Ongoing Industry Needs and Cheese Research Gaps to help Expand Cheese Exports

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Center for Dairy Research “Solution Based Research Backed by Experience, Passion and Tradition”
Compared to U.S. cheese, many export markets want:

- Cheese with lower salt (e.g., ≤1.0%)
- Less typical cheese flavors (acid, bitter, sulfur, etc.)
- Specific melt characteristics
- Specific color (e.g., if they previously sourced cheese from NZ then Mozzarella with more yellow)
- Want traditional cheeses but in bulk format (e.g., block, dry salted Gouda)
Research Gaps

• Need a better understanding of cheese shelf-life and viable approaches to extend shelf-life
• Low/reduced sodium cheeses that are not soft, non-bitter and with good shelf-life
• To compete internationally, we need to improve cheesemaking efficiency
  – Improved yield, fat recoveries, etc.
• New cheese formats
  – High protein snacks
• New approaches to cheesemaking
  – Eliminate unwanted steps like curd washing, brining, etc.
  – Methods to color the cheese (no color in the whey)
Extending Shelf-Life Issues

- Microbiological (mold, pathogens, etc.)
- Sensory (texture, flavor)
- Avoiding defects (e.g., crystals)
- Performance (e.g., melt, shredding, etc.)

- Refrigerated vs. non-refrigerated storage
- Shipping/additional transportation/distribution
Extending Shelf-life: Possible Technologies

• Freezing
  – Block or shreds (IQF)
  – Only some cheeses are suitable
  – Length of time frozen and still retain acceptable quality?
  – Cost? Ease of use?

• Non-thermal technologies
  – High pressure (cost? throughput?)
  – Others?

• Super-chilling (new CDR project)
  – Very low temperature (just above freezing, e.g., fish)
  – Would this work for cheeses that we cannot freeze? (e.g., cream cheese)
Other Approaches to the Shelf-life Issue

• Make cheeses overseas from concentrated dairy solids (supplied by U.S)
  – Reconstitute powders like MPC and add milk fat
  – Liquid casein concentrates/micellar caseins
  – Liquid lactose-free (shelf-stable) concentrates (e.g., Dairyvative)

• Make new types of cheeses that inherently have longer shelf-life (less traditional aging)
  – Processes involving MF to remove bacteria/spores, etc
  – Processing involving thermal (UHT) processing, e.g., cheese base
New Cheeses Designed for Overseas Markets (not for U.S. Standards)

• Non-standard of identity cheeses
  – UF cast Feta is a good case study
    • Denmark used UF to increase yield and made a novel feta cheese in a box, ripened in the container with enzymes and salt
    • Middle East consumers preferred it over traditional Feta
• Cheeses with unique flavors (Green tea, ginger, kimchi, etc.)
  – Extracts or purified compounds?
  – Impact on flavor/flavor stability?
  – Recovery?
  – Added to milk or cheese? (whey issues)
• New opportunities for cheese as an ingredient
  – e.g., snacks, in local cuisine
• Cheeses with non-dairy components
  – e.g., Plant proteins, vitamins, supplements, etc.
  – Impact on texture, off-flavor?
Colored Cheese/Whey

• EU now prohibits added color in any whey products used for infant formula products

• What about Asia?
  – In theory some carryover may be allowed in whey for infant formula?

• How will this change the U.S. cheese industry?

• Can color be added to the cheese instead?

• Should “native whey” (derived from milk) be used to supply infant formula business?
Processed Cheese

• CDR/USDEC did a study in 2009/2010 on the use of U.S. cheese for process cheese manufacture in South-East Asia
  – Issues raised included:
    • Low spore levels (to avoid need for preservatives for ambient stored products)
    • Matching texture of currently supplied Australia/NZ cheese (U.S. cheese was too soft)

• Opportunities include:
  – Designing natural cheeses with high levels of intact casein to provide good body
  – Creating novel cheese ingredients for use in process cheese (e.g., UF bases, dairy protein blends including denatured whey proteins, etc.)
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