# Variety Specification for Soybeans and Buckwheat

How IP Technical Handling Improves Food Manufacturing Processes

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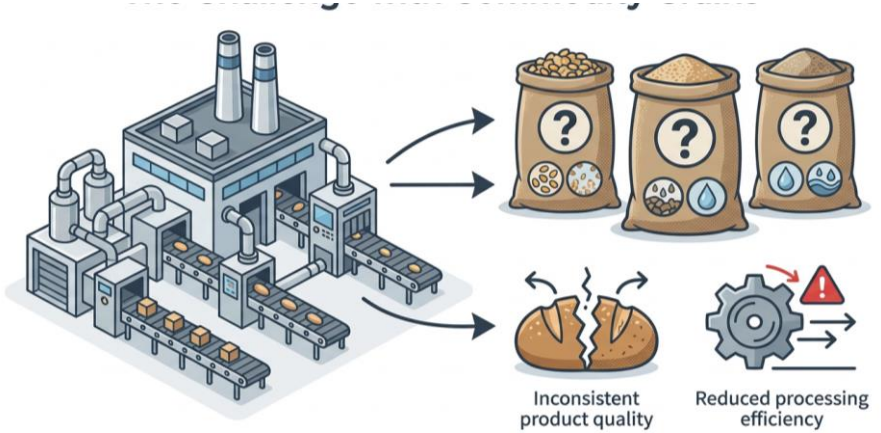
# Why Variety Matters in Food Processing

Food manufacturers need raw materials that perform the same way every time.

## The Challenge with Commodity Grains

- Variable composition
- Unpredictable processing behavior
- Inconsistent product quality
- Reduced processing efficiency



# The Hidden Cost of Raw Material Variability

- When grain quality changes, the entire m

Processing In

Unpredictal processing perfo

- Different wate absorption
- Different cook behavior
- Different gel formation

## Processing Impacts:

### Unpredictable processing performance

- Different water absorption
- Different cooking behavior
- Different gel formation

### Yield variability

- Lower extraction efficiency
- Reduced product output

### Product quality inconsistency

- Texture differences
- Color variation
- Flavor differences

# From Variety to Final Product Quality

**Variety Selection (Genetic Traits)**

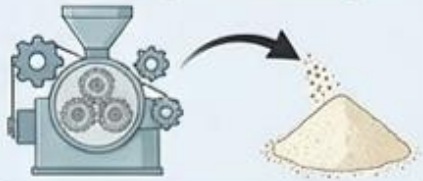
- Protein content
- Starch properties
- Seed color
- Bioactive compounds

**Grain Characteristics**

- Seed size and uniformity
- Hull thickness
- Chemical composition
- Functional components

## Processing Performance

### Milling Efficiency



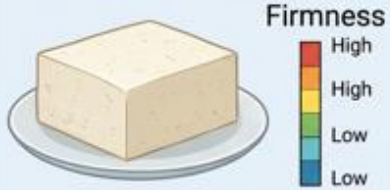
### Water Absorption

### Gel Formation


### Dough Behavior


## Final Product Quality

### Tofu Yield & Texture




Silken tofu and texture

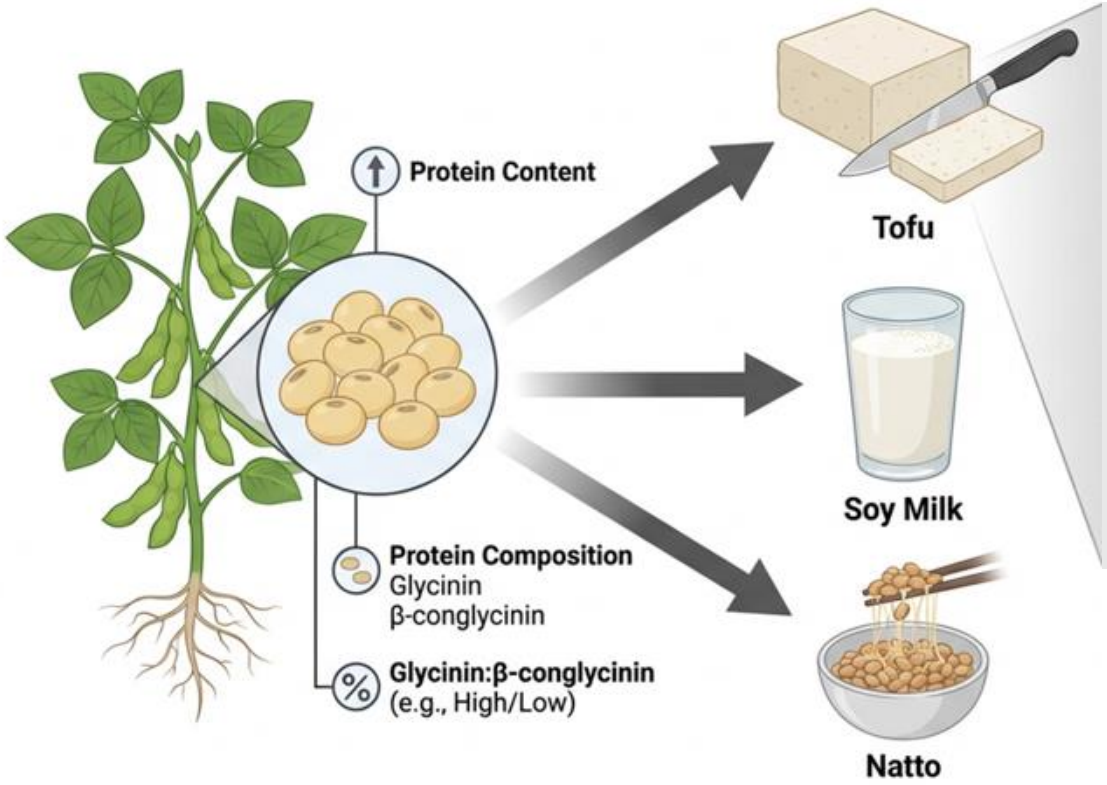
### Soy Milk Solids & Flavor

Soy milk

### Soba Noodle Texture & Color

Texture analyzer Color pallette

# Soybean Variety Traits that Drive Soyfood

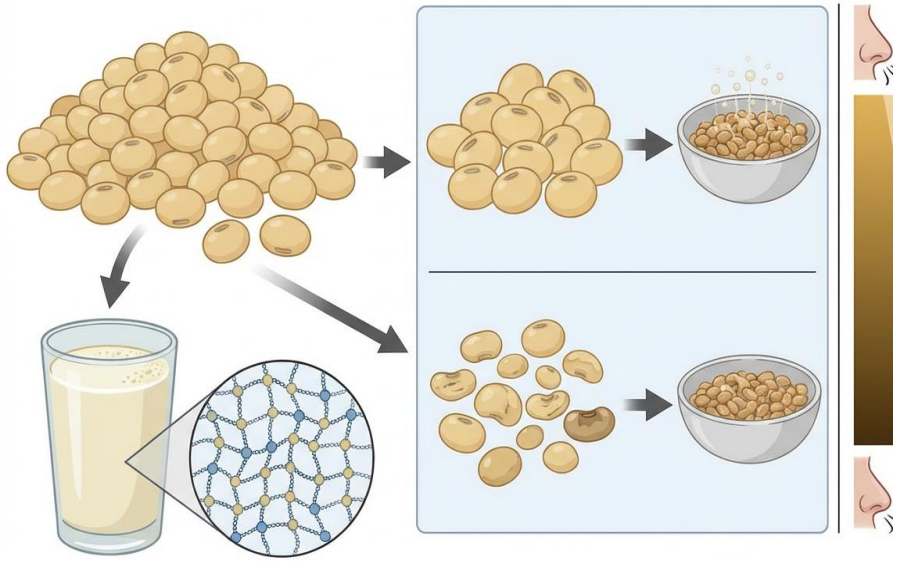



Important characteristics of Soybean varieties determine the performance of products such as Tofu, Soy Milk, and Natto.

# Soybean Variety Traits that Drive Soyfood

## Soluble Solids (°Brix)

- Higher solids improve soymilk body
- Supports stronger protein network formatic



## Seed Size and Uniformity

- Important for hydration efficiency
- Critical for natto fermentation

## Lipoxygenase Activity

- Determines beany flavor intensity

# Soybean Variety vs Tofu Yield and Texture

Soybean Variety Directly Impacts Tofu Production.

# Case Scenario: The Cost of the Wrong Soybean Variety

**Raw Material Change**

- High-protein Soybean → 42 %
- Lower-protein soybeans → 38 %

**Yield Impact in Tofu Production**

- Normal yield1 kg soybeans → 2.5 kg tofu
- Lower protein soybeans1 kg soybeans → 2.0 kg tofu
- Loss ⚠ 0.5 kg tofu per kg soybeans

Processing **5,000 kg soybeans/day**
**2,500 kg tofu lost per day**
**≈ $7,500 revenue lost per day**
**≈ $2.2 million lost per year**

# Product Preferred SoybanTraits

| Product | Preferred Soybean Traits |
|---|---|
| Tofu | High protein, large uniform seeds, light hilum |
| Soymilk | High protein, bland flavor, light-colored beans |
| Natto | Small seed, high sugar, sticky texture, fast hydration |
| Tempeh | Medium size, uniform, moderate oil |
| Roasted Snacks | Uniform size, good flavor, crunchy texture |
| Soy Sauce / Fermented Products | Medium protein, moderate sugar, unique flavor compounds |

# Know Your Product First

Define your product goal:

- Tofu (silken, firm, yuba, dougan)
- Soymilk
- Soy flour
- Snacks
- Natto
- Tempeh
- Miso
- Soy sauce
- Extruded product (plant base meat)

# Activity :

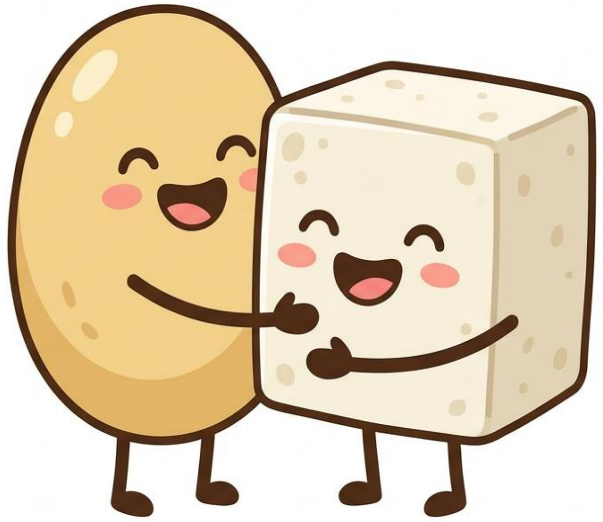
You are selecting a variety of **Soybean** for producing **Tofu**. Which trait would you prioritize the most?

A ) Larger seed size

B ) Higher protein content

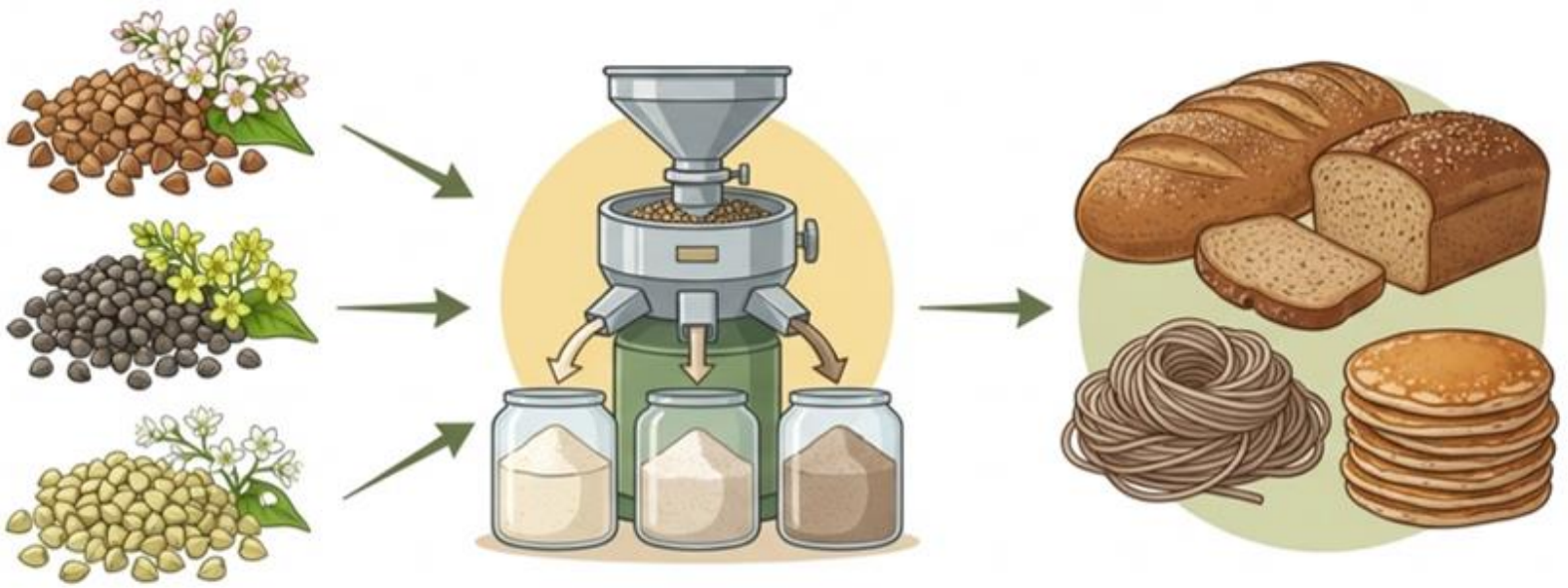
C ) Higher oil content

D ) Higher yield in the field



# Why Buckwheat Variety Matters for Milling and Food Applications

The characteristics of Buckwheat varieties significantly affect milling performance, flour functionality, and final food product quality.



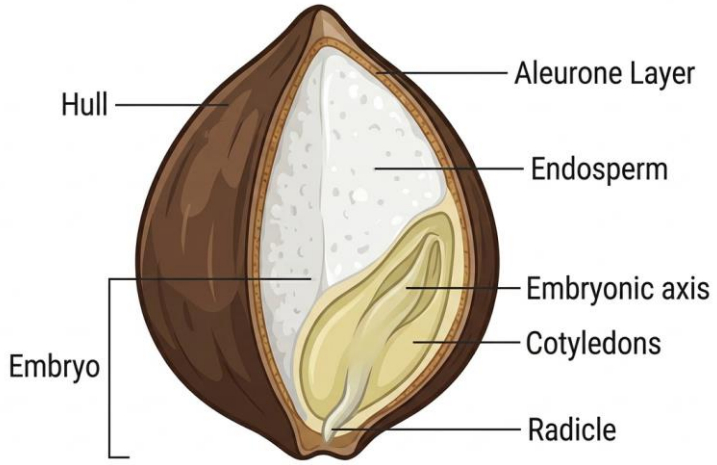
# Key Traits that Vary Between Buckwheat Varieties

**Kernel Size and Uniformity**
- Influences milling efficiency
- Affects flour particle size distribution

**Hull Thickness**
- Determines dehulling performance
- Impacts flour yield

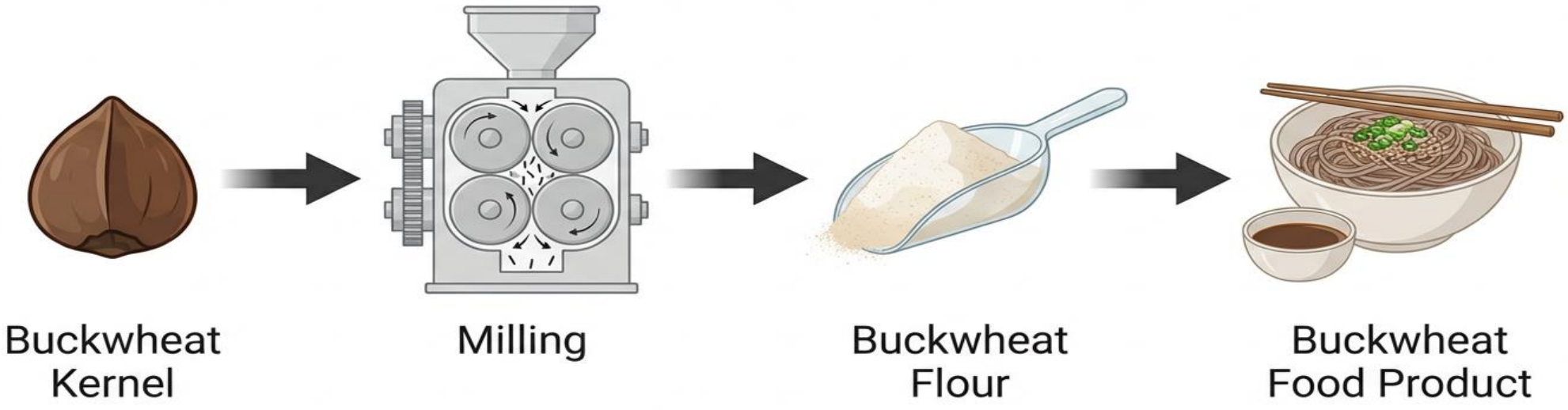
**Starch Properties**
- Affect gelatinization and viscosity
- Influence noodle texture and cooking behavior

**Flour Color**
- Important for consumer acceptance
- Determines appearance of finished products



# From Buckwheat Kernel Structure to Flour Functionality

The physical structure of Buckwheat determines how the grain behaves during milling and how the resulting flour performs in food applications.



# How Buckwheat Variety Affects Soba Noodle Quality

**Important traits**

*-High flour yield -Light flour color -Strong starch functionality for stable noodle texture*

# Case Scenario: The Cost of the Wrong Buckwheat Variety

## Raw Material Change

- Preferred variety → thin hull, high flour yield
- New variety → thicker hull, lower milling efficiency

## Milling Impact

- Normal yield100 kg buckwheat → 70 kg flour
- Lower-yield variety100 kg buckwheat → 60 kg flour
- ⚠ Loss: 10 kg flour per 100 kg grain

**10,000 kg** buckwheat/day
**1,000 kg** flour lost per day
**≈ $2,000** lost per day
**≈ $600,000 per year**


**Simple and memorable**

In Japanese, *soba* (そば) literally means *buckwheat*.

**Cultural fun fact**

In Japan, people traditionally eat soba noodles on New Year's Eve (*Toshikoshi Soba*) because the long noodles symbolize a long life and resilience.

**Processing fact**

Traditional soba noodles are often made with 80% buckwheat and 20% wheat flour, a style called "Ni-hachi soba" (二八そば).

**Variety connection**

Japanese soba producers pay close attention to grain quality and milling characteristics.

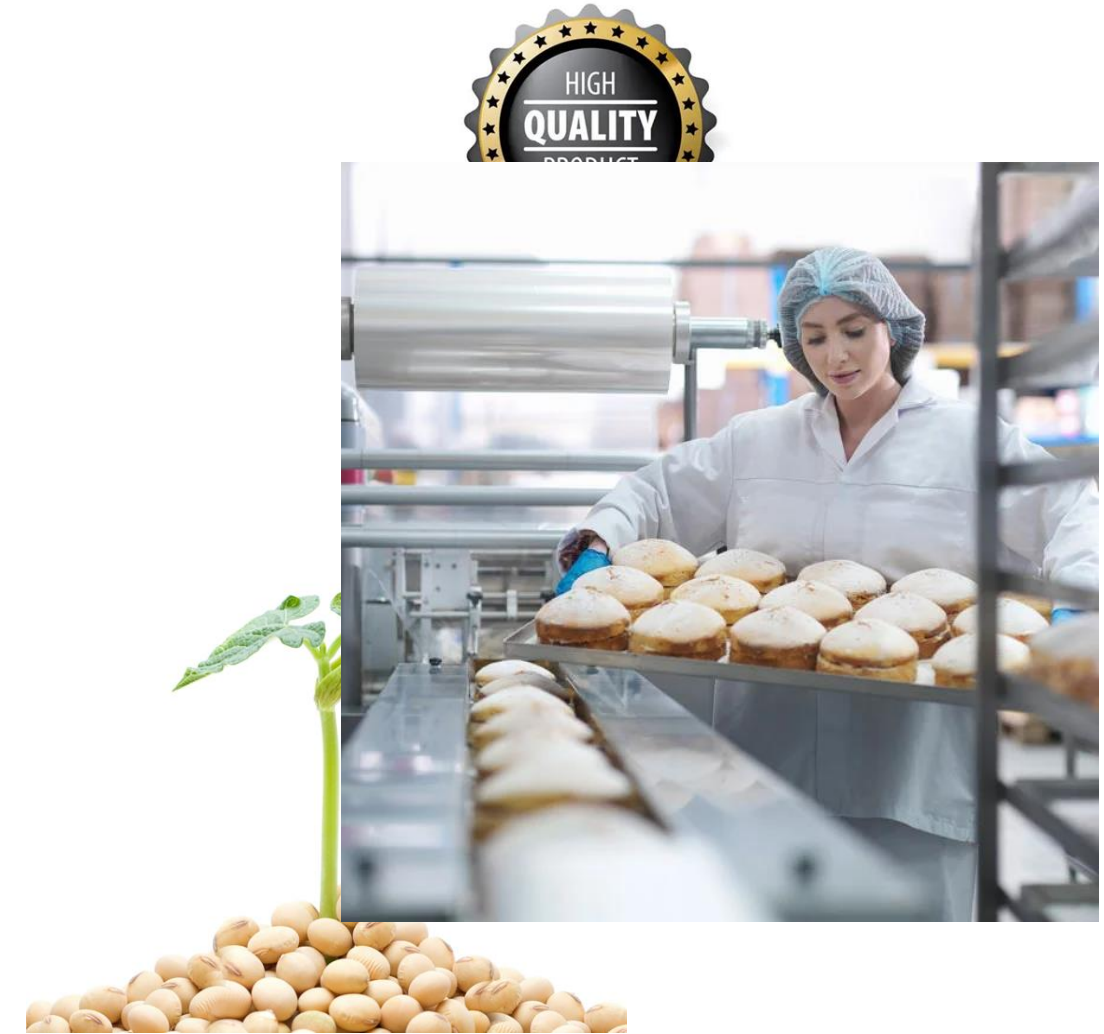
# When Variety and Processing Align, Everyone Wins

**Seed Companies**
- Develop varieties with functional traits

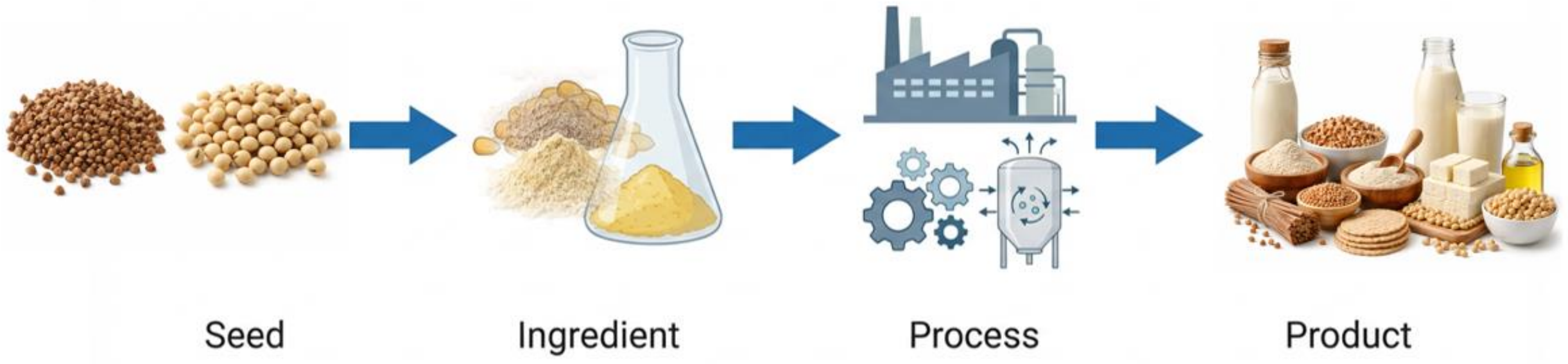
**Farmers**
- Access higher value specialty markets

**Food Manufacturers**
- Predictable processing performance

**Consumers**
- Better texture, flavor, and quality



# The Future of Food Starts with the Right Variety



# Key Takeaways

- Variety Determines Processing
- Raw Material Traits Affect Product Quality
- Raw Material Variability Has Real Economic Impact
- Collaboration Across the Supply Chain Is Essential

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