



LIPO EN+

Bypass glucose precursor

BENEFITS

- Boosts positive Energy Balance
- Prevent and treat ketosis
- Improves annual milk production and its quality
- Improve reproductive performance

“Goals of ketosis treatment are to stimulate gluconeogenesis, increase plasma glucose, and decrease lipolysis.”

- *Therapy of diseases of ruminant intermediary metabolism, T H Herdt and R S Emery. Vet Clin North Am Food Anim Pract. 1992 Mar;8(1):91-106.*

Effective solution for ketosis problem

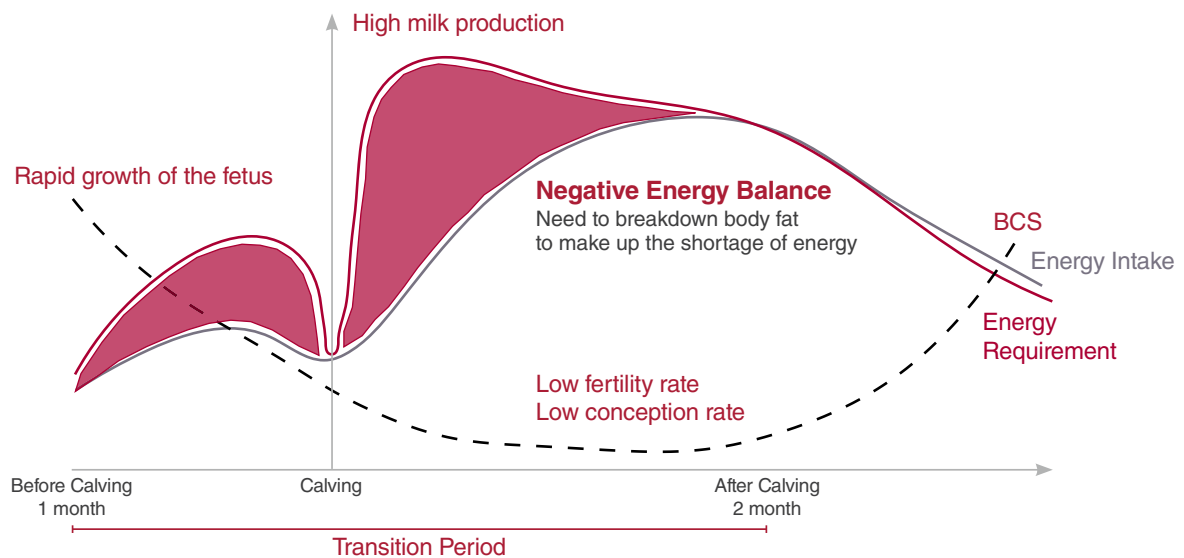
Ecolex animal nutrition addresses this issue with Lipo EN+. Rumen Bypass Technology enables Lipo EN+ to boost plasma glucose, which reduces plasma ketone level when it is mixed in feed during the early lactation period. This reaction intensifies milk production and overall milk quality, keeping body condition score and improves reproductive performance.

Ketosis- metabolic disorder of high milk production cow

Ketosis- a frequent metabolic disorder that occurs in dairy cattle when energy demands exceed energy intake and results in a negative energy balance. Ketotic cows often have low plasma glucose concentrations especially in the transition period, therefore, demand high energy use to grow the fetus and produce good

quality milk. During the negative energy balance, dairy cows need to break down body fat to make up for the shortage of energy. It will decrease body condition scores and reduce reproductive performance, including low fertility and conception rate.

Why Ketosis?

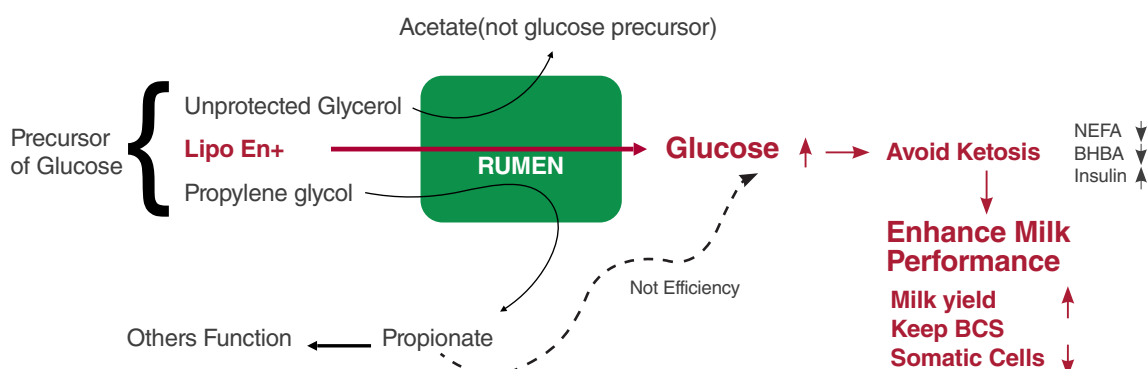


Highly gluconeogenesis bypass glucose precursor

A recently recommended base treatment for ketosis is 300 mL of propylene glycol (PG) administered orally once daily for 5 d (Gordon et al., 2013). However, glycerol would be more effective than propylene glycol in increasing plasma glucose concentration when bypass to the abomasum (Piantoni and Allen, 2015). When glycerol is absorbed intact from the gastrointestinal tract, glycerol is metabolized in the liver and enters the

cytosolic gluconeogenic pathway as glyceraldehyde-3-phosphate without the need of entering the tricarboxylic acid (TCA) cycle, and therefore, skipping metabolic steps with limiting enzymes (Johnson, 1954). Lipo En+ (aka bypass glycerol) could enhance gluconeogenesis to increase plasma glucose and reduce lipolysis to decrease the ketone body.

Goals ketosis treatment → Gluconeogenesis↑ → Lipolysis↓



Higher plasma glucose and insulin, lower NEFA and BHBA

In the feeding trial, comparing oral 300mL propylene glycol and top dressing 300g Lipo En+. 10 dairy cows for each group, detect plasma glucose, insulin, NEFA, and BHBA every 2 hours for 24 hours.

In gluconeogenesis, Lipo En+ has higher plasma glucose enhancing level and total amount. In lipolysis,

Lipo En+ has a similar ketone body reducing level and lower total amount.

Lipo EN+ is more effective than propylene glycol in enhancing gluconeogenesis and reducing lipolysis.

	Unit	Glucose mg/dL	Insulin μIU/dL	NEFA μEq/L	BHBA mg/dL
Propylene Glycol Liquid (99%) 300 mL/cow	Baseline	55.1	1.39	411	9.20
	Delta ¹	12.6	7.88	-231	-5.39
	AUC min x unit	1073	321	-1464	-839
	24 h post-feeding	55.8	1.75	351	11.9
Lipo En+ Powder (65%) 300 g/cow	Baseline	54.1	1.60	404	9.53
	Delta ¹	15.8	12.36	-165	-5.53
	AUC min x unit	1545	483	-1814	-756
	24 h post-feeding	55.8	2.05	340	10.5

¹Delta = maximum value – baseline value.
AUC = area under the curve.

① Higher Gluconeogenesis
② Lower Lipolysis

Higher milk yield and lower somatic cell in early lactation period

200 high milk production dairy cows were used for this trial, 100 dairy cows for each group. The Control group used a basal diet (NRC level), and the Lipo EN+ group is based on the basal diet with 200g Lipo EN+/cow/day. The trial period is after calving two months. The results

(Table 1.) shows that increases milk production about 6% and decrease somatic cell about 40%. In addition, the total milk fat, milk protein, and lactose production also increase.

Table 1. The value of milk fat, milk protein, lactose and somatic cells

		Day 0 - 60
Milk Yield (kg)	Control	37.9 ^a
	Lipo En+	39.6 ^b ↑
Milk Fat (%)	Control	3.43 ^a
	Lipo En+	3.42 ^a
Milk Protein (%)	Control	3.01 ^a
	Lipo En+	3.08 ^b ↑
Lactose (%)	Control	5.22 ^a
	Lipo En+	5.16 ^a
Somatic cells (thousand/mL)	Control	130.75 ^a
	Lipo En+	90.31 ^b ↓

^{ab} Different letters indicate significant differences at the $P < 0.05$

Conclusion

Lipo En+ can enhance plasma glucose quickly in the early lactation period to avoid negative energy balance

and ketosis. At the same time, milk yield, milk protein, and lactose will increase and the somatic cell will decrease.



APPLICATIONS

- Used as a feed additive in the production of complete feeds or ruminant TMR feeds.



PACKAGING

- 25kg (55 lb) paper bag with PP woven laminated.



FEEDING RECOMMENDATION

- 100-400g/com/day in the dairy cows completed feeds or TMR.



KEY BENEFITS

- >80% rumen bypass rate in 48 hr
- Stimulates gluconeogenesis to enhance plasma glucose
- Reduces lipolysis to decrease plasma ketone body (NEFA and BHBA)
- Controlled dry matter intake & body condition score
- Reduces immunosuppression to decreases somatic cell



STORAGE

- Store in a cool and dry place, away from direct exposure to sunlight and heat. 12 months shelf life.

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