Effect of Sweet and Fermented Buttermilk Samples on Growth of SW480 Human Colon Cancer Cells and FHC Human Colon Normal Mucosa Cells.

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The milk fat globule membrane (MFGM) that surrounds fat globules in milk is a natural source of polar lipids and proteins with defined anticancer properties. Modern dairy processing operations, such as homogenization, heating, aeration, agitation or drying can affect the structure and composition of milk fat globule membrane, potentially influencing its anticancer activity. Buttermilk is naturally rich in disrupted MFGM material and its polar lipid content is relatively high compared with most other dairy products. The aim of this study was to determine if anticancer activity can be attributed to sweet and fermented buttermilk samples and examine if different milk processing operations may influence the antiproliferative activity of resultant buttermilks. After 3 days of incubation sweet pasteurized (72°C, 15 sec) buttermilk at a concentration of 0.38 g total solids/ml significantly ($P \leq 0.001$) inhibited growth of SW480 human colon cancer cells by 97.5% but had no toxic effect on FHC human colon normal mucosa cells as determined by the acid phosphatase cytotoxicity assay. Washed buttermilks showed higher cytotoxicity on SW480 colon cancer cells relative to unwashed samples. Washed pasteurized (72°C, 15 sec) buttermilk at the concentration of 0.062 g total solids/ml inhibited SW480 cell growth by 96.2%. Moreover, we report that the anticancer activity of buttermilks remained the same after heat treatment but was lost after spray drying. Furthermore, fermented buttermilks were less inhibitory on colon cancer cell growth. The highest cytotoxicity for fermented buttermilks was obtained for buttermilk fermented with *Streptococcus thermophilus* HDPC4694, which inhibited SW480 colon cancer cell growth by 46.6% at concentration of 0.94 g total solids/ml. Demonstration of selective anticancer activity by buttermilks is novel and warrants further investigation at the cellular level.