

食肉のおいしさを分子レベルで解き明かす

— 脂質・うま味・物性の統合解析 —

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食肉のおいしさ形成の統合モデル

食肉のおいしさは、タンパク質、油脂、水の相互作用によりもたらされる

背景

食肉の“おいしさ”は、脂質・うま味・構造の複雑な相互作用で決まる。しかし、その関係は明確でない。

【生産・飼育条件】



研究の特徴

- ・脂質・うま味・構造を統合的に解析
- ・分子レベルで食肉品質を理解
- ・生産～調理まで一貫した視点

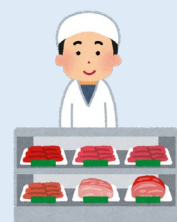
脂質 グリセリン・NEFA等

うま味 IMP・遊離アミノ酸等

物性 タンパク質、油脂等

『美味しさ』
うま味・コク・食感など

最終品質



加熱・調理

脂質(コク・風味)

NEFA(遊離脂肪酸)の生成機構を解明し、
脂質の質と風味の関係を解析
脂肪酸組成の違いがコクやうま味に与える
影響を評価

うま味成分

IMP(イノシン酸)や遊離アミノ酸の動態を
流通・季節から解析
加熱による遊離アミノ酸の変動を評価
熟成や加熱によるIMP分解機構を解明

脂肪交雑 → 脂質構造 → NEFA → コク

ATP → IMP (うま味) → HxR → Hx

物性・食感

ソーセージなどの練り肉の加工条件がタン
パク質の物性、食感、呈味成分に及ぼす影響
を統合的に解析

応用・分析技術

植物素材を用いたソーセージ様代替肉製品
の物性評価
GC/MSによる微量呈味成分の解析

タンパク変性 → ゲル → 食感

成分分析 → モデル化 → 食品設計

食肉のおいしさを「分子レベル」で解き明かす

本研究室では、脂質・うま味・構造の統合的理解により、食肉のおいしさの本質解明に取り組ん
でいる → 食品開発・品質評価・代替肉設計への応用

Understanding Meat Palatability at the Molecular Level

Integrated Analysis of **Lipids** , **Umami** , and **Physical Properties** –

Animal Products Science Laboratory, College of Agriculture, Ibaraki University

Integrated Model of Meat Palatability

Meat palatability is determined by the interaction of lipids, umami components, and structure.
[Animal Production and Rearing Conditions]

Background

Meat palatability is determined by complex interactions among lipids, umami components, and structure. However, the relationships among these factors are not yet fully understood.

Objectives

To elucidate the mechanisms underlying meat palatability through an integrated analysis of lipids, umami components, and structure. To understand meat quality at the molecular level from production to cooking.



Lipids Glycerin, NEFA, etc.

Umami IMP , free amino acids, etc.

Physical proteins, fats and oils, etc.

"Deliciousness" → Final Quality
Umami, richness, texture, etc.



Heating/cooking

Lipids (Richness and Flavor)

This study aims to elucidate the mechanism of NEFA (free fatty acid) formation and to analyze the relationship between lipid quality and flavor. We also evaluate how differences in fatty acid composition affect richness and umami.

Umami Components

We investigate the dynamics of umami-related compounds, such as IMP and free amino acids, during storage and distribution. We also evaluate the effects of heating and clarify the mechanisms of IMP degradation.

Fatty marbling → Lipid structure → NEFA → Richness

ATP → IMP (umami) → HxR → Hx

Rheological properties and texture
This study focuses on how processing conditions affect protein structure, texture, and taste-related components in processed meat products.

Applications and Analytical Technologies
We evaluate the physical properties of plant-based meat analogues and analyze trace taste components using GC/MS. These approaches contribute to food design and quality improvement.

Protein denaturation → Gel → Texture

Component analysis → Modeling → Food design

Understanding Meat Palatability at the Molecular Level

Our laboratory aims to clarify the mechanisms of meat palatability through an integrated understanding of lipids, umami, and structure. These findings will contribute to food development, quality evaluation, and alternative meat design.