Comparison between phage-ELISA and phage dot-blot assay methods for the detection of hepatitis B surface antigen and its antibodies in human serum

Abstract

A modified phage-enzyme link immunosorbent assay (phage-ELISA) and a phage dot-blot assay specific for hepatitis B surface antigen (HBsAg) and its antibody were developed by using phage display technology. The phage-ELISA and phage dot-blot assays enabled to detect HBsAg and anti-HBsAg in human sera, and compatible to commercial detection kit. The fusion phages were immobilized onto microtiter plate wells and nitrocellulose membrane sheets, then blocked with 10% milk diluent, and added with human serum at dilution of 1:5000. The absorbance at 405 nm was determined once the colour changes formed. The same human serum also applied on the commercial diagnostic kit for comparison. The statistical analysis was carried out using ANOVA and T Test (LSD) for variable comparison between phage-ELISA and phage dot-blot assays. Based on these studies, the phage-ELISA was found to be more sensitive compared to phage dot-blot assay as the detection of HBsAg in human sera was about 80% as compared to 51.7% by using phage dot-blot assay. Meanwhile, the sensitivity for detection of anti-HBsAg by using phage-ELISA was slightly higher which showed about 83.3%. However, the sensitivity of the assay was dropped almost half when using phage dot-blot assay. Therefore, they are practical to be used as a reliable alternative way for the detection HBsAg and its antibody in human sera.

Keyword: HBsAg; Phage-ELISA; Phage dot-blot assay; Human sera