ROQUETTE
Offering the best of nature™

SOLULYS®: The Difference Between a Defined Product and "CSL By-Product"

ROQUETTE - www.roquette.com

INTRODUCTION

Corn steep liquor (CSL) is a common by-product of the corn wet-milling industry. This by-product has numerous industrial applications from animal feed to fermentation.

Traditionally, CSL has been utilized as a cost-effective source of nitrogen, and other available nutrients in a variety of fermentation applications. However, as a by-product, CSL can vary widely in consistency from lot to lot, and vary by manufacturer. The typical corn wet miller produces CSL as a function of demand for starch, the desired end product. Starch demand cycles dramatically impact the composition of the CSL. Changing nutrient profiles and residual sugar content can create difficulty in predicting performance. Typically CSL manufacturers will not specify or characterize composition of their CSL, creating challenges for end users. These factors combined make CSL a less than ideal nutrient source for many fermentation applications.

SOLULYS® is not a by-product, rather a corn steep type product developed specifically by Roquette for fermentation applications. The tightly controlled patented process is aimed at producing a characteristic product profile that differentiates SOLULYS® from CSL in composition and functionality. In addition, the Roquette process operates independent of starch demand utilizing a dedicated steep cycle.

Due to Roquette's process technology, SOLULYS® products demonstrate the necessary lot to lot consistency, predictable performance, and offer industrial pricing/availability.

MATERIALS

SOLULYS® comes from an optimized process designed to recover corn soluble proteins and other nutrients specifically for fermentation applications:

- Defined Process (patented)
- Dedicated Production Capacity

Product Format:

– Liquid SOLULYS® : SOLULYS® 048

– Powder SOLULYS® : SOLULYS® 095

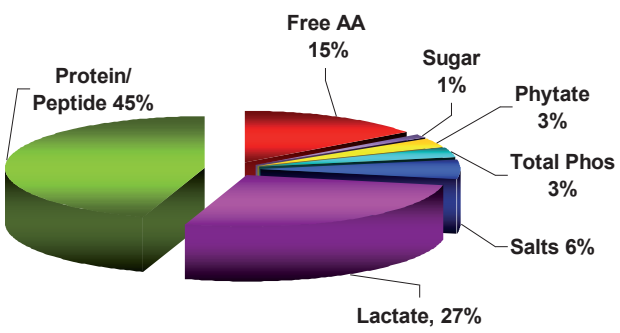
Product Characteristics:

– High protein content, excellent Nitrogen Source

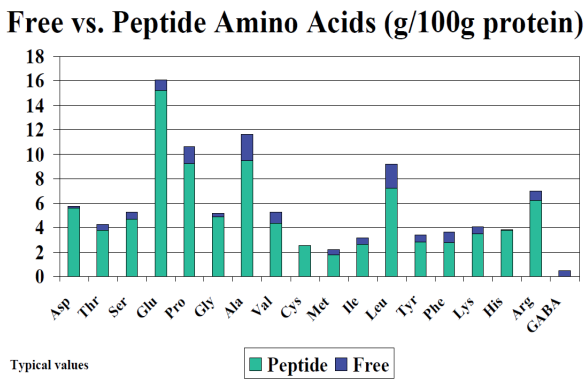
– Low Residual sugars, stable composition

– Key components such as: Vitamins, minerals, trace elements…

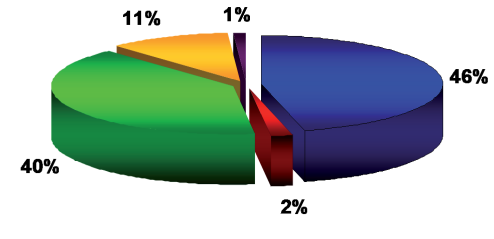
Typical SOLULYS® Composition



Rich in Free and Peptide Amino Acids



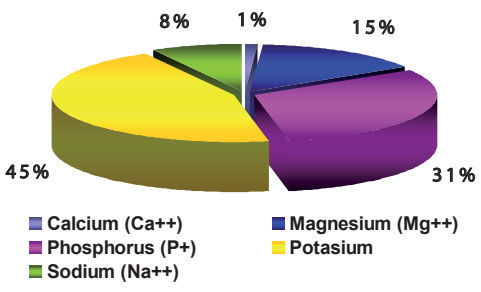
Trace Metals COMPOSITION



TRACE METALS*	RANGE	UNIT
Iron (Fe++)	221	mg/kg/DM
Copper (Cu++)	<10	mg/kg/DM
Zinc (Zn++)	191	mg/kg/DM
Manganese (Mn+)	51	mg/kg/DM
Nickel (Ni+)	<5	mg/kg/DM

(*) Typical Values

Minerals



MINERALS*	RANGE	UNIT
Calcium (Ca++)	0.05	% DM
magnesium (Mg++)	1.38	% DM
Phosphorus (P+)	2.86	% DM
Potassium (K+)	4.22	% DM
Sodium (Na+)	0.74	% DM

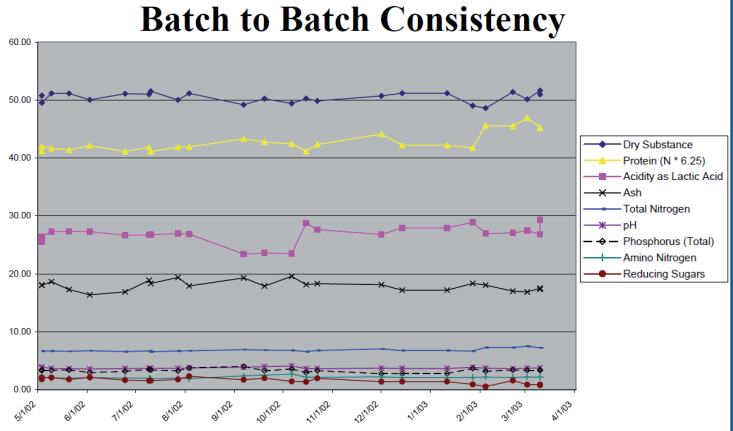
(*) Typical Values

Vitamins

Vitamins (mg/100gm DS as supplied)

Thiamine	1.9
Riboflavine	1.1
Niacin	13.6
Pantothenic Acid	3.1
Pyridoxine	3.0
Biotin	0.1
Folic Acid	0.04
Choline	431
Cyanocobalamin (mg/kg)	0.03
PABA	2.7
Inositol	294

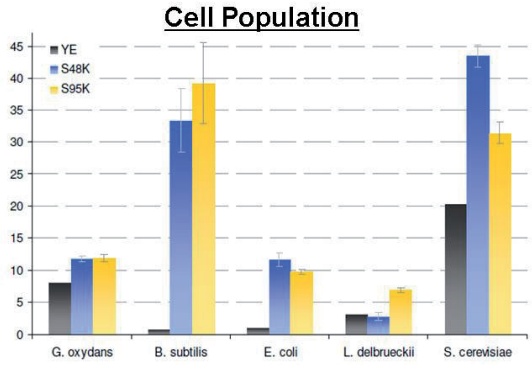
Demonstrated Consistency



RESULTS

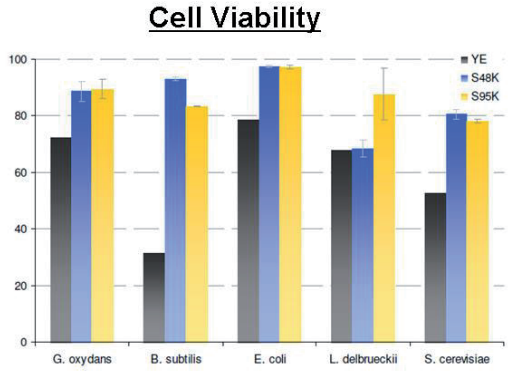
SOLULYS® vs. Yeast Extract

Graph 1. Viable population ($x10^8$ ufc. ml^{-1}) for different microorganisms tested regarding the nitrogen source.



SOLULYS® vs. Yeast Extract

Graph 2. Viability (%) for different microorganisms tested regarding the nitrogen source.



CONCLUSION

SOLULYS® is recognized for its batch to batch consistency, stable composition, and predictable performance.
The SOLULYS® process differentiates the product from CSL, producing a cost-effective and rich nutrient source for industrial fermentation applications.
SOLULYS® offers improved fermentation performance compared to CSL, and equivalent performance compared to Yeast Extracts.