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

Process for preparing the enzymatic marker 2,4-dichlorophenoxyacetic acid-hexamethylenediamin-peroxidase

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Abstract

The invention relates to a process for preparing an enzymatic marker to be used for dosing the pesticide 2,4-dichlorophenoxyacetic acid (2,4-D) from biological and environmental samples.

The process consists in:

- activation of 2,4-dichlorophenoxyacetic acid;
- the reaction of coupling the activated pesticide mixture with hexamethylenediamine;
- the reaction of oxidation of the peroxidase carbohydrate,
- purification of the oxidized product by chromatography,
- the reaction of purifying and coupling the oxidized peroxidase with the derivative 2,4-dichlorophenoxyacetic acid-hexamethylenediamine,
- the reaction of purifying and reducing the resulting Schiff base,
- purification of the resulting enzymatic marker by column chromatography.

2,4-D ($C_8H_6Cl_2O_3$) 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 obtained product, 2,4-dichlorophenoxyacetic acid-hexamethylenediamin-peroxidase can be used in ELISA (enzyme-linked immunosorbent assay) immunochemical technique as enzymatic marker for dosing the 2,4-D pesticide from environmental samples and it was validated in this 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 biological and environmental samples;
- the field of laboratory medicine;
- 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.

-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.

Advantages

-the enzymatic marker obtained (2,4-dichlorophenoxyacetic acid-hexamethylenediamin-peroxidase) has a high specific enzymatic activity, the obtaining procedure takes place in a much shorter time, of approximately 3-5 hours, compared to the procedures for other peroxidase-based conjugates.

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