

Title: Folate production by starter and probiotic cultures using a culture media supplemented with amaranth flour, mango and okara by-products

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Abstract:

Folate is a B-group vitamin that needs to be acquired from the diet since human beings are unable to synthesize it. This vitamin plays an important role in the human organism such as the biosynthesis of DNA, RNA and some amino acids and prevention of neural tubes defects. Folic acid supplementation programs are present in several countries. Nevertheless, studies suggested that the high consumption of this vitamin in its synthetic form may cause some adverse effects on human health. Therefore, this study aimed to evaluate the ability of starter (*Streptococcus thermophilus* STM-6 and *S. thermophilus* TA-40) and probiotic (*S. thermophilus* TH-4 and *Bifidobacterium animalis* subsp. *lactis* BB-12) cultures in producing natural folates from fermentation of amaranth flour, mango residue and okara (a by-product of the soymilk industry) since these microorganisms are commonly used by food industry. For fermentation assay, 4-5 log cfu/ml were inoculated in phenol red MRS broth supplemented with 1% of each by-product or amaranth flour and incubated aerobically (*S. thermophilus*) or anaerobically (*B. animalis*) at 37 °C. Folate measurement was performed by microbiological assay using as indicator the strain *Lactobacillus rhamnosus* NCIMB 10463. Samples were taken at 0 h and 24 h of fermentation. Phenol red MRS broth contained 27±3 ng/ml of folate. This amount was subtracted from the final values. STM-6 and TH-4 strains were able to produce folates from the fermentation of phenol red MRS broth supplemented with mango residue (37±5 to 58±7 ng/ml and 35±13 to 72±3 ng/ml, respectively) while TA-40 and BB-12 strains consumed it. Although okara has showed the highest folate content, no strain was able to produce this vitamin from okara fermentation. After 24 h, only BB-12 was able to produce folate from amaranth flour fermentation (64±0 to 252±9 ng/ml), with an increase of approximately three folds of initial folate concentration. Evidences shows that probiotics are ideal candidates for delivering folate into foods, however, the production of folate by microorganism is strain-dependent. Therefore, folate bio-enriched foods can be a cheaper, natural and important alternative to folic acid supplementation in these products preventing possible adverse effects to human health.

Key-words: Folate, vegetable by-products, amaranth, fermentation

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