

NUCLEOBOOST

Dried Fermentation Biomass Premix; Feed Grade

NUCLEOBOOST is an all-natural, non-viable, hydrolyzed, spray dried bacterial cream preparation naturally high in nucleotides and protein.

This is a by product of lysine fermentation. A benign strain of *E. coli* (there are many more of these than there are strains that are problematic) is grown in pure culture in a fermenter. When the maximum amount of lysine has been produced and the bacteria begin to die off, the bacterial cream is harvested. This material is ruptured and as per FDA requirements the lysis process is carried out to the point in which all of the genetic material in it is hydrolyzed (thus the high nucleotide content). The final product is coated with soybean oil to ensure that there is no dust generated. It would not be possible to identify this material as any bacteria as all the genes are degraded. This is a concentrated source of some important nutrients.

This is a source of high quality, highly digestible protein (most of the current product is being used in baby pigs) that is also high in the building blocks of DNA and RNA, essential for lymphocyte function (they require exogenous sources) as well as pieces of the immunogenic lipopolysaccharide (LPS) that made up a good portion of the cell wall.

It is highly likely that the LPS will exert a non-specific immuno-stimulatory effect on the animals consuming it. For this reason, it is best fed discontinuously. It should be fed for a few weeks at a time with enough time in between to avoid the possibility of over stimulating the animal's immune system. Please note that this is theoretical. Bacteria are an important part of the diets of shrimp and they consume large quantities constantly.

Product comes in a 1 MT super sac (other options available).

Physical Data:

Appearance	Light-brown, dry, meal-like texture; slight odor
Dry Matter	90% approx.

Feeding Directions:

To be used in the manufacturing of animal feeds. Add up to 60 lbs. per 2000 lbs. of feed (30 kgs per MT).

NUCLEOBOOST

Guaranteed Analysis*:

Nitrogen	11% Min on an as-is basis
Crude Protein	73% Min on an as-is basis

*There is some batch to batch variation.

Amino Acid Content of Representative Batch of Nucleoboost versus Fish Meal

	Total %	Fish Meal
Crude Protein	76.79	70
Lysine	6.50	4.9
Threonine	3.50	2.73
Methionine	1.94	1.86
Cysteine	0.44	0.67
Methionine + Cysteine	2.38	2.53
Arginine	4.49	3.93
Isoleucine	3.58	2.82
Valine	4.28	3.29
Tryptophan	1.07	0.69
Leucine	6.24	4.74
Histidine	1.53	1.52
Alanine	5.17	---
Glutamic Acid	8.51	---
Glycine	3.44	4.22
Aspartic Acid	7.33	---
Phenylalanine	3.13	2.52
Serine	2.64	---

NUCLEOBOOST

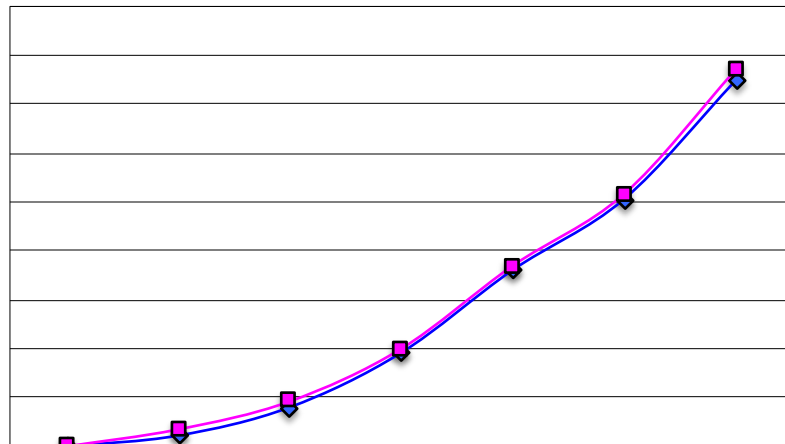
Other Nutrients:

Nutrient	Value (%)
Fat	8.16
Ash	6.35
Calcium, mg/kg	29.30
Phosphorus	1.04
Potassium	0.03
Sodium	0.01
Sulfur	1.38

Base/Nucleotide	% of cell mass
DNA	0.8
Cytosine	0.21
Adenine	0.15
Thymine	0.27
Guanine	0.17
RNA	4.2
Cytosine	0.94
Adenine	1.02
Uracil	0.78
Guanine	1.45

Nucleoboost at 10 kg per MT

Percent Growth per week



◆ A (10 kg/ton) SCP

■ Control - 0 kg ton

The above graph shows that when larval shrimp are fed larval diets containing 10 kg/MT it did not adversely impact the growth of the PLs over the course of the study (6 weeks).