

ProteoMeat™ Technical Guide: Advanced Applications in Meat Products

A comprehensive technical guide for meat product manufacturers and food engineers on implementing INTABIOTECH's high-functionality textured vegetable protein in formulations.



ProteoMeat™ Technical Characteristics

ProteoMeat™ is a highly functional textured vegetable protein designed to partially or completely substitute meat in processed meat products. Developed by INTABIOTECH, it offers competitive texture, water retention, and protein profile with these key functional properties:

- High hydration capacity and water retention
- Fibrous structure that simulates ground meat
- Excellent performance in fat-muscle emulsions
- Firm and juicy texture after cooking



General Usage Protocol: Rehydration

Water Temperature

Use cold or lukewarm water (5-20°C) for optimal protein functionality.

Rest Time

Allow to rest for 10-15 minutes; stir halfway through for even hydration.

Proportion

Mix at 1:2 ratio (dry ProteoMeat™ weight : water volume).
Example: 1kg ProteoMeat™ + 2L water.

Drainage

Drain excess water thoroughly, or drain minimally if higher water retention is desired.

The rehydration process is critical for proper functionality. When executed correctly, it creates the fibrous structure that simulates ground meat texture.

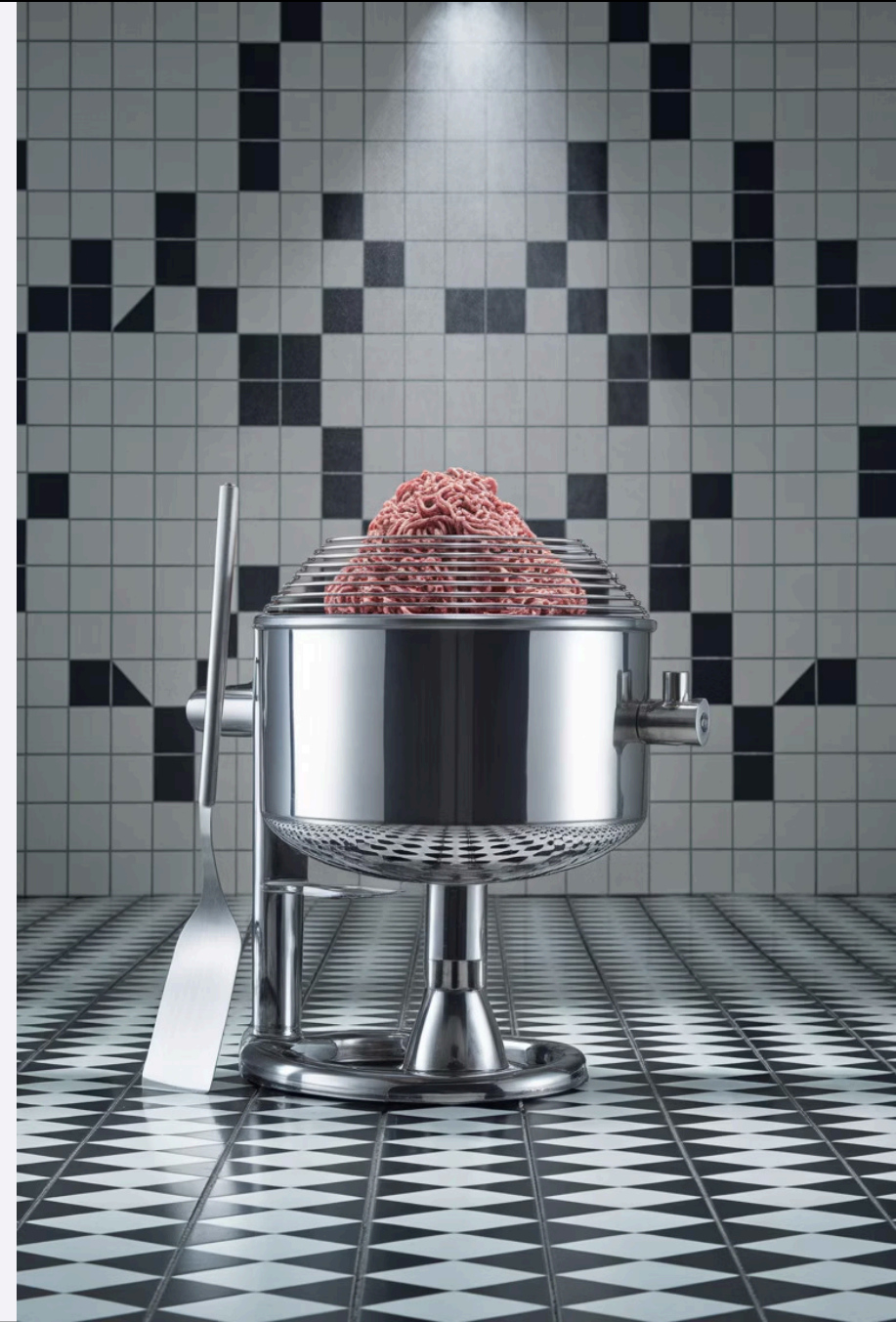
Meat Mass Integration Guidelines

Typical Substitution Levels

- Substitute 15% to 40% of meat muscle with rehydrated ProteoMeat™
- Example for hamburgers: In a formulation with 60% meat, 30% fat, 10% water/binders → substitute 20% of raw meat with rehydrated ProteoMeat™ (≈ 10% of final product weight)

Technical Criteria

- Water adjustment: Reduce free water in formula by ~5-8% of total due to ProteoMeat™'s retention capacity
- Stabilizers/emulsifiers: Include carrageenan, phosphates, or isolated vegetable protein (1-2%) to aid cohesion
- Salt (sodium chloride): Minimum 1.5% in raw material (final weight) to help plant protein functionality
- Mixing timing: Mix in paddle mixer or cutter in third stage, after fat and spices





Forming and Cooking Procedures

Forming Process

Form pieces into desired shapes: hamburgers, meatballs, sausages. Use standard meat forming equipment with slight adjustments to account for different texture.

Thermal Cooking

Ensure internal temperature reaches at least 72°C (minimum pasteurization). This is essential for food safety regardless of meat substitution level.

Slow Cooking Method

For uniform product: 75-80°C in cooking bath for 20-30 minutes. This approach yields more consistent texture throughout the product.

Product-Specific Formulations

Hamburgers (80g net, industrial style)

Ingredient	% total weight
Lean meat	48%
Fat (pork/beef)	24%
Rehydrated ProteoMeat™	12%
Water/ice	10%
Salt and spices	4%
Others (binders, phosphates)	2%

- Raw meat substituted: 12% replaces approximately 20% of muscle
- Adjust added water according to ProteoMeat™ retention

Product-Specific Applications

Meatballs in Sauce

- Lean meat substitution: 15-25%
- Higher hydration: can use ProteoMeat™ + hydrated breadcrumbs
- Slightly spongier texture; useful to reduce added egg or starches by 1-2%



Frankfurt Sausages / Mortadella

- Substitutions of 20-30%
- Excellent functionality in emulsified systems due to vegetable proteins' capacity to retain fat and water
- Essential to use casing and vacuum cutter or high-speed emulsifier in emulsion and rectification stages

Technical Considerations and Best Practices

System pH

Control pH between 5.8 and 6.2 to favor protein-water binding and firmness. Regular pH monitoring during processing is recommended.

Final Total Protein

With substitution, maintain protein > 15% (legal minimum for meat products in many countries). This ensures regulatory compliance and nutritional value.

Microbiological Stability

ProteoMeat™ contains no meat, but final product must comply with thermal standards and add nitrite/nitrate and antioxidants if applicable.

Sensory Control

Add flavor enhancers (umami, natural glutamates) to compensate for the vegetable flavor of ProteoMeat™ when needed.

Physical-Chemical Analysis

To ensure consistent quality, regularly evaluate these key parameters:



Water Retention

Measure cooking loss percentage using standardized heating protocols to quantify water-holding capacity.



Firmness by Cutting

Use texture analyzer to determine bite resistance and structural integrity of finished products.



Perceived Juiciness

Conduct sensory analysis with trained panels to evaluate mouthfeel and perceived moisture.

Comparison with Traditional TVP

Parameter	Traditional TVP	ProteoMeat™
Rehydration ratio	Similar (1:2 ratio)	Similar (1:2 ratio)
Common substitution levels	10-30%	15-40%
Texture	Somewhat granulated	More fibrous, meat-like
Water retention	Lower	Higher
Flavoring needs	Higher	Lower
Emulsifying function	Basic	Improved with less need for additional stabilizers

Updated ProteoMeat™ Usage Instructions

Rehydration Process



Proportion

1 part ProteoMeat™ : 2 parts water (e.g., 1 kg ProteoMeat™ + 2 L water)



Time

15–20 minutes, gently stirring halfway through for homogeneous hydration



Water Temperature

10–20°C (cold or lukewarm water)



After Hydration

Drain excess water only if necessary; ideally use directly with all absorbed water

Yield: 1 kg dry ProteoMeat™ → ~3 kg hydrated ProteoMeat™

Lean Meat Substitution Guidelines

📊 Recommended Typical Substitution

15–40% of lean meat can be replaced with hydrated ProteoMeat™

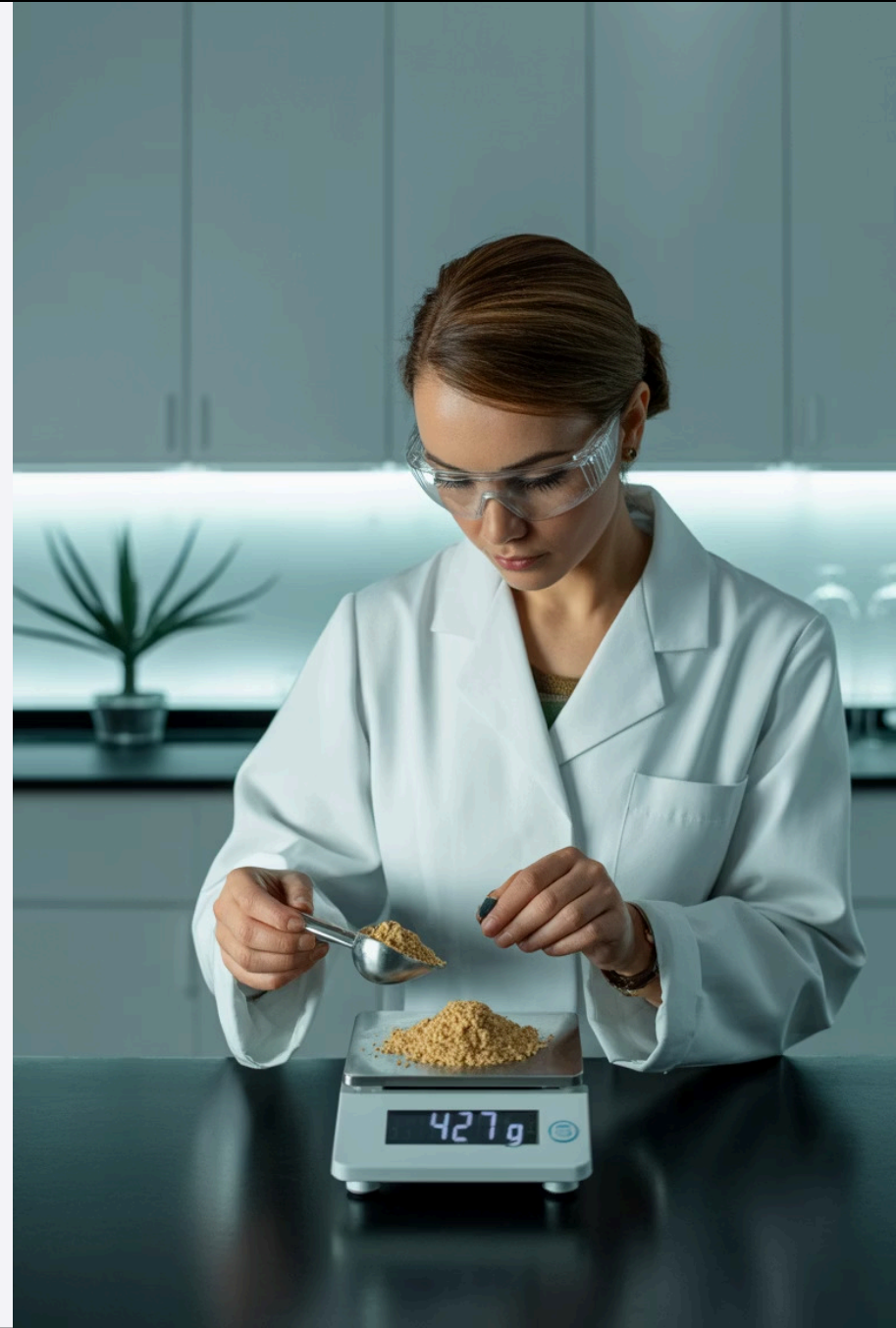
At meat mass level, this means using 5–15% of dry ProteoMeat™ of the total formulation weight, hydrated at 1:2 ratio



Calculation Example

For a product with 100 kg of meat mass → substitute 20% of lean meat:

- Remove 20 kg of meat
- Add ~7 kg of dry ProteoMeat™ hydrated with 14 L of water → 21 kg of functional ingredient



Formula Adjustment Parameters

1

Added External Water

Reduce free water in recipe (normally added as ice or water) based on ProteoMeat™'s high retention (absorbs ≈ 200%)

2

Fat Content

Maintain usual levels (15–30% depending on product), as ProteoMeat™ does not replace fat functionality

3

Salt (NaCl)

Minimum 1.5% to improve protein solubilization and functionality

4

Phosphates/Emulsifiers

0.3–0.5% for cohesion and water retention enhancement

5

Other Binders

Starches or vegetable fibers can be reduced by 10–20% when using ProteoMeat™

Specific Applications: Hamburgers

Industrial Standard Hamburger (80g unit)

Ingredient	% total weight
Lean meat (beef/pork)	45%
Animal fat	25%
Hydrated ProteoMeat™	20% (≈7% dry)
Additional water/ice	6%
Salt + spices + additives	4%

Result: Juicy texture, reduced cooking loss (cooking loss < 20%)

Final protein profile: > 15% protein



Specific Applications: Meatballs & Sausages

Meatballs (35g unit, for sauce)

- Lean meat substitution: 15–25% with hydrated ProteoMeat™
- Binders: Breadcrumbs or starches can be reduced by 15–20%
- Result: Spongier structure, good sauce absorption



Frankfurt/Mortadella Type Sausages

Ingredient	% total weight
Lean meat	35%
Fat	25%
Hydrated ProteoMeat™	25% (≈8.5% dry)
Additional water/ice	10%
Salt and additives	5%

Note: High-speed cutter or emulsifier essential

Advantage: More stable emulsion, reduced post-cooking syneresis



Technical Best Practices

Target pH

5.8–6.2 for optimal water retention. Monitor throughout processing to ensure stability.

Emulsion Temperature

Do not exceed 12°C during chopping/emulsifying to prevent protein denaturation and maintain binding properties.

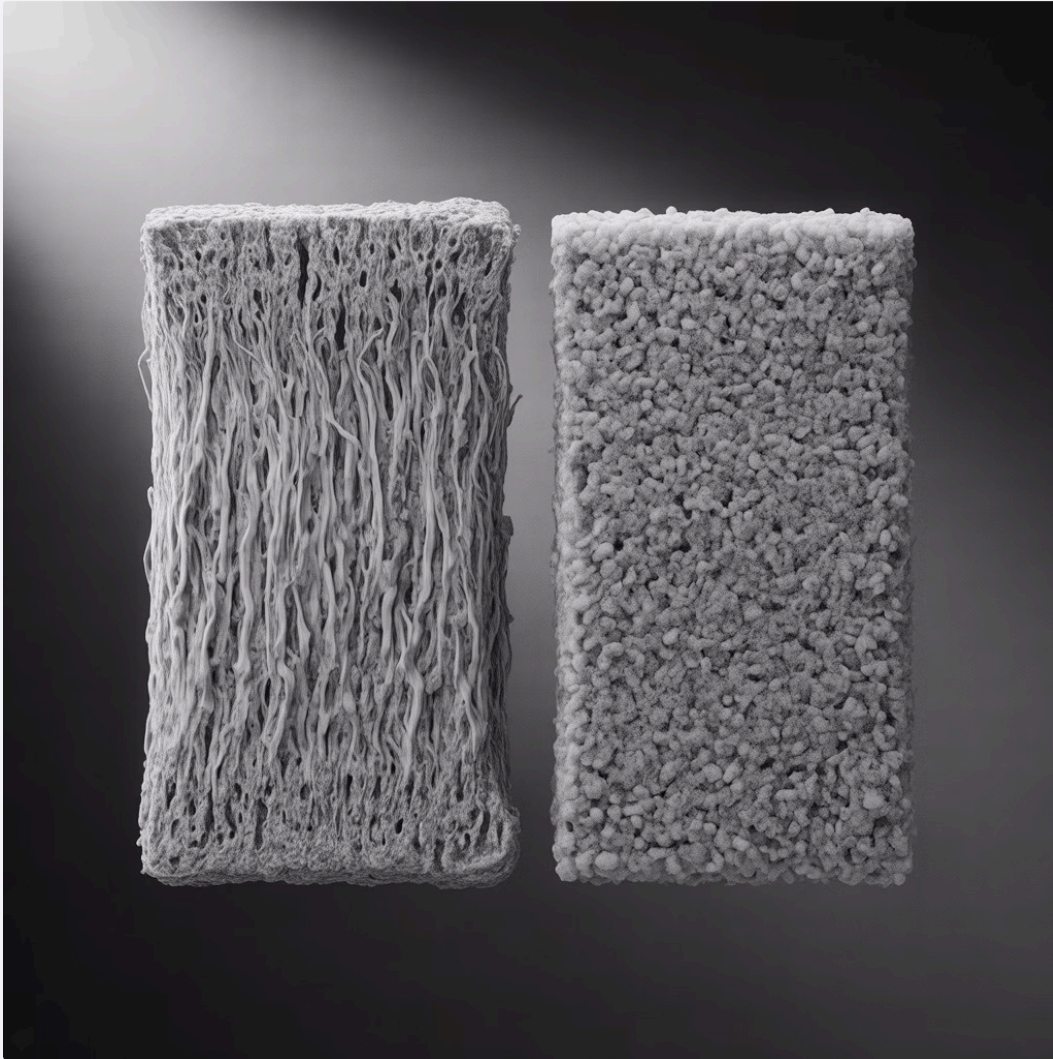
Cooking Parameters

Reach minimum 72°C internal temperature to ensure food safety and proper protein coagulation.

Sensory Evaluation

If seeking "100% meat" profile, use of natural meat flavors or autolyzed yeasts (0.3–0.5%) is recommended.

ProteoMeat™ vs. Standard TVP Advantages



Key Advantages of ProteoMeat™ (1:2 rehydration)

- More fibrous and homogeneous texture, better mimicking muscle tissue
- Reduced perception of vegetable flavor
- Higher yield in water retention and juiciness
- Better cohesion with less need for external stabilizers
- Non-allergenic composition (advantage over soy-based TVP)

Substitution Level Variations in Formulations

15% Substitution

For minimal intervention with traditional meat flavor profile:

- Hamburgers: 60.5% lean meat, 25% fat, 3.5% dry ProteoMeat™ (+ 7L water)
- Meatballs: 59.5% lean meat, 20% fat, 3.5% dry ProteoMeat™ (+ 7L water)
- Sausages: 51% lean meat, 25% fat, 3% dry ProteoMeat™ (+ 6L water)

40% Substitution

Maximum substitution for hybrid products:

- Hamburgers: 42% lean meat, 25% fat, 9.5% dry ProteoMeat™ (+ 19L water)
- Meatballs: 42% lean meat, 20% fat, 9.5% dry ProteoMeat™ (+ 19L water)
- Sausages: 36% lean meat, 25% fat, 8% dry ProteoMeat™ (+ 16L water)

1

2

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30% Substitution

Balanced approach with significant cost reduction:

- Hamburgers: 49% lean meat, 25% fat, 7% dry ProteoMeat™ (+ 14L water)
- Meatballs: 49% lean meat, 20% fat, 7% dry ProteoMeat™ (+ 14L water)
- Sausages: 42% lean meat, 25% fat, 6% dry ProteoMeat™ (+ 12L water)

All formulations maintain other ingredients at consistent levels, with adjustments primarily between meat and ProteoMeat™ quantities.

Final Technical Considerations

Processing Parameters

- Maintain mass pH between 5.8 and 6.2 for optimal functionality
- Do not exceed 12°C during emulsion/grinding process
- Cook to minimum internal temperature of 72°C
- Evaluate sensory adjustments (meat aromas, flavor enhancers) according to product profile

Regulatory & Quality Considerations

- Verify final protein content meets local regulations (typically >15%)
- Document substitution levels for labeling compliance
- Conduct shelf-life testing to validate stability
- Monitor water activity in final products

ProteoMeat™ offers superior functionality compared to traditional TVP, especially in emulsified meat products and molded formats. It contains no declarable allergenic components, providing a competitive advantage over soy-based alternatives.