



www.ifin.ro

Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering

Process for obtaining anti- 2,4-dichlorophenoxyacetic acid (2,4D) antibodies from protein mixture complex based on nanoimmunosorbents

Patent no. 131121 / 30.09.2019

Abstract

The process according to the invention consists in the use of nanoimmunosorbents in the separation of specific antibodies from antiserum protein mixtures, namely the obtaining anti-2,4-dichlorophenoxyacetic acid (2,4D) antibodies meant to be used in immunochemical techniques for dosing 2,4D from environment samples.

The process consists in:

- synthesis of the nanoimmunosorbent based on SiO₂ nanoparticles whereto the conjugate goat serum albumin- 2,4-D is coupled,
- separation of globulins from polyclonal antiserum containing anti-2,4D specific antibodies and anti bovine serum albumin antibody,
- the reaction of the anti-2,4D specific antibody from the globulin mixture with the 2,4D antigen coupled to the nanoimmunosorbent surface,
- centrifugation of suspension, dissociation of 2,4D-antigen - anti-2,4D-antibodies immune complex, dosing the anti-2,4D-antibodies amount and storage thereof for use.

2,4-D (C₈H₆Cl₂O₃) is an herbicide used in agriculture to control and destroy of the weeds that can affect agricultural crops. It is used in turf, lawns, rights-of-way, aquatic sites, forestry sites, and a variety of field, fruit and vegetable crops. It may also be used to regulate the growth of citrus plants.

The remaining of this organochlorurate compound in alimentary products, transfer and contamination of the ground water in the areas where this pesticide is used require the analysis of this chemical in order to establish the contamination level of the alimentary products and the environmental factors (water, soil).

Technology stage

The antibodies obtained by this process retain their immunological qualities (affinity and specificity) against the antigen and were validated in the ELISA technique.

Applications

The obtained product can be used in:

- ELISA immunochemical technique in the homogeneous phase for dosing the pesticide 2,4-dichlorophenoxyacetic acid from environmental samples;
- Medical field;
- environmental protection: quantitative analysis of pesticide contaminants from environmental factors (soil, water).

Derwent Class Codes:

-B04- Natural products and polymers. Including testing of body fluids (other than blood typing or cell counting), pharmaceuticals or veterinary compounds of unknown structure, testing of microorganisms for pathogenicity, testing of chemicals for mutagenicity or human toxicity and fermentative production of DNA or RNA. General compositions.

-C06- Biotechnology - including plant genetics and veterinary vaccines;

-D16- Fermentation industry - including fermentation equipment, brewing, yeast production, production of pharmaceuticals and other chemicals by fermentation, microbiology, production of vaccines and antibodies, cell and tissue culture and genetic engineering;

-S03- Scientific Instrumentation.

Advantages

The nanoimmunosorbent consists of SiO₂ nanoparticles on their surface being covalently coupled the specific antigen.

The nanoimmunosorbent has the advantage of a large specific surface area (> 200 m² / g) a large amount of specific antibody can be obtained (100-200) mg per 1 g of nanoimmunosorbent (equivalent amount of 100-200 ml antiserum).

The number of antisera containing the specific antibody that can be analyzed and from which the specific antibodies can be separated in the same time period is high compared to the affinity chromatographic method.

Contact

Daniela Zamfir

Tel.: 0741289153

Email: daniela.zamfir@nipne.ro