High-Throughput Simultaneous Detection of Vitamin B₁₂ and Folate using Intrinsic Factor and Folate Binding Protein

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doi: 10.20964/2020.06.18

Received: 13 November 2019 / Accepted: 16 February 2020 / Published: 10 May 2020

The research was to establish high-throughput simultaneous detection of vitamin B₁₂ and folate correspondingly using intrinsic factor and folate binding protein. The influence of linker selection, experiment temperature, sample dilution solution pH, coating time, serum pretreatment, incubation time and concentration were evaluated for further experiment. Standard curve was established. ECL signal of 21°C was higher than that of 37°C. At 21°C, ECL signal of pH5.5 was higher than that of pH7.3 for linker1 detecting vitamin B₁₂ and linker10 detecting folate. Higher protein incubation concentration (FBP 25µg/L, IF 1.33µg/L) had significantly higher signal than the other incubation concentration (FBP 7.5µg/L, IF 0.4µg/L). Incubation 0.5h had higher signal than incubation 1h. Coating 0.5h was chosen as the suitable coating time. R-squares of standard curve were 0.991 for vitamin B₁₂ and 0.993 for folate using the first pretreatment method. A simultaneous detection method of vitamin B₁₂ and folate was initially established. 12uL was enough for the volume of detection serum, detection time was as quickly as 2-3 hours, and the method was convenient and high-throughput. This study provides technical support for solving the bottleneck problems existing in human nutrition detection, and might contribute to the accurate nutrition development of human.

Keywords: simultaneous detection; high-throughput; folate; vitamin B₁₂

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