Letter to the editor on Enhancing vitamin B12 content in soy-yogurt by Lactobacillus reuteri, IJFM. 206:56 59

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Letter to the editor on ‘Enhancing vitamin B₁₂ content in soy-yogurt by Lactobacillus reuteri, IJFM. 206:56–59’

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Dear Editor,

A recent paper in IJFM (Gu et al., 2015) describes that the vitamin B12 content of soy-yogurt can be enhanced through fermentation by *Lactobacillus reuteri*. The authors suggest that *L. reuteri* fermented soy product could be served as an alternative food for the aged and vegetarians with a high risk of low vitamin B12 content in serum. However, we have concerns about this study.

In humans, diet is considered the most likely source of vitamin B12, but the presence of B12 in various foods is misinterpreted due to obscurity in the methodology used to measure the compound and particularly in the ability to discriminate between active forms of B12 and other corrinoids (Degnan et al. 2014). While earlier studies reported that *L. reuteri* produces vitamin B12 (Taranto et al. 2003; Santos et al. 2008), recent studies using mass spectrometry to accurately differentiate between different cobamides have revealed that *L. reuteri* produces only pseudovitamin form of B12 (Santos et al. 2007; Crofts et al. 2013; Degnan et al. 2014). From the perspective of human metabolism, the difference between vitamin and pseudovitamin is crucial, as the transporter protein in the human gastrointestinal tract, the intrinsic factor, has very low affinity to pseudovitamin (Stupperich and Nexø, 1991), making it virtually unavailable to humans.

While the HPLC/UV (Gauch et al., 1992) or UHPLC/UV (Chamlagain et al., 2015) methods can be used for separation of the vitamin-B12-like compounds, Gu et al. (2015) do not document the distinction between the vitamin B12 and the pseudovitamin. As production of active B12 vitamin by *L. reuteri* would be surprising and contradict current knowledge based on molecular studies (Santos et al. 2007; Crofts et al. 2013), the distinction between active and pseudo forms is crucial for the assessment of this study.

Furthermore, based on the results obtained with microbiological method (Denter and Bisping, 1994) Gu et al. report production (10%) of vitamin analogs by *L. reuteri*. By definition “analogs” give positive result in bioassay but lack vitamin B12 activity and include other corrinoids, such as pseudovitamin B12 and factor A, as well as non-corrinoid compounds, such as DNA, deoxyribonucleotides and deoxyribonucleosides (Ball 2006). In the protocol by Denter and Bisping (1994) all the corrinoid compounds, including vitamin B12 and pseudovitamin, are destroyed by heating, and the “analogs” supporting growth of the test organism are accordingly non-corrinoid compounds (Ball 2006). Thus, in our opinion the term “vitamin analogs” is used in a misleading context by Gu et al., since here it cannot include pseudovitamin B12.

*L. reuteri* has a long history of safe use and could be potentially used for in situ fortification of foods with vitamin B12. However, for this purpose it is of vital importance to make a distinction between strains producing the active and the pseudo form of the vitamin.

Yours sincerely,

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