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A Riboswitch Sensor to Determine Vitamin B12 in Fermented Foods

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# 1    **A Riboswitch Sensor to Determine Vitamin B12 in Fermented Foods**

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## 8    **Abstract**

9    We describe a sensitive and selective method for determination of vitamin B12  
10    content in fermented foods using riboswitch sensor. A riboswitch amplicon from  
11    *Propionibacterium freudenreichii* was cloned in p519NGFP vector in *Escherichia coli*  
12    BL21 (DE3). The expression of green fluorescence protein was revers correlated to  
13    the concentrations of adenosylcobalamin. Adenosylcobalamin directly binds to  
14    riboswitch region leading to conformational changes in the secondary structure of  
15    mRNA, thus inhibiting expression. After various examinations, a standard curve was  
16    obtained from 10 to 1000 ng/mL of cyanocobalamin. The limit of determination is 10  
17    ng/mL. The inter-assay coefficients of variation were 7.5% for the range of 10-1000  
18    ng/mL. The recovery of this method was 92.3%. This method has no or less responses  
19    to nucleic acid, pseudovitamin B12, vitamin B12 bound to intrinsic factor and  
20    haptocorrin. The riboswitch sensor results were similar with HPLC, but they were Ca.  
21    24% lower than the microbiological assay results.

22    **Keywords:** riboswitch; green fluorescence protein; cobalamin

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