Making donated milk more accessible through improved processing techniques

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Current infant feeding modes (regulated)

Breastfeeding

Exclusive feeding rate is 40%

Donated milk

Contamination risk, but is antimicrobial
Premature hospitalised infants

Infant formula

Accessible
Lacks protective components
Direct contamination risk
### Risks of not receiving breastmilk in the first 6 months

<table>
<thead>
<tr>
<th></th>
<th>Low income countries</th>
<th>High income countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formula fed infants</td>
<td>6-10 times more likely to die from diarrhoeal or respiratory disease (WHO)</td>
<td>3 times more likely to be hospitalised for respiratory disease (UNICEF)</td>
</tr>
</tbody>
</table>

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**Image:**
- The left image shows jars of breastmilk.
- The right image depicts a refugee camp with individuals and children.
Current processing techniques of donated milk

**Holder Pasteurisation**

62.5 °C for 30 minutes

**Problems:**
- uneven heat transfer
- Difficult to pasteurise large batches
- Degrades many immune components

**Storage: Frozen**

**Problems**
- Limits capacity
- Expensive
- Short-shelf life
- Limits ability to ship
Aims

1. Establishment of reference data using a range of accepted analytical techniques to characterise human raw human milk.

2. Study of the impact of treatment of different milk processing methods (freeze-drying and spray-drying, irradiation and heat)

- Physicochemical properties
- Functional properties
Antimicrobial capacity
Test pathogen: Staph aureus

Log growth of *S. aureus* in irradiated freeze-dried human milk (0-5 Gy)

![Graph showing log growth of S. aureus in irradiated freeze-dried human milk.](image)

Log growth of *S. aureus* after 6 hours

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0.00</th>
<th>0.42</th>
<th>0.69</th>
<th>0.14</th>
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</thead>
<tbody>
<tr>
<td>Untreated</td>
<td>0.00</td>
<td>0.42</td>
<td>0.69</td>
<td>-0.31</td>
</tr>
<tr>
<td>HoP</td>
<td></td>
<td></td>
<td></td>
<td>0.14</td>
</tr>
<tr>
<td>FD 2kGy</td>
<td></td>
<td></td>
<td></td>
<td>-0.31</td>
</tr>
<tr>
<td>FD 5kGy</td>
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<td>-0.31</td>
</tr>
<tr>
<td>FD 10kGy</td>
<td></td>
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<td>-0.31</td>
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</table>
Acknowledgements

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