Impact of Processing Aids on Rice Crisps at Various Protein Levels

AACC 2005
By
Eric Sevatson, USC, LLC
Steve Peirce, RIBUS, Inc.
Overview

- Crisp Rice Study (historic)
- Market Conditions
- High Protein Rice Crisp Testing
- Data & Expanded Testing
Rice Crisp Extrusion
(past tests on rice flour)

- Good Expansion & Output
- Bulk Density Needs Management
- Machinery Wear
- Common Processing Aid
  - Mono glycerides
Historic Testing

Bulk Density of Rice Crisps with Various Processing Aids

- Control
- 0.25% Myvaplex
- 0.5% Myvaplex
- 0.25% Nu-RICE
- 0.5% Nu-RICE
- 0.75% Nu-RICE
- 1% Nu-RICE
- 2% Nu-RICE

Bulk Density (kg/m³)

Processing Aid Use Rate
Rice Crisp Samples

Control                   0.25% Mono                 0.5% Nu-RICE

Photos taken by Texas A&M University
Rice Crisp Samples

Photos taken by Texas A&M University
Current Market

- Atkins Diet / Protein is Positive
- Demand for Nutrition Bars (inclusions)
- Added Protein has Impacted Production
  - Decreased Output
  - Raised Bulk Density
  - Changed Cell Structure
  - Affects Product Consistency
Directional Study Objectives

- Evaluate processing aids on crisp rice at various protein levels.
  - Bulk Density
  - Shape
  - Cell Structure
- Determine economic benefits.
Testing Conditions

- Pilot Plant Test, Wenger TX-52
- 30 & 70% Protein Levels
- Rice Flour (long grain)
- Soy Protein Isolate
- Processing Aids
  - Mono Glycerides
  - Rice Bran Extract
Results
30% Protein

- Product did not run on screw set up for high protein levels.
- Mono glycerides provided some improvement in the product.
- Unable to complete the testing.
Results
70% Protein
Processing aid dose impacts bulk density.

70% Protein Rice Crisps

![Graph showing bulk density (g/500 ml) for different processing aid doses: Control, 1% Mono, 0.25% RBE, 0.5% RBE, 1% RBE. The graph indicates that the 1% Mono dose has the highest bulk density compared to the control and other RBE doses.](image-url)
Samples
70% Protein Rice Crisps

Control  1% Mono  0.25% RBE  0.5% RBE  1% RBE
What was Learned?

- Different screw configurations are required for different protein levels
- Processing aid impacts bulk density
- RBE at low doses was more effective as protein was added
- Issues other than bulk density are critical
Future Studies

- Vary Use Rates of Processing Aids
- Evaluate Items Important to Producers
  - Texture
  - Moisture / Oil Uptake
  - Various Protein Sources (dairy, pea, etc.)
  - Output (in commercial system)
  - Product Consistency
  - Production at Lower Moisture
Testing Cooperation

- Texture
- Moisture / Oil Uptake
- Protein Sources
- Output
- Consistency
- Moisture Level
- Cost Reduction

- Commercial Producers
- Protein Suppliers
- Universities
- Consultants
- Equipment Manufacturers
- Product Users

Working jointly to achieve your necessary Product Characteristics!
Reasons for Testing

- Market’s Desires are Changing
- Upcoming Allergen Labeling
- Growth / Sourcing Issues for Organics
- Producers want to enhance / differentiate their products & take them to the next level
Summary

- Historic Crisp Rice Study (carbs)
- Current Market Conditions
- High Protein Testing Data
- Future / Expanded Testing
Contributing Organizations

- USC, LLC
- Kerry, Inc.
- Texas A&M University
- RIBUS, Inc.

Rice Bran Extract is sold as Nu-RICE by RIBUS, Inc.
Mono glyceride is sold as Dimadan by American Ingredients