

TITLE: Water extracts of fruit by-products improve growth and folate production by starter and probiotic microorganisms

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ABSTRACT:

Folate is a soluble B-group vitamin, which occurs naturally in foods or can be produced naturally by some microorganisms during fermentative processes. Folate is involved in several functions of human metabolism, such as DNA replication, repair, methylation and neural tubes development of fetus during pregnancy. Human beings are not able to produce folates thus the intake of this vitamin from the diet or consuming supplements rich in folic acid (the synthetic form of the vitamin) is necessary. In order to prevent folic acid deficiency, some countries established mandatory programs to fortify foods with folic acid, however, people with balanced diets may consume excess amounts of the vitamin which may cause health problems. In this sense, the aim of this study was to evaluate the ability of a starter *Streptococcus (St.) thermophilus* TH-4 and the probiotic *Lactobacillus (Lb.) rhamnosus* LGG (as pure culture and in co-culture) to growth and produce folate in the presence of four fruit by-products water extracts (passion fruit, orange, acerola, and mango). All fruit extracts were obtained after a hot water extraction (100 °C/1h), using a mixture of fruit by-product powder with distilled water (1:12). For fermentation assay, 4-5 log cfu/ml of each strain were inoculated in 4.5 mL of phenol red MRS broth supplemented with 500 µL of each fruit and incubated aerobically at 37 °C. Folate measurement was performed by microbiological assay using as indicator the strain *Lb. rhamnosus* NCIMB 10463 and samples were taken at 0 h and 24 h of fermentation. When in pure culture, *Lb. rhamnosus* LGG fermented all fruit extracts consuming the available folate and *St. thermophilus* TH-4 did not grow in the presence of acerola extract and produced the highest amount of folate in the presence of mango extract. When in co-culture, LGG was also able to grow in the presence of all fruit extracts while TH-4 fermented only orange and mango extracts. Additionally, when in co-culture, the microorganisms were able to increase the folate content during the fermentation of all fruit extracts except acerola. The use of extract from fruit by-products is associated with folate production by lactic acid bacteria (especially probiotic microorganisms) and represents a novel potential to develop innovative nutraceutical product.

Keywords: probiotic, folate, fruit by-products, fermentation

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