Claims

1. An aflatoxin B1 nanobody immunoabsorbent, comprising:

a solid phase carrier; and

an aflatoxin nanobody coupled to the solid phase carrier, wherein the aflatoxin nanobody consists of aflatoxin B1 nanobody 2014AFB-G15, wherein the aflatoxin B1 nanobody 2014AFB-G15 comprises

the amino acid sequence of SEQ ID NO:7, encoded by the nucleic acid sequence of SEQ ID NO:8; wherein the aflatoxin B1 nanobody 2014AFB-G15 comprises further three complementary determining regions of: CDR1 consisting of amino acid sequence of SEQ ID NO:1, CDR2 consisting of amino acid sequence of SEQ ID NO:2 and CDR3 consisting of amino acid sequence SEQ ID NO:3; wherein the CDR1 is encoded by the nucleic acid sequence of SEQ ID NO:4, the CDR2 is encoded by the nucleic acid sequence of SEQ ID NO:5; and CDR3 is encoded by the nucleic acid sequence of SEQ ID NO:6; and wherein the aflatoxin B1 nanobody immunosorbent specifically binds aflatoxin B1.

2. The aflatoxin B1 nanobody immunoabsorbent according to claim 1, wherein the solid phase carrier is sepharose gel or silica gel microparticles.

3. A method for preparing the aflatoxin nanobody immunoabsorbent according to claim 1, wherein the solid phase carrier is silica gel microparticles or sepharose gel, wherein when the solid phase carrier is silica gel microparticles, the method comprises: weighing 1-5g silica gel microparticles and alternatively washing the silica gel microparticles with pure water and phosphate buffer of pH 6; suspending the silica gel microparticles in 5-25ml phosphate buffer of pH 6, and stirring to obtain a silica gel microparticles suspension; dissolving 2-10 mg of aflatoxin B1 nanobody 2014AFB-G15 in 1-5 mL of phosphate buffer of pH 6; adding dropwise the dissolved aflatoxin B1 nanobody 2014AFB-G15 solution to the silica gel microparticle suspension; weighing 70-350mg of carbodiimide and rapidly adding the carbodiimide into the silica gel microparticle suspension having the aflatoxin B1 nanobody 2014AFB-G15, and reacting under stirring at 4 °C for 18-22 h, to obtain the aflatoxin nanobody immunoabsorbent with silica gel microparticles as the solid phase carrier; or

when sepharose gel is the solid phase carrier, the method comprises: weighing 0.3-1g sepharose gel; washing the sepharose gel repeatedly with 1 mM of HCl solution; suspending the washed sepharose in 5-15 mL of coupling buffer, adding 0.6-2mg of aflatoxin B1 nanobody 2014AFB-G15 to the sepharose gel in coupling buffer and reacting under stirring for 1-2h at room temperature to obtain a sepharose gel suspension aflatoxin B1 nanobody 2014AFB-G15is coupled to the sepharose gel; filtering the unreacted aflatoxin B1 nanobody solution from the sepharose gel and washing the filtered sepharose gel with coupling buffer; adding 0.1M of Tris-HCl buffer of pH 8.0 to the washed sepharose gel; and reacting under room temperature for 2 h; and alternatively washing the washed sepharose with 0.1 M of Tris-HCl buffer of pH 8.0 and 0.1M of Tris-HCl buffer of pH 4.0, to obtain the aflatoxin nanobody immunoabsorbent with sepharose gel as the solid phase carrier,

wherein the coupling buffer is 0.1 M $NaCO_3$ and 0.5 M NaCl having pH 8.3.

4. An aflatoxin B1 nanobody immunoaffinity column loaded with the aflatoxin B1 nanobody immunoabsorbent according to claim 1.

5. A method for preparing the aflatoxin B1 nanobody immunoaffinity column of claim 4, comprising: filling the aflatoxin B1 nanobody immunoabsorbent into a solid phase extraction tube; adding 0.01 M of phosphate buffer of pH 6 therein and allowing the resulting solution to precipitate naturally; washing with 0.01 M of phosphate buffer of pH 6; and storing in 0.01 M of phosphate buffer of pH 6 containing 0.02 wt% sodium azide, thereby obtaining aflatoxin B1 nanobody immunoaffinity column.

6. A method for purification and concentration of aflatoxin B1 in an extracting solution of a sample using the aflatoxin nanobody immunoaffinity column of claim 4, the method comprising: firstly rinsing the prepared aflatoxin B1 nanobody immunoaffinity column with purified water; then adding the extracting solution of a sample to the rinsed aflatoxin nanobody immunoaffinity column; rinsing with purified water to remove unbound aflatoxin nanobody from the column; after the liquid drains completely, eluting with methanol; and collecting the eluate,

wherein the eluate comprises purified and concentrated aflatoxin which can be used directly for loading to a machine for detection.