International Journal of Pharmacy

Journal Homepage: http://www.pharmascholars.com

Perspective **CODEN: IJPNL6**

A Brief Overview on Oxylipins and their Analytical Techniques

Toshiyuka Suzuki*

Department of Pharmacy, Tokyo University of Pharmacy and Life Sciences, Hachioji, Tokyo, Japan

***Corresponding author email:** Toshiyukasuzuki@hokudai.jp

Received : *07-Mar-2022, Manuscript No. IJP-22-64398;* ***Editor assigned*** *: 11-Mar-2022, Pre QC No. IJP-22-64398 (PQ);* ***Reviewed:*** *28-Mar-2022, QC No. IJP-22-64398;* ***Revised:*** *04-Apr-2022, Manuscript No. IJP-22-64398 (R);* ***Published:*** *11-Apr-2022, DOI: 10.37532/2249-1848-2022.12(4).19.*

DESCRIPTION

Oxylipins are lipid mediators synthesized from polyunsaturated fatty acids (PUFAs) such Arachidonic Acid (ARA), Linoleic Acid (LA), -Linolenic Acid (ALA), Eicosapentaenoic Acid (EPA), and Docosahexaenoic Acid (DHA) through enzyme-catalyzed and non-enzymatic oxidation processes. Oxylipins are involved in a wide range of biological activities, although they are most commonly associated with inflammation control. The effect of oxylipins on inflammation is determined by their PUFA precursor; typically, oxylipins formed from n-3 PUFAs are anti-inflammatory and pro-resolving, but oxylipins derived from n-6 PUFA metabolites might increase inflammation. Because oxylipins bind to Peroxisome Proliferator-Activated Receptors (PPARs) and G protein-coupled receptors (GPCRs), they can operate as molecular mediators.

COX and LOX modify ARA metabolism in epithelial-derived malignancies, resulting in the generation of pro-inflammatory molecules that promote tumour development and aid the creation of a tumour microenvironment conducive to angiogenesis and immunosuppression. Obesity has been linked to altered PUFA metabolism, with the interplay of PPAR and GPCR modulating adipogenesis. Due to the vasoconstrictive properties of various oxylipins, plasma oxylipin levels have also been linked to the outcome of cardiovascular disease, metabolic syndrome, preeclampsia, and cardiac arrythmias. Due to the limited sensitivity of existing techniques, the existence of most oxylipins at low concentrations, as well as their tremendous variability and the development of numerous structurally identical oxylipins, makes qualitative and quantitative determination challenging.

The primary extraction procedures were including Protein Precipitation (PPT), Liquid-Liquid Extraction (LLE), solid-phase extraction (SPE), and the derivatization process. The Oxylipins group of interest influences the extraction process and solvents used to generate good target analytic recoveries and repeatability needed for subsequent quantitative analysis.

SPE is the most extensively utilized extraction method in the investigation of oxylipins due to the availability of many types of sorbents and solvents. The extraction techniques for LLE and SPE have been categorized according to the features of the biological material being examined (bio fluids, solid tissues, cell cultures). Finally, novel methodologies and trends in Oxylipins analysis were discussed, including material collection (dried blood spot), precipitation (ferromagnetic particle assisted deproteination), and extraction (micro extraction, online SPE, mixed-mode extraction using a spin column).

Because oxylipins are typically found in biological samples at very low concentrations, the accuracy of sample collection, storage, and extraction methods is crucial. The current study discusses additional phases of analysis as well as the quantitative assessment of oxylipins levels in prepared samples utilizing currently available analytical methods. To study oxylipins, researchers employed immunoassays, Thin Layer Chromatography (TLC), HPLC with a diode array or fluorescent detector, and capillary electrophoresis with a photodiode array detector. However, these approaches are constrained by a very similar structure, poor stability, and relatively low oxylipins concentrations in tissues. As a result, oxylipins levels in biological samples have recently been determined using Gas Chromatography-Mass Spectrometry (GC-MS) and Liquid Chromatography-Mass Spectrometry (LC-MS).

Immunoassays (Enzyme Immunoassay (EIA) and Radioimmunoassay (RIA)) were the most extensively used quantitative procedures for oxylipins for a long time, owing to their great sensitivity: RIA was created to measure the amounts of IsoPs (8-iso-PGF2) in human plasma and urine, 15-keto-dihydro-PGF2 in human plasma, Prostaglandin E2 (PGE2) and LTB4 in human prostate tissues, PGE2, PGF2, PGI2, 6-oxo-PGF2, TXA2, TXB2, and PGF2 in human plasma, PGI2, TXA2, 13,14-dihydro-15-keto PGF2α (M-PGF2α). ELISA, like EIA and RIA, requires particular antibodies, and because oxylipins are structurally similar, antibodies that will properly separate them are unlikely to be found.

CONCLUSION

Although RIA and EIA are sensitive enough to detect subpicomole quantities of oxylipins, they have certain limits in tissue and plasma samples, lowering immunoassay sensitivity. Plasma proteins bind to eicosanoids, and commercially available eicosanoid antibodies have a high level of immunological cross-reactivity (e.g., the PGE2 antibody can cross-react to a significant extent with PGE3 and 8-iso-PGF2a).