Ready-to-Use Therapeutic Food (RUTF) for Severe Acute Malnutrition (SAM) Treatment

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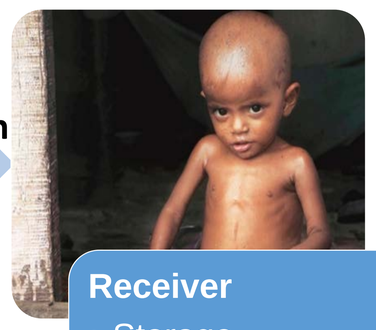
Community-Based SAM Treatment

- 20 million children afflicted worldwide
- 8 million in India
- Hospital-based treatment: costly and inconvenient
- Community-based treatment using RUTF is recommended by WHO

Distribution



Provider
- Production or import
- Quality and security control
- Government regulation

Receiver
- Storage
- Consumption
- Recovery
- Feedback

Issues with the Current RUTF

- The current RUTF is a peanut butter-based paste recipe by Nutriset®
- Water-born disease risk (anhydrous product, must be supplied with water)
- Low penetration, affordability, and acceptability
- Especially poorly accepted by children under 2 years old in India

RUTF Specifications

- Very high energy concentration (500kcal/100g), high protein concentration (10g/100g), with vitamins and minerals
- Fat and oil supply the majority of energy
- Milk powder supplies protein
- Sugar/Carbohydrates for balanced diet

Current Model: Centralized Production-Distribution

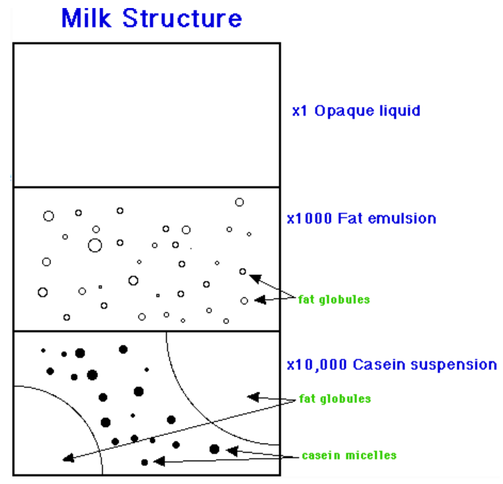
- Locally produced in Mumbai
- Testing cost is high (INR 50000/batch)
- Limited penetration to rural areas
- Depend mainly on public funds
- Product has to be anhydrous for long-term storage

Proposed Model: Equipment Distribution-Local Production

- Equipment, instead of products, are distributed
- Use local ingredients only
- Short storage time (Water permitted to give improved palatability)
- Each family is responsible for its own food quality (No testing required)
- Require cheap but efficient equipment
- Require education on properly making and consuming RUTF

Milk-Based RUTF

- Closest to breast milk
- Culturally acceptable
- Widely accessible in India
- Animal protein source (required 5g/100g in RUTF)
- Require additional protein
- Sedimentation issue

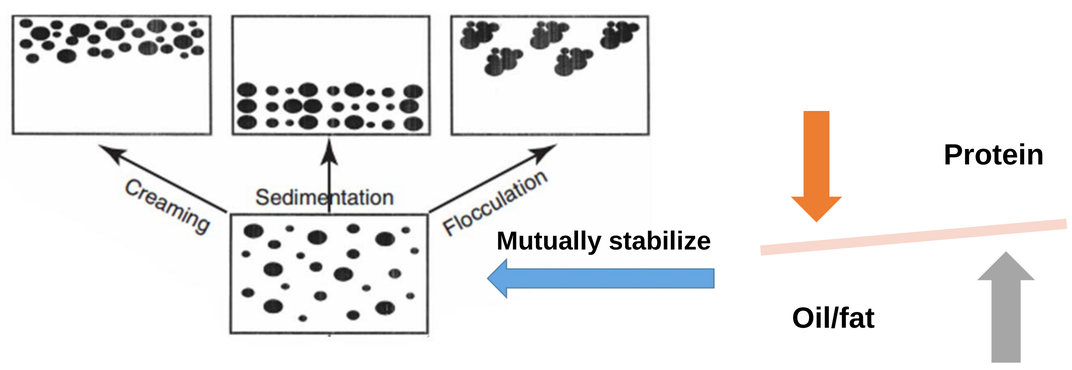


Emulsification

- No additional artificial surfactants
- Oil and fat are emulsified/stabilized by protein
- High concentration (target 30%vol) of oil/fat causes creaming

Microstructure Engineering

- Density balance by assembly of protein and oil/fat



- Achieve desired microstructure with a human-powered efficient emulsification equipment

Research in Progress

- Understand the microstructure-stability relationship
- Understand emulsification by a complex fluid (milk) as the continuous phase
- Particle incorporation and stabilization
- Two-phase fluid dynamics analysis for improving emulsification efficiency
- Equipment design and optimization
- Field research on palatability improvement

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References

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