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High-throughput Label-free Enzymatic Bioassays using Automated DESI-MS

Automated Desorption Electrospray Ionization -Mass Spectrometry (DESI-MS) offers a high-throughput, label-free, and precise method for evaluating enzymatic bioassays, improving efficiency and accuracy in drug discovery and biological research.

Researchers at Purdue University have developed a new high-throughput label-free technique for evaluating enzymatic bioassays using automated Desorption Electrospray Ionization -Mass Spectrometry (DESI-MS). Researchers study enzyme reaction kinetics in the presence of substrates, inhibitors, reactivators, and ligands as a crucial aspect of drug discovery and other biological and biomedical research. Automated DESI-MS can improve the study of enzyme kinetics by its speed (0.6 s/sample), specificity and quantitative precision. The technique has been tested with the neuromuscular enzyme acetylcholinesterase and several other enzymes with improved efficiency and accuracy over high-throughput optical assays using labeled compounds.

Advantages:

-High-Throughput

-Efficient

-Reliable

-High Linearity in Results

-Fast Readout

Potential Applications:

-Pharmaceutical

-Biomedical

-Research in Chemistry and Biochemistry

Technology ID

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Category

Pharmaceuticals/Drug Discovery & Development
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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Technology Validation:

Acetylcholinesterase, a common neuromuscular enzyme, has been tested with the new label-free bioassays using automated DESI-MS, and excellent efficiency and accuracy were observed.

Recent Publication:

"High-Throughput Label-Free Enzymatic Assays Using Desorption Electrospray-Ionization Mass Spectrometry"

Angewandte Chemie, a Journal of the German Chemical Society

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Intellectual Property:

Provisional-Gov. Funding, 2020-05-11, United States | PCT-Gov. Funding, 2021-03-05, WO | NATL-Patent, 2021-03-05, Europe | NATL-Patent, 2021-03-05, South Africa | NATL-Patent, 2021-03-05, China | Utility-Gov. Funding, 2021-03-05, United States | CON-Gov. Funding, 2022-06-22, United States | CON-Gov. Funding, 2022-12-20, United States | CON-Gov. Funding, 2024-09-26, United States | NATL-Patent, N/A, India

Keywords: High-throughput, label-free technique, enzymatic bioassays, automated DESI-MS, Desorption Electrospray Ionization -Mass Spectrometry, enzyme reaction kinetics, drug discovery, biological research, biomedical research, acetylcholinesterase, pharmaceutical, biochemistry, Assays, Biochemistry, Biological and Chemical Assays, Biomedical, Biometrics, Biotechnology, Chemistry, Chemistry and Chemical Analysis, DESI, Drug Development, Drug Discovery, Drug Targets and Screening Assays, Enzyme Inhibitor, Enzymes, Ligand-Targeted Therapeutics, Ligands, Mass Spectrometry, Medicinal Chemistry, Microscopy, Microscopy Design, Neurobiology, Pharmaceutical Research, Pharmaceutics