

NOURICHE NUTRITION LTD.  
21 NORMANDY DRIVE  
LAKE SAINT LOUIS, MO 63367 USA

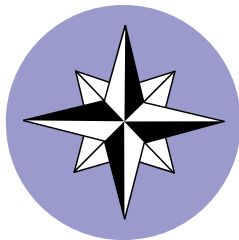
PHONE: 636 - 625 - 1884  
FAX: 636 - 625 - 1747

VEAUX@EARTHLINK.NET

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# Solutions<sup>™</sup> Nutrition News

## Use of Nutrior<sup>™</sup> Soluble Wheat Gluten Protein in Milk Replacer

© 2005 by Dr. Drew A. Vermeire



Nutrior is the "Champagne of Wheat Proteins"

Solubility. Digestibility. Acceptability. Nutrior<sup>™</sup> soluble wheat gluten protein (SWGPs) has all the attributes needed to enhance milk replacer composition and calf performance.

SWGPs is manufactured from wheat flour by separating the gluten protein from wheat starch. The protein is then enzymatically hydrolyzed and transformed to small proteins and peptides before drying. The resulting product is highly digestible and has beneficial characteristics for milk replacers including:

high protein content; amino acid composition which is complementary to whey powder; highly soluble; a fine powder; creamy white color; neutral taste and odor; high emulsifying capacity and emulsion stability.

### Performance of Veal Calves Fed SWGP Compared to Skim

Recent research showed that soluble wheat gluten protein yielded similar results versus skim milk powder in milk replacers for veal calves. Ortigues-Marty et al. (2003) compared performance of veal calves fed SWGP in replacement for skim milk powder in grower and finisher feeds after a 28 day adaptation period. Calves were fed one of two diets starting at 29 days of age. The control diet was comprised of skim milk powder, whey protein concentrate, and whey, whereas the treatment diets were comprised of SWGP, whey protein concentrate, and whey, with or without supplemental branched-chain amino acids. Approximately 74% of the protein in the control grower diet was provided by skim milk powder. With

the grower treatment diets, skim milk powder was replaced with whey protein concentrate and soluble wheat gluten protein which comprised approximately 55% of the protein in the milk replacer. The finisher control diet had skim milk powder comprising about 65% of the protein which was replaced with soluble wheat gluten protein with or without supplemental branched-chain amino acids.

### Performance of Herd Replacement Calves Fed SWGP Compared to WPC

Kansas State University research showed that SWGP was equal or better to an all milk protein milk replacer which was comprised of whey protein concentrate and whey. The research was conducted with 120 calves fed one of five milk replacers in a study lasting six weeks.

The Kansas State University researchers concluded, "Soluble, enzyme-modified wheat gluten was a good source of protein for calf milk replacer because growth of calves fed milk replacer containing 20% crude protein did not differ when wheat gluten was lacking or when it furnished 30 or 50% of the crude protein. Calves tended to gain more body weight when 33% of crude protein was supplied by wheat gluten than when no crude protein was supplied by wheat gluten. Calves fed 18% crude protein with 33% of protein from wheat gluten performed as well as calves fed any other milk replacer containing 20% crude protein."



# Chemical

Analysis - Holmes Laboratory, Inc.	Nutrior*
Moisture, %	5.32
Dry Matter, %	94.68
<b>Protein Constituents</b>	
Crude Protein (N x 6.25), %	81.13
Available Protein, %	80.96
Adjusted Crude Protein, %	81.13
A.D.F. Protein, %	0.17
N.D.F. Protein, %	0.54
<b>Fiber Constituents</b>	
Acid Detergent Fiber (A.D.F.), %	0.80
Neutral Detergent Fiber (N.D.F.)	4.12
N.D.F. (Protein Free)	3.58
Non-Fiber Carbohydrate (N.F.C.)	8.05
Lignin	0.20
Crude Fiber	0.39
<b>Crude Fat, %</b>	0.19
<b>Ash, %</b>	1.57
<b>Lignin Insoluble Ash, %</b>	0.20
<b>Major Minerals</b>	
Calcium, %	0.05
Phosphorus, %	0.17
Magnesium, %	0.02
Potassium, %	0.06
Sulfur, %	0.33
Sodium, %	0.438
Chloride, %	0.06
DCAD, meq/100 g DM	-1.9
<b>Trace Minerals</b>	
Copper, ppm	2
Manganese, ppm	11
Zinc, ppm	19
<b>Iron, ppm</b>	<b>63</b>
Molybdenum, ppm	2.3
<b>Calculated Energy Values</b>	
<b>TDN, %</b>	84.72
<b>Nel, Mcal/lb</b>	0.889
<b>Nem, Mcal/lb</b>	0.954
<b>Neg, Mcal/lb</b>	0.659
pH of 10% solution (10 g in 100 g solution)	5.3
Lab ID number	05-1117

### Nutritional Composition

Nutrior™ contains approximately 80% protein and has a calculated ME content of 17,327 kJ/kg. It is very low in fiber ( $\leq 0.5\%$ ) and low in ash ( $\leq 2.5\%$ ), however, it is naturally low in lysine relative to other protein sources and relative to calf requirements. In order to meet the calves nutritional requirements, it is recommended to add 7-10 lb of synthetic lysine for each 100 lb of Nutrior.

A general rule of thumb is to replace 3 parts of skim-milk powder with 1 part of soluble wheat gluten protein (SWGP) and 2 parts of whey powder plus lysine. According to researchers, "an ideal pattern of essential amino acids can be obtained if synthetic lysine is added."

Research has shown SWGP to be a high quality and highly digestible source of soluble protein, yielding equal or better performance in calves and nursery pigs versus all milk protein (skim milk and whey protein concentrate) or soy protein supplements in milk replacers, with important cost savings.

- All values reported on an as-sampled basis.
- Assays conducted by: Holmes Laboratory Inc., 3559 U.S. 62, Millersburg, Ohio 44654 USA Phone: 330.893.2933 e-mail: info@holmeslab.com
- Holmes Laboratory Inc is certified by the National Forage Testing Association

# Analysis

Analysis - Univ. Missouri Lab.	Nutrior**
Moisture, %	4.34
Dry Matter, %	95.66
<b>Protein Constituents</b>	
Crude Protein (N x 6.25), %	81.47
<b>Amino Acids</b>	
Taurine	0.03
Hydroxyproline	0.00
Aspartic Acid	2.35
Threonine	1.95
Serine	3.62
Glutamic Acid	29.77
Proline	9.80
Lanthionine	0.03
Glycine	2.57
Alanine	2.01
Cysteine	1.63
Valine	3.20
Methionine	1.27
Isoleucine	3.00
Leucine	5.62
Tyrosine	2.61
Phenylalanine	4.16
Hydroxlysine	0.00
Histidine	1.67
Ornithine	0.01
Lysine	1.30
Arginine	2.68
Tryptophan	1.00
<b>TOTAL</b>	<b>80.28</b>
<b>Crude Fat, %</b>	<b>0.09</b>
<b>Ash, %</b>	<b>1.63</b>
University of Missouri-Columbia Experiment Station Chemical Laboratories, Lab ID number	2284

\*\* All values reported on an as-sampled basis  
 Assays conducted by: University of Missouri-Columbia Experiment Station Chemical Laboratories, Room 4 Agricultural Building, Columbia, Missouri 65211 USA  
 Phone: 573.882.2608 FAX: 573.884.4631

*"An Educational, Research and Analytical Service Resource since 1888"*



SWGP has an amino acid profile which is complementary to whey and whey protein concentrate. It is ideal for milk replacer applications due to its high solubility. Animal performance is excellent because SWGP does not apparently contain anti-nutritional factors and causes no observed reduction in feed desirability.

**Nutrior Usage in Milk Replacers:**

- ◆ Use 2.5 - 7.5 % Nutrior in milk replacer formula, depending on protein content, feed intake, type of calves, etc.
- ◆ Formulate approximately 20 - 40 % of protein in milk replacer from Nutrior
- ◆ Add lysine at the rate of 7 - 10 lb lysine per 100 lb Nutrior Soluble Wheat Gluten Protein
- ◆ Make gradual changes in milk replacer composition and feed intake.
- ◆ Nouriche can assist in your milk replacer formulation needs.



"Solutions Through Science"

Nouriche Nutrition Ltd.  
21 Normandy Drive  
Lake Saint Louis, MO 63367 USA

Phone: 636 – 625 – 1884  
Fax: 636 – 625 – 1747

Veaux@earthlink.net

Visit our website at [www.Nouriche.com](http://www.Nouriche.com)

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## Nutrior Wins Coveted "Clean Strainer Award"

### ***Superior Solubility & Mixability Wins Again!***

Nutrior easily won the coveted "Clean Strainer Award" for easiest mixing and highest solubility over Solpro 508, the "improved" wheat gluten protein from Amylum. Although both have similar chemical composition, calf growers know that when milk replacers don't mix easily, clean-up becomes a problem because of film on bottles, buckets, and mixing equipment.

High solubility means calves consume every drop of milk replacer. Ingredients that are low in solubility often settle out of the mix only to be dumped when buckets and mixing equipment are cleaned. Every calf grower knows that ingredients that settle out of milk replacer and get dumped does nothing for calf growth and health.

### Here's how the test was conducted:

- 1) A 3% solution of each wheat gluten protein was prepared in hot water.
- 2) Each solution was mixed with a wire whisk for 10-30 seconds.
- 3) Each solution was poured through a stainless steel strainer back into the respective graduated cylinder.
- 4) The cleanest strainer wins!!

*Nutrior...The Only Soluble Wheat Gluten Protein Worthy of Your Formulation & Your Farm*

