

Expanding Clean Label Excipients Globally



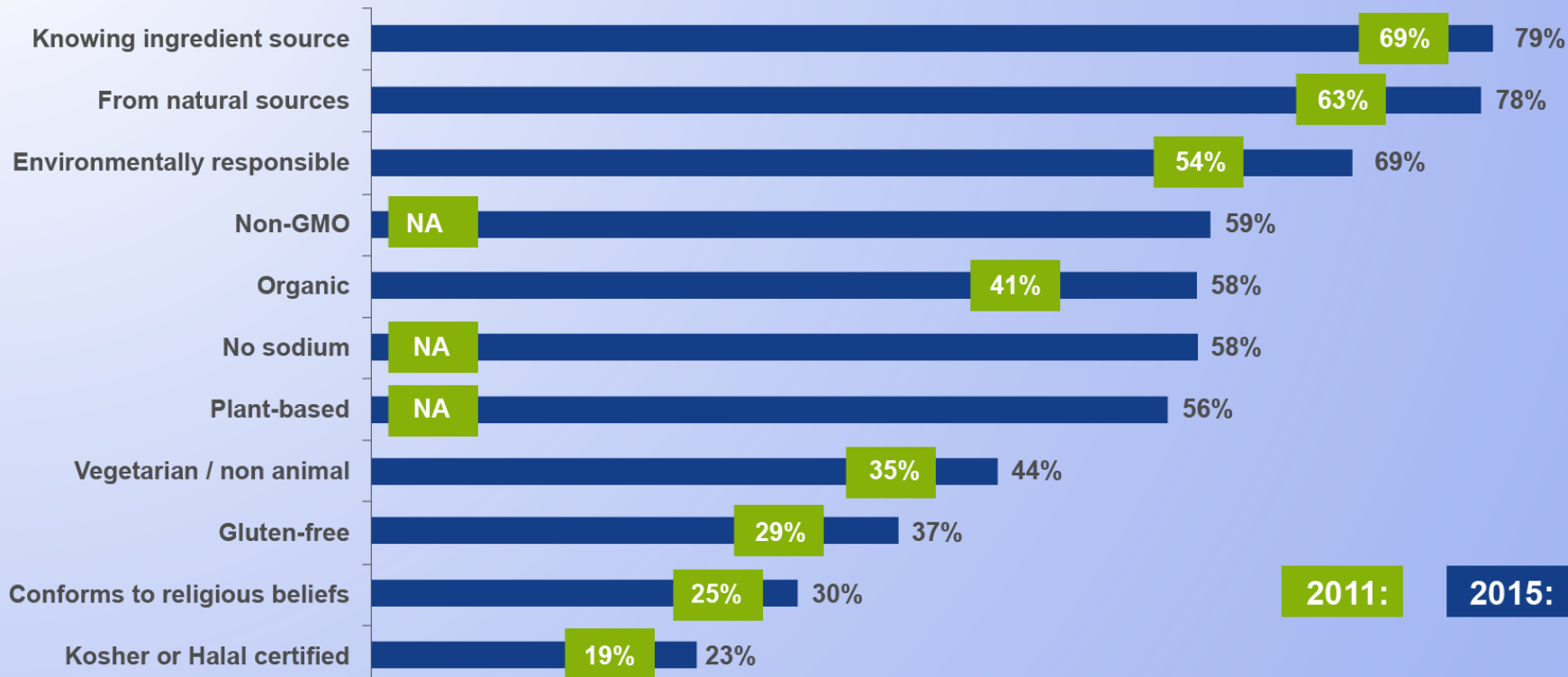
SupplySide West 2016

Presented by:
Steve Peirce
Steve Dybdal

OVERVIEW

1. Expanding Clean Label Excipients
2. New Product Launch
3. Breakthrough Data

LIFESTYLE INFLUENCES ON CONSUMER DECISIONS



Source: NMI SORD: 2011, 2015

CAPSUGEL®

IMPACT OF CLEAN LABEL

Consumer Demand

- Capsules
- Tablets

Your Production Needs

- Flow Agent (Not SiO_2)
- Lubricant (Not Mg Stearate)

Organic Legislation

- SiO_2 not allowed in organics as long as rice hulls are commercially available
- Mg Stearate use causes product to become “Made With”
- Stearic Acid not approved for organics

2011 RIBUS Brings Clean Label Excipient Options to the Market



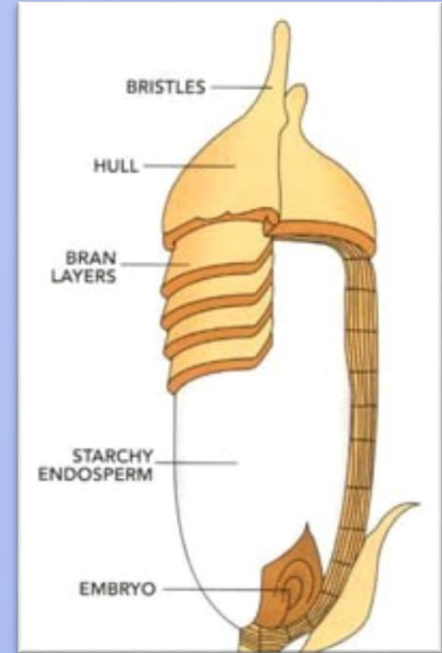
—GENERATION 1—

Anatomy of a Rice Plant

20% Hulls => Nu-FLOW®

10% Bran => Nu-RICE®

70% => White Rice



“Clean Label” Alternatives for Excipients



- Functions as flow aid and glidant (~20% plant based silica)
- 1:1 replacer for SiO₂ (E-551)
- Label declaration “Rice Hulls” or “Rice Concentrate”
- Clean label, Non-GMO, Vegan, Organic



- Functions like stearates as a lubricant & compaction aid
- 2 or 3:1 replacer for Mg Stearate (E-470b)
- Label declaration “Rice Extract”
- Over-mixing is not a problem
- Clean label, Non-GMO, Vegan, Organic

For use in capsules, tablets and powders.

—GENERATION 2 ARRIVES—



- Organic or Natural
- Enhanced Functionality

Label as “Rice Extract Blend”

- Nu-RICE®
- Nu-FLOW®
- Gum Arabic
- Sunflower Oil

Developed by BioGrund & Licensed by RIBUS.

PERFORMANCE DATA

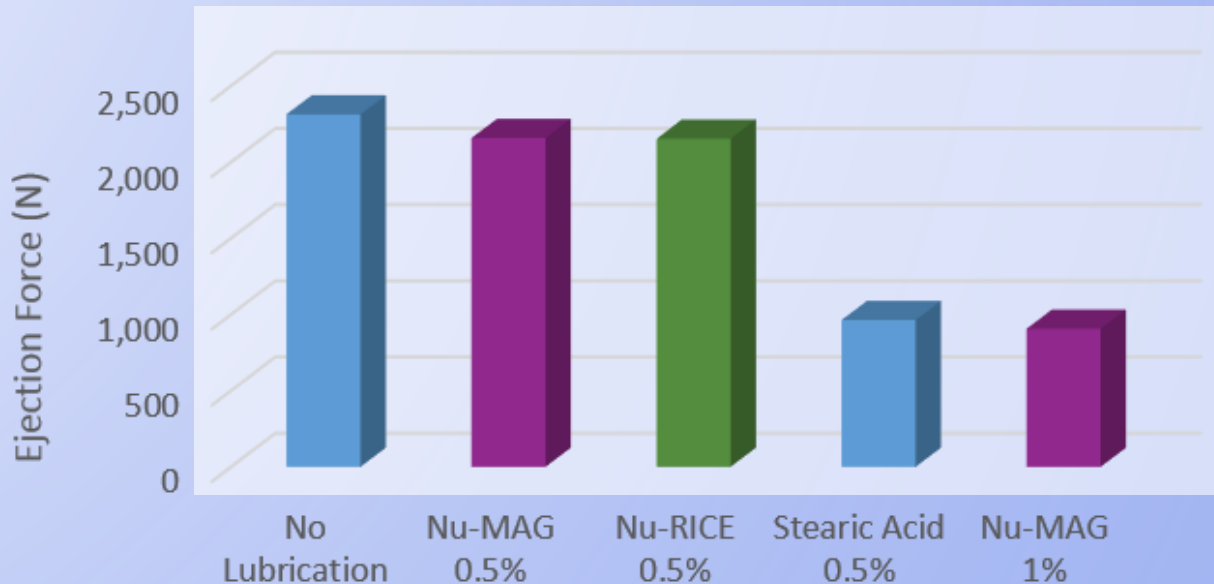
Tablets

- Romaco
- Natoli

Capsules

- Customers

Tablet Lubrication: Stearic Acid vs. Nu-MAG



Romaco Kilian's Tableting robot STYL One Evolution,
speed 1,125 tablets /min.

...“Nu-MAG™ Performed as well as Mg Stearate”

Dr. Robert Sedlock, Natoli Institute, Long Island University



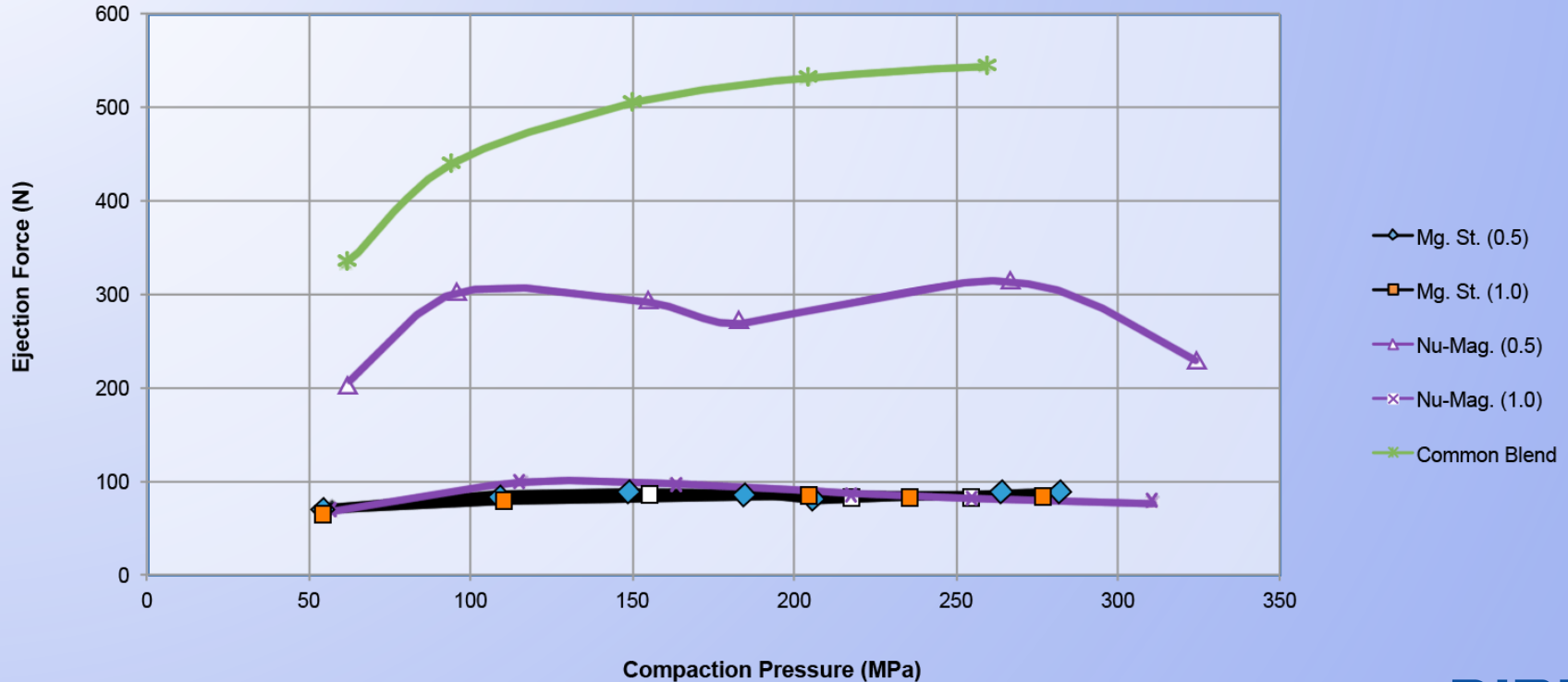
- Ejection Force
- Powder Flow / Rheology
- Break Force, Hardness
- Friability, Disintegration
- Blend Time Study (Compaction)
- Dwell Time Study

Formulation

- Emcocel 50M 50%
- Explotab 5%
- Emdex 42 - 44.5%
- Lubricants
 - Mg Stearate 0.5, 1, 2, 3%
 - Nu-MAG 0.5, 1, 2, 3%

EJECTION FORCE IS COMPARABLE

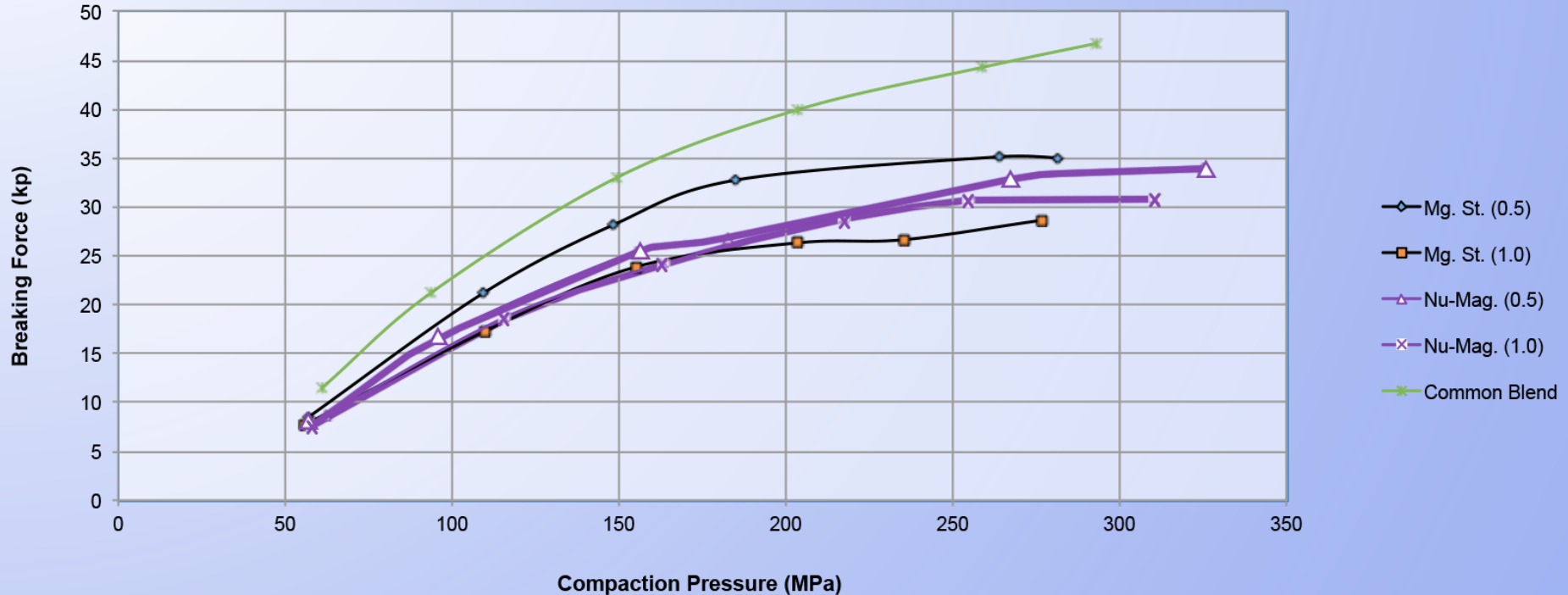
Ejection Force vs. Compaction Pressure



Test conducted by, Natoli Institute at Long Island University.

HARDNESS IS COMPARABLE

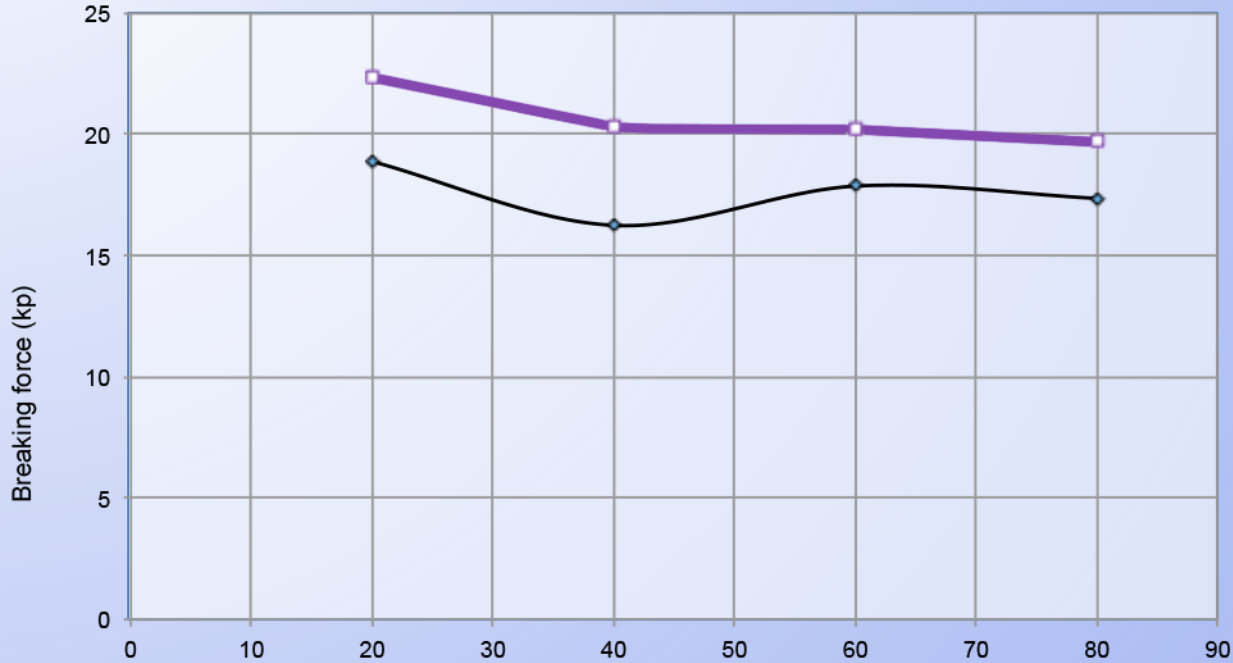
Breaking Force vs. Compaction Pressure



Test conducted by, Natoli Institute at Long Island University.

BREAK FORCE COMPARABLE AT SPEEDS

Breaking force vs. Turret RPM

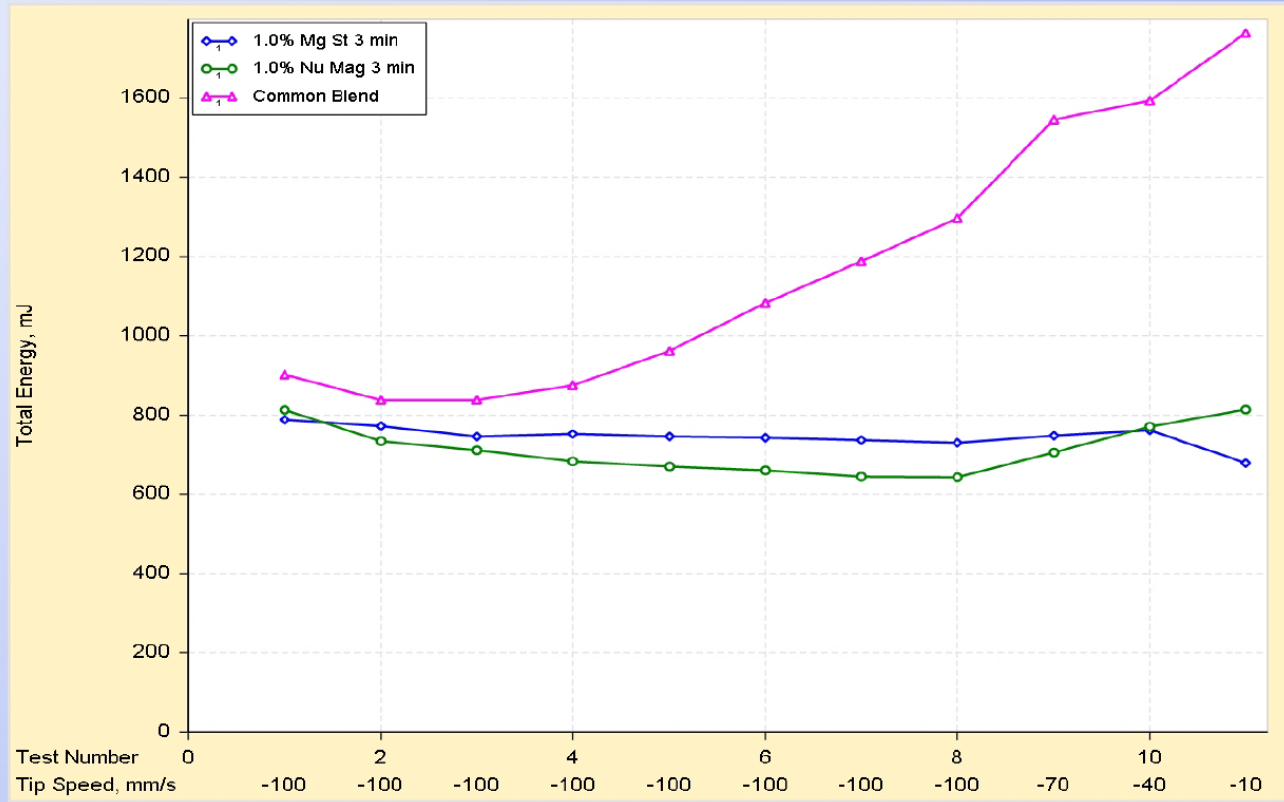
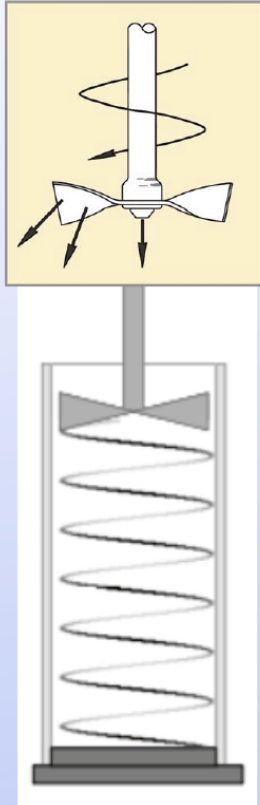


**Nu-MAG™ is
17.5% Harder**

—◆— Mg. St. (1.0)
—□— Nu-Mag. (1.0)

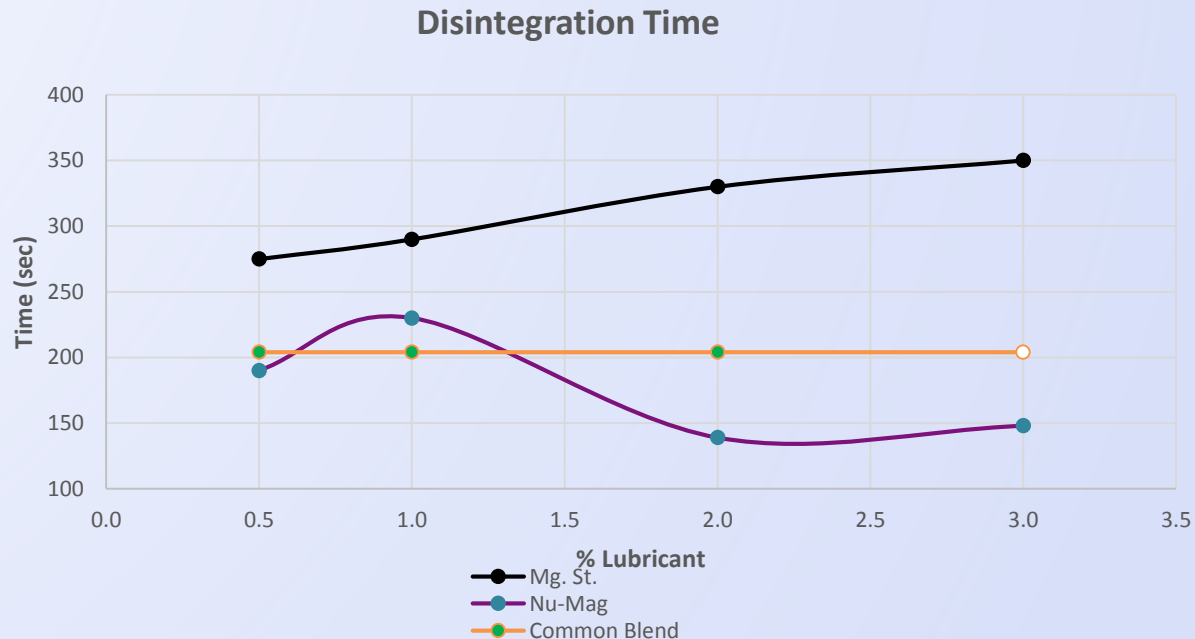
Test conducted by, Natoli Institute at Long Island University.

POWDER FLOW (ENERGY REQUIREMENTS)



Test conducted by, Natoli Institute at Long Island University.

DISINTEGRATION ADVANTAGE TO Nu-MAG™



Test conducted by, Natoli Institute at Long Island University.

Clean White Tablets with 1%

Nu-MAG™



1% Nu-MAG™, paddle feed, 3 minute mix.

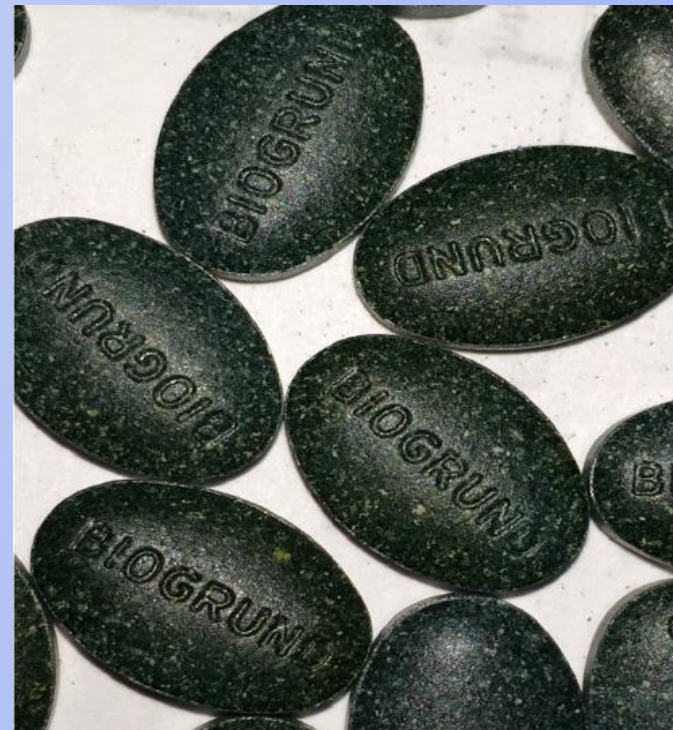
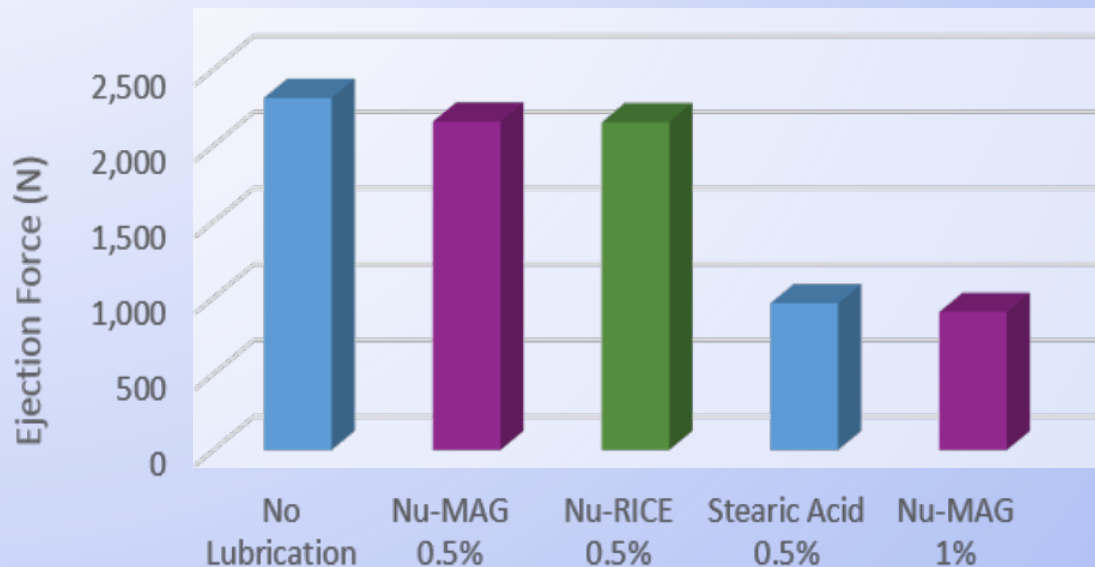
Test conducted by, Natoli Institute at Long Island University.

EARLY DATA



EARLY DATA

Tablet Lubrication: Stearic Acid vs. Nu-MAG



Romaco Kilian's Tableting robot STYL One Evolution, speed 1,125 tablets / minute.

CUSTOMER COMMENTS ON CAPSULES

“Wanted to give you some feedback. The product is working GREAT!!!
We are looking to scale up to over a million capsules...”

“We have done R&D, and will use it in 2
products. We are now going to test in tablets.”

“Looking forward to the organic version.”

Data Collection

Lubrication

Slug
Transfer

Splits

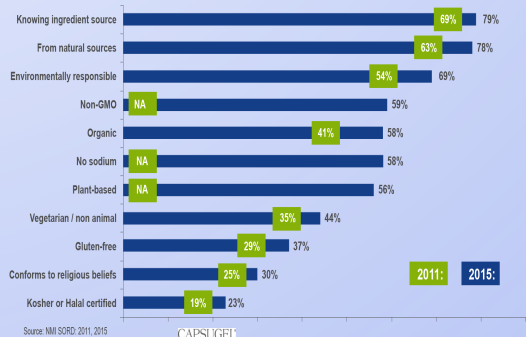
Deformed
Capsules

SUMMARY

GENERATION 2 ARRIVES

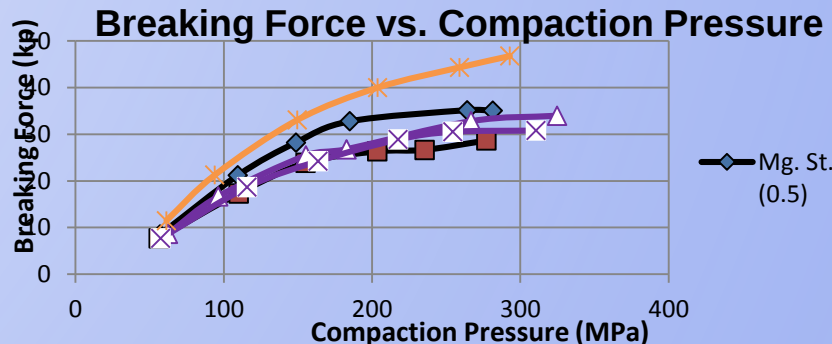
Nu-MAG™

LIFESTYLE INFLUENCES ON CONSUMER DECISIONS



...“Nu-MAG™ Performed as well as Mg Stearate”

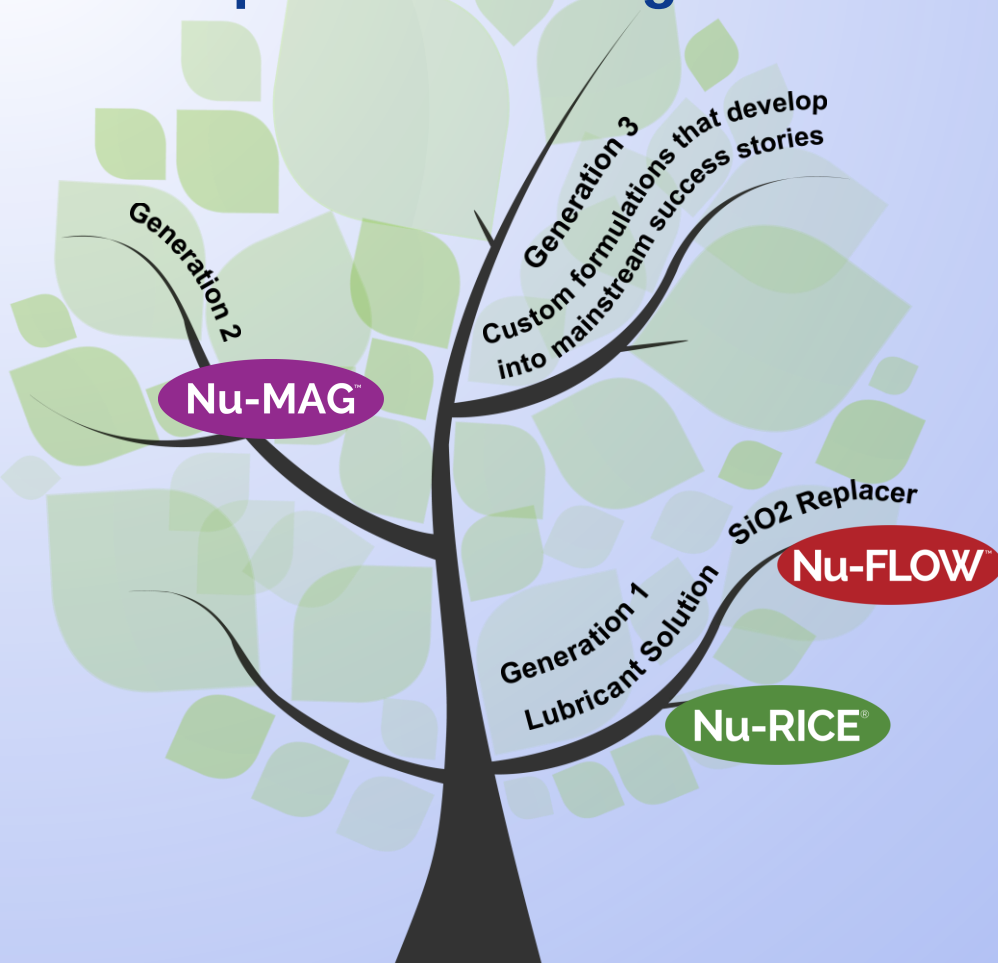
Dr. Robert Sedlock,
Natoli Institute,
Long Island University



“Nu-MAG works GREAT in capsules!”



Excipients Growing from Generation 1 to 2



From Clean Label Alternatives to
**Alternatives with
Enhanced Functionality!**

THANK YOU!



Booth W 106

Presented by:
Steve Peirce
Steve Dybdal