Impact of Breast Milk in Escherichia coli Inhibition: Variation of the Antibacterial Efficacy According to the Stage of Breastfeeding

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Breastfeeding is the process of nourishing an infant through the production of breast milk. Human breast milk has complex components crucial for the health of both mother and child, encompassing but not limiting to, various cell types, antibodies, microorganisms, nutrients, and minerals. This study delved into the impact of breast milk and its components when exposed to Escherichia coli, a gram-negative bacterium that naturally inhabits in the intestinal flora. The investigation scrutinized immune activity within milk samples of different maturation stages, colostrum, mature milk at 6 and 12 months, and varying quantities, employing two procedures. In Procedure I, bacterial growth was assessed across three increasing milk volumes from the different extractions, revealing a notable reduction in E. coli proliferation when exposed to colostrum, compared to mature milk. Remarkably, the study found no significant variance between results obtained from milk at 6 and 12 months. Procedure II involved pre-growing bacteria before seeding them to equal milk quantities from the extractions, demonstrating that breast milk doesn't eradicate all bacteria upon initial exposure. Instead, antibacterial efficacy demonstrated a direct correlation with milk volume, exposure time, and frequency of exposure. Quantification of approximate colony counts in milk samples aged 0-12 months through the "Colony Count" application confirmed the evaluation of antimicrobial efficacy. This research sets the stage for potential applications of breast milk and its constituents, leveraging their bioavailability and beneficial influence on intestinal flora. Future efforts are aimed at exploring this potential opportunity, investigating pharmaceutical applications, and enhancing its health benefits.

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