

TITLE: Probiotic and starter cultures as bioproducers of riboflavin: an alternative to chemical enrichment of fermented foods

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ABSTRACT:

The bioenrichment is an interesting alternative to synthetic food fortification, and some strains of lactic acid and probiotic bacteria can produce B group vitamins, such as riboflavin (B2) and folate through a fermentative process. Fruit-processing industries generate by-products that may contain bioactive compounds, like phenolic compounds and fibers, being an interesting ingredient for the development of functional foods. Moreover, it is a sustainable solution for the environmental impact of agro-industrial pomace. This study aimed to evaluate the capacity of strains of *Streptococcus thermophilus* (ST-M6, TA-40, and TH-4), *Bifidobacterium (B.) animalis* subsp. *lactis* (BB-12), *B. longum* subsp. *infantis* (BB-02), *B. longum* (BB-46), *Lactobacillus (Lb.) acidophilus* (La-5), *Lb. fermentum* (PCC), *Lb. paracasei* subsp. *paracasei* (F-19, *L. casei* 431), *Lb. reuteri* (RC-14), and *Lb. rhamnosus* (GR-1, LGG) to produce riboflavin and to ferment fruit by-products. To assess the riboflavin production, each strain was inoculated individually to a culture medium without riboflavin (Riboflavin Assay Medium, RAM), and then incubated at 37 °C for 24 h. The strains that were able to produce vitamin B2 were tested for fermentation (37 °C/ 24 h) of fruit pomace flour from grape (*Vitis* spp.) and cashew (*Anacardium occidentale* L.) in modified DeMan, Rogosa and Sharpe (MRS) broth prepared without the addition of carbohydrates and supplemented with each fruit by-product flour (1% w/v). Among the strains tested, *Streptococcus thermophilus* (ST-M6, TA-40, and TH-04) and the probiotic *Lactobacillus fermentum* PCC showed potential to produce riboflavin in RAM. Only PCC and ST-M6 were able to ferment the cashew flour, reaching populations of, respectively, 8.25 and 4.82 log CFU / mL. Regarding the fermentation of grape flour, TH-4, TA-40, PCC, and ST-M6 showed populations of, respectively, 6.87, 7.24, 8.40, and 8.38 log CFU/ mL. Therefore, *Streptococcus thermophilus* strains ST-M6, TH-4, and TA-40 and *Lactobacillus fermentum* PCC were able to produce riboflavin, and combined with grape by-product, have potential for bio-enriched fermented food production.

Keywords: probiotics, fruit by-products, riboflavin, bioenrichment, vitamin B

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