Development of highly sensitive chemiluminescence enzyme immunostaining assay to determine glycyrrhizin content using anti-glycyrrhizin monoclonal antibody

Abstract

Licorice, the root of *Glycyrrhiza* spp., is used in a large number of herbal medicines, such as traditional Chinese medicines, Japanese Kampo medicines, and therapeutic drugs. Since glycyrrhizin (GL) is among the main components in licorice and exhibits numerous beneficial pharmacological activities, the content of GL directly affects biological activity. The quality control based on GL content is an important factor in ensuring biological activity; however, the content of GL in licorice varies depending on plant cultivation environment, genetic factors, and species type. Previously, we prepared an anti-GL monoclonal antibody (anti-GL mAb) and employed it in various immunochemical assays for quality control of licorice and licorice-based products. In this study, we employed the anti-GL mAb in chemiluminescence enzyme immunostaining (CLEIS) to develop a very simple, rapid, specific, and sensitive quality control assay for licorice products, with a limit of detection of 3.9 ng. Furthermore, the CLEIS assay enabled semiquantitative analysis of GL in Kampo medicines. Our results showed that multiple samples can be simultaneously analyzed using CLEIS, and it is a useful tool for determining GL content, as well as ensuring chemical quality control of licorice-containing products and herbal medicines.