Production of monoclonal antibody and development of immunochromatographic assay for Ochratoxin A

Ochratoxin A (OTA) is a mycotoxin produced by Aspergillus and Penicillium species, and causes nephrotoxicity, hepatotoxicity, and carcinogenicity in animals. It has been frequently detected in grains, cereals, coffee, and other commodities including animal feeds, although a range of commodities has been reported to contain ochratoxin A. For the rapid and quantitative detection of ochratoxin A levels in human foods and animal feeds, a monoclonal antibody against ochratoxin A was produced by immunization of BALB/c mice with ochratoxin A-bovine serum albumin (BSA) conjugate. After several screening steps, we selected one monoclonal antibody (mAb: C7G25) and it belongs to the IgGk heavy chain subclass with a kappa type light chain. The level of 50% inhibition value (IC50) was 1.20 ng/mL in a competitive direct enzyme-linked immunosorbent assay (ELISA) and the detection limit was 0.12 ng/mL. This antibody is also very specific, cross-reacting only with ochratoxin B (31.7%) in a competitive direct ELISA. Based on the sandwich format using the produced monoclonal antibody against ochratoxin A, a rapid immunochromatographic assay was developed to efficiently detect ochratoxin A. This immunochromatographic method was able to detect up to 500 ng/mL of ochratoxin A in less than 10 min.

KEYWORDS: ochratoxin A; monoclonal antibody; Enzyme-linked Immunosorbent Assay (ELISA); colloidal gold; immunochromatographic assay