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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 B\textsubscript{12} content of soy-yogurt can be enhanced through fermentation by \textit{Lactobacillus reuteri}. The authors suggest that \textit{L. reuteri} fermented soy product could be served as an alternative food for the aged and vegetarians with a high risk of low vitamin B\textsubscript{12} content in serum. However, we have concerns about this study.

In humans, diet is considered the most likely source of vitamin B\textsubscript{12}, but the presence of B\textsubscript{12} 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 B\textsubscript{12} and other corrinoids (Degnan et al. 2014). While earlier studies reported that \textit{L. reuteri} produces vitamin B\textsubscript{12} (Taranto et al. 2003; Santos et al. 2008), recent studies using mass spectrometry to accurately differentiate between different cobamides have revealed that \textit{L. reuteri} produces only pseudovitamin form of B\textsubscript{12} (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-B\textsubscript{12}-like compounds, Gu et al. (2015) do not document the distinction between the vitamin B\textsubscript{12} and the pseudovitamin. As production of active B\textsubscript{12} vitamin by \textit{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 \textit{L. reuteri}. By definition “anals” give positive result in bioassay but lack vitamin B\textsubscript{12} activity and include other corrinoids, such as pseudovitamin B\textsubscript{12} 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 B\textsubscript{12} and pseudovitamin, are destroyed by heating, and the “anals” 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 B\textsubscript{12}.

\textit{L. reuteri} has a long history of safe use and could be potentially used for in situ fortification of foods with vitamin B\textsubscript{12}. 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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