13.5	-73	-78	-91	-52	-10	1	9	-16	-8	-23
8	35907	17	25	1	59.1	27	-10	-35	130	-19	18	7	8	9	-6
9	33815	16	27	1	24.9	29	-37	-69	196	18	21	6	-13	22	105
10	35345	16	28	1	11.2	-4	-41	-44	-22	3	5	12	-17	-20	-14
11	35492	16	37	1	57.1	13	28	-10	8	10	38	57	-10	4	-10
12	14325	19	45	3	64.3	-40	-66	-41	-23	32	12	-2	6	-1	2
13	5220	19	49	2	30.9	-67	-96	-59	-42	24	13	27	-35	-8	-23
14	4580	19	62	2	115.1	-1	-15	-10	17	13	3	0	-100	-1	-1
15	10859	16	62	5	47.0	-29	-33	-62	-40	13	8	16	-12	-12	-15
16	14992	19	62	4	111.7	0	-15	11	-3	17	-14	-4	-100	-4	-9
17	1436	20	63	3	31.8	-39	-59	0	-77	16	9	4	-100	-6	-1
18	8920	20	65	3	132.9	-3	-29	-5	15	13	4	6	-100	8	-6
19	14622	20	67	4	97.8	-4	-15	17	-11	34	1	-4	-100	3	2
20	34808	4	73	1	74.8	1	3	-10	-17	-1	-5	20	21	6	-1
21	35623	4	78	1	30.3	-63	-47	-76	-64	17	39	13	-5	-26	-27
22	33553	2	135	1	80.5	20	-6	-	35	14	25	19	1	-12	1
23	33687	21	225	1	41.0	1	9	-16	-15	-6	26	8	-2	-1	0
24	7918	1	236	1	86.4	0	14	9	-17	6	10	28	-4	-3	3
25	6726	21	344	1	37.2	8	2	-2	33	10	24	25	5	0	20
26	4640	21	564	1	39.6	36	-17	137	-3	19	18	9	-1	7	-6

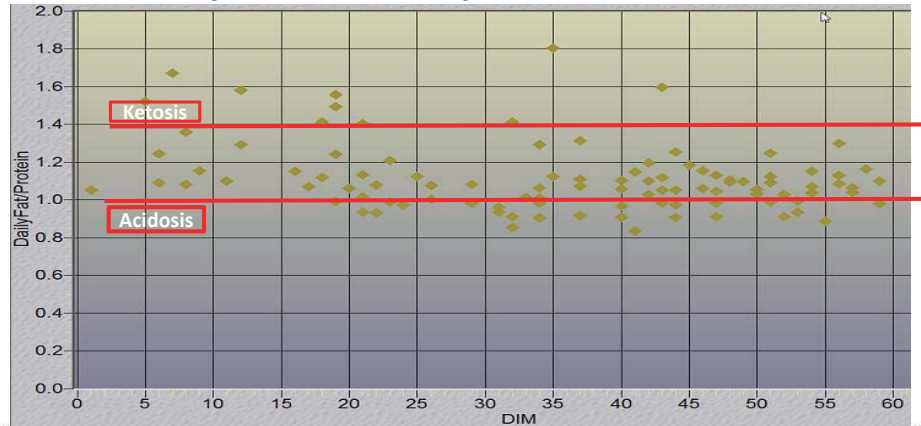


IMPROVED HEALTH - FRESH COW FOLLOW-UP 改善健康-新產牛健康狀況追蹤

Fresh cow follow-up for optimizing the milk curve 新產牛追蹤-使泌乳曲線最佳化

- Monitoring production during early stages of lactation is especially critical 在泌乳期初期監測產量是重要且關鍵的
- Early attention/identification of animals failing to perform gets them to the expected production curve 及早注意、辨識到泌乳表現不佳的牛隻,使其有機會再達到預期的泌乳曲線

Daily Fat/Protein Graph 脂肪/蛋白質 日報表



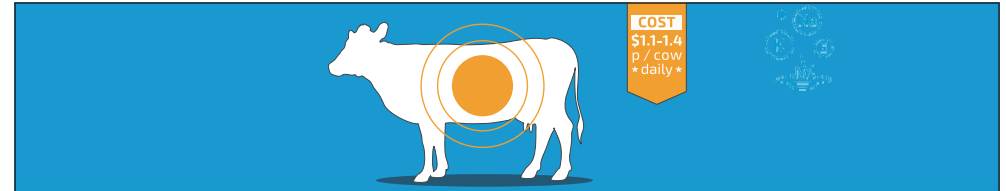


Efficient Nutrition 有效的營養



The immediate effect on milk solids concentration enables early detection of nutrition deficits and reduced feed quality

乳固體濃度的即時偵測，能夠及早發現營養的不足或飼料品質的下降



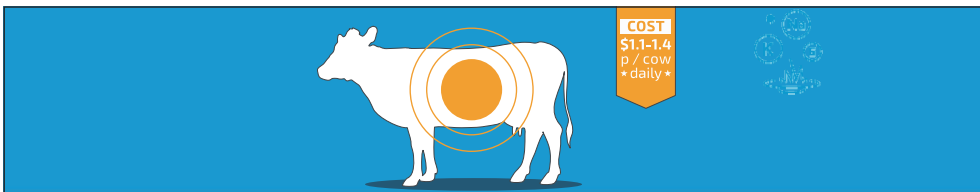
EFFICIENT NUTRITION - SARA DETECTION 亞急性瘤胃過酸症

Damage Associated with Sub-Acute Ruminal Acidosis (SARA) 與亞急性瘤胃過酸症相關的損失

- Incidence of SARA: 19% to 26% in early and mid-lactation dairy cows* 發生率：19%-26% 泌乳初期和中期
- Cost \$ 400/cow/lactation per affected cow: \$1.12 up to \$1.4 (US) per day** 損失約：NT\$12,000每頭/泌乳期
- "It has been estimated that the economic costs associated with SARA are \$ 0.5 - 1 billion annually. These losses are mainly the result of reduced milk production, decreased efficiency of milk production, premature culling and increased death loss"***

據估計，與SARA相關的經濟成本每年約5-10億美元。這些損失主要來自於產奶量減少，生產效率降低，過早淘汰和死亡增加。

* Garrett et al., USA (1997)
** Stone, USA (1999)
*** Krause and Oetzel, USA (2005)



EFFICIENT NUTRITION - SARA DETECTION 亞急性瘤胃過酸症

Sub-Acute Ruminal Acidosis (SARA) detection for preventing production losses

亞急性瘤胃酸中毒 (SARA) 檢測，制止產量損失。

Indication of milk fat reduction on a group level

Feed correction

Preventing production losses

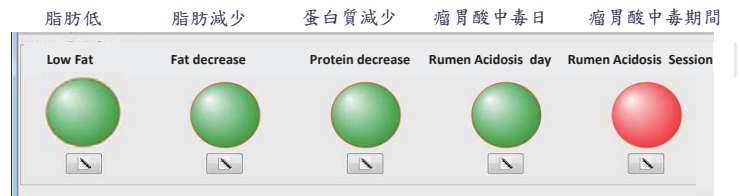
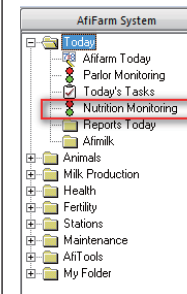
- Early detection is challenging 早期發現是有挑戰性的
- Prevent complications such as laminitis 預防併發症，如蹄葉炎。

Over 90% detection with AfiLab, very high recovery rate

魔盒有超過90%的偵測率! 痊癒率非常高!

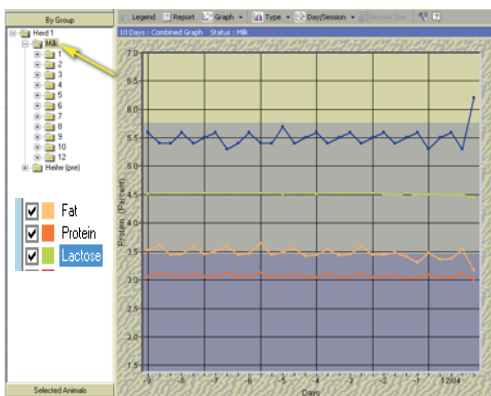
Feeding Monitoring - Detect Problems

飼養監測 - 察覺問題

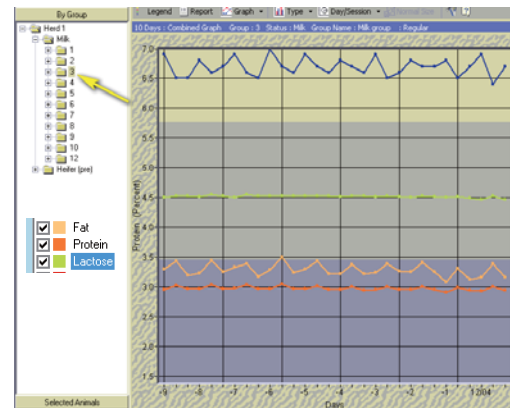


3000 Milking Cows – Fat , Protein , Lactose

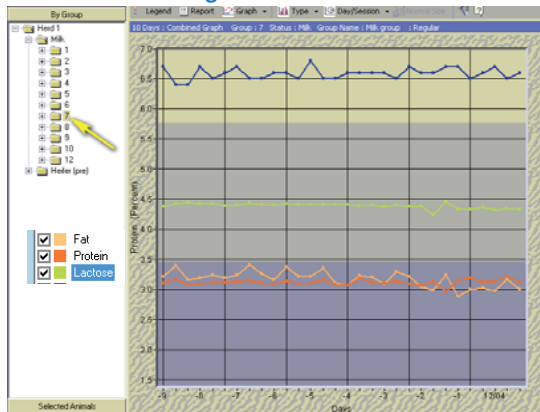
3000頭泌乳牛 - 脂肪/蛋白質/乳糖



Group 3 – 56 Daily Average Milk – Fat,Protein,Lactose 300 milking cows 2+3 lactation 124 DIM



Group 7– 56 Daily Average Milk – Fat,Protein,Lactose 300 milking cows 2+3 lactation 120 DIM



Two Similar Groups, same amount of cows ,same milk yield, same DIM
Big Difference in COMPONENTS

兩個相似的組別：泌乳牛頭數相同、產量相同、泌乳天數相同
為什麼乳成份差異甚大？

7 Group **WHY?** **3 Group**



Group 7 - High Percentage Of Cows With Low Fat

第7組 - 低脂肪泌乳牛的比例很高



Index	Status+group	Total animals	Daily yield	Daily avg. yield	Daily yield < %	Daily Fat[%]	Daily Avg. Fat[%]	% suspect acidosis	Low fat cows
1	101	128	46.8	65.6	-29	3.72	3.91	--	--
2	102	154	73.2	104.7	-30	3.85	4.03	0.6	1
3	103	309	124.0	126.7	-2	3.23	3.28	2.9	9
4	104	357	52.5	81.4	-35	3.64	3.65	0.8	3
5	105	351	58.6	90.1	-35	3.58	3.61	0.6	2
6	106	357	47.7	73.5	-35	3.76	--	--	--
7	107	308	123.3	123.8	0	3.05	3.17	14.3	44
8	108	313	122.4	123.7	-1	3.28	3.30	2.9	9
9	109	342	77.5	88.6	-13	3.44	3.45	0.3	1
10	110	352	87.5	89.5	-2	3.43	3.46	0.6	2
11	112	13	62.3	88.4	-30	3.60	3.63	--	--

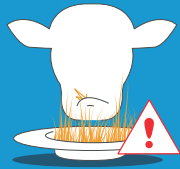


EFFICIENT NUTRITION 有效的營養

Precise feeding management for reducing feed costs

精確的餵飼管理，降低飼料成本。

- Measuring milk fat and protein production, AfiLab allows for accurate planning of feeding regimes and identifies the effects of any change in feed
- 偵測乳脂和蛋白質的產量，AfiLab魔盒讓您能夠規劃精準且有效的餵飼方案，並時時監測任何變化的影響。



EFFICIENT NUTRITION 有效的營養

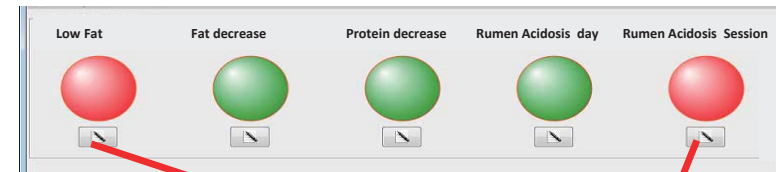


Alerts of reduced feed-quality for preventing losses in milk production

飼料質量降低的警報，以避免牛奶產量損失。

- Detecting changes in milk solids, indicating deviations in feed consumption at early stages to allow corrections
- 偵測乳成份的變化，提供飼料消耗量的偏差值，使管理者能盡早做調整。
- Reduction of damage associated with health, reproduction and milk quality
- 減少與健康、繁殖、牛奶品質相關的損失

Feeding Monitoring - Detect Problems 餵飼監控-偵測問題



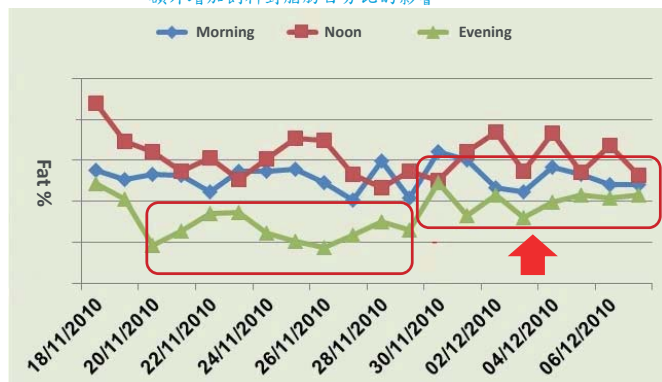
Gr	Number of cows	DI M	Daily Yield	Daily Fat[%]
1	117	104	33.08	3.37
2	97	359	30.11	3.87
4	106	201	37.20	3.50
5	106	200	37.04	3.49
6	105	211	39.11	3.45

Gr	Number of cows	Percent of cows with low fat s.1	Percent of cows with low fat s.2	Percent of cows with low fat s.3
1	117	4.27	0.85	3.42
2	97	0.00	0.00	1.03
4	106	3.77	1.89	1.89
5	106	11.32	1.89	1.89
6	105	8.57	3.81	2.86

Small Adjustments Can Make Changes 稍作調整即可改變

Impact of additional feed delivery on fat percentage

額外增加飼料對脂肪百分比的影響



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In-line Milk Lab - Alternatives Comparison 線上牛奶實驗室 - 替代比較

Topic 項目	Standard 一般檢測	In-line Milk Lab 魔盒檢測
Ketosis detection 酮症偵測	Cow-side test 至牛隻旁邊	Real time indications enable better control of energy balance status, allowing for higher milk production, better fertility and lower involuntary culling 及時偵測功能可以使能量平衡狀態控制得更好, 並提高奶量、繁殖率, 減少非自願性的淘汰。
Fresh cow's monitoring 新產牛隻監控	None 無	Detection of common postpartum metabolic and infectious disorders 偵測產後的新陳代謝及傳染性疾病
Sub-Acute Ruminal Acidosis (SARA) detection	None 無	Detection on a group level for preventing production losses, and allowing feed correction 及時偵測組別平均值, 防止奶量損失, 並可立即做飼糧的調整。
Mastitis detection 乳房炎	Cow-side test 至牛隻旁邊	Early detection and prompt treatment may prevent most damage 早期檢測和及時治療可以預防大多數傷害
Health issues alerts 健康狀況警報	Limited 有限	Allows to focus on unhealthy cows only, saving expensive treatment costs 可專注於不健康的奶牛, 節省昂貴的治療費用。
Milk quality 乳品質	Milk lab tests 實驗室	Alerting for system cleaning issue, enabling prompt and effective response 提醒擠乳系統清潔問題, 以致快速有效的立即處理。

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Thank you

In line
milk lab

afimilk

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