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Title:

Digestion of dairy vs plant-based infant formula: role of gastric clots

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Abstract: (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text into it.)

Preparation of Your Abstract

1. The title should be as brief as possible but long enough to indicate clearly the nature of the study. Capitalise the first letter of the first word ONLY (place names excluded). No full stop at the end.
2. Abstracts should state briefly and clearly the purpose, methods, results and conclusions of the work.

Introduction: Clearly state the purpose of the abstract
Methods: Describe your selection of observations or experimental subjects clearly
Results: Present your results in a logical sequence
Discussion: Emphasize new and important aspects of the study and conclusions that are drawn from them

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Traditional dairy formulas provide more complete and bioavailable nutrients for infant growth while plant-based formulas offer options for allergy management, dietary preference and sustainability. Dynamic *in vitro* digestion model physiologically mimics real digestion tracts, allowing for more realistic digestion assessment. This study provides insights into how protein sources affect digestion and nutrient release, facilitating food design strategies aimed at optimizing digestion profiles, satiety control and nutrient delivery.

A novel dynamic *in vitro* infant stomach–duodenum system (DIS-II) was developed to reproduce key physiological features of infant gastrointestinal tract, including anatomical geometry, pH gradients, peristaltic motion, and gastric emptying. Commercial dairy- and plant-based infant formulas (IFs) were examined under simulated infant gastrointestinal digestion, including concentrated whole cow milk (CWCM), skimmed cow milk (CM), goat milk (GM), and soy milk (SM). This study compared gastric clotting and examined how protein sources affect gastric emptying, proteolysis, and lipolysis.

CWCM formed the most rigid and viscous gastric clots while SM showed no visible gastric clotting. Clot mass decreased over time due to mechanical disruption, proteolysis, and gastric emptying. SM and GM exhibited similar gastric emptying, whereas cow milk samples were emptied more slowly during later digestion phase. CWCM formed the firmest clots, slowing both proteolysis and lipolysis. After gastrointestinal digestion, GM and CM showed the highest proteolysis. Lipolysis, assessed via free fatty acid release, followed the trend SM > GM > CM > CWCM, likely due to differences in lipid entrapment within gastric clots.

This study employed a novel dynamic infant digestion model (DIS-II) to investigate the relationship between protein source, gastric clotting and digestive kinetics. Gastric clot formation varied by protein source and influenced digestion efficiency, especially extensive gastric clotting hindering protein and fat digestion. These findings underscore the role of gastric clotting in nutrient release, offering insights for improving IF nutrient bioavailability.