Perspective

iMedPub Journals
www.imedpub.com

Insights in Analytical Electrochemistry
ISSN 2470-9867

2021
Vol.7 No.5:033

Application of Analytical Chemistry and Bioanalytical Chemistry

Gary F Massart*

Department of Analytical Chemistry, National Center for Food Safety and Technology, 6502 S. Archer Road, IL, USA

*Corresponding author: Gary F. Massart, Department of Analytical Chemistry, National Center for Food Safety and Technology, 6502 S. Archer Road, IL, USA, Email: gafmass@cfst.edu

Received date: November 03, 2021; **Accepted date:** November 18, 2021; **Published date:** November 25, 2021

Citation: Massart GF (2021) Application of Analytical Chemistry and Bioanalytical Chemistry. Insights Anal Electochem Vol.7 No.5:100033.

Description

Bile Acids (BAs) constitute an important class of biological molecules produced in the metabolism of all vertebrates. In mammals, they exhibit the so called C24 structure: 24 carbon atoms form a steroid nucleus (three six-member rings indicated as A, B C and a five-member ring indicated as D) and a five-carbon side chain with a carboxyl group at the C-24 position. The A and B rings are linked in cis configuration, inducing an overall bent shape. Such a structural feature delineates a concave and convex side of the steroidal backbone where OH groups in α orientation (up to three) and two methyl groups in β orientation, respectively, point out. Therefore, two opposite faces with hydrophilic and hydrophobic properties can be distinguished. Further variations of the molecular structure can be observed at C-3 carbon due to hydroxyl, sulfate or glucuronate substituents. C-6 and C-24 glucoronide conjugates were also found in humans. Other C-24 substituents are glycine or taurine. Recently Dorrestein et al. reported new amino acid C-24 substituted Cholic Acid (CA) namely phenylalanocholic, tyrosocholic and leucocholic acid. BA actions generally occur in conditions where they are deprotonated; for this reason, many authors refer to them as bile salts instead of acids. In this review the term BA will be used keeping in mind that we refer mostly to their salt form.

Study of the modification of the particle morphology deposited on different substrates and subjected to various conditions during storage, handling, and analysis. For their study, they generated, collected, and analyzed three types of particles: sodium chloride, sulfuric acid, and soot coated with sulfuric acid. Depending on substrates and conditions, they observe that morphological changes of the deposited particles could vary from negligible to severe. They, therefore, recommend caution during each step of the specimen lifetime from the collection to the analysis. They also provide specific conditions and sampling media that can work better for the specific problem and particle type investigated **[1]**.

Different Bioprocesses

The study of the food domain as a whole to reach an optimized human health and well-being is referred as to foodomics. Accordingly, after intake, Cy3G within a food matrix must be subject to different bioprocesses in order to exert its functional action within target organs. It must be releasable (bioaccessible) from its food matrix, presented to and absorbed by gut epithelial cells, transported in the bloodstream, bio-transformed in target tissues and finally excreted in urine and feces. During ADME, Cy3G undergoes many transformations that reduce or enhance its bioactivity such as acid and enzymatic modifications, transport across gut epithelium, phase I and II metabolism and delivering mechanisms to name a few. Particularly, the specific enzymatic action on Cy3G along with its enhanced capacity to be absorbed (as compared to its aglycone) have a great influence on its metabolic fate. A step-by-step review on Cy3G's metabolic physiological fate and foodomics **[2]**.

The basic strength (pKBH+) and surface area of prepared catalysts were analyzed using the Hammett indicator test and Brunauer–Emmett–Teller (BET) surface area measurement, respectively. The basic strength of CaO was found to be increased from 9.8–10.1 to 11.1–15.0 after 2 wt % doping of Zn, which further increased to a maximum of 18.4 after calcination at 400°C. However, a further increase in calcination temperature decreased the basic strength. The improvement of the basic strength of CaO after zinc ion doping with an increase in calcination temperature up to 400°C could have been due to the partial dehydration and strong increase in the surface area. An increase in the Zn ion concentration did not improve the basic strength **[3]**. However, after Zn doping on MgO and ZnO, the basic strength was increased to the range of 15.0–18.4. The BET surface area was another critical factor that had a direct impact on catalytic efficiency. Bare CaO had a surface area of 3.56 m^2/g, which improved to 16.87 m^2/g after 2 wt% doping of Zn along with calcination at 400◦C. However, calcination at high temperatures, viz. 600°C and 800°C, caused a reduction in surface area to 10.12 m^2/g and 5.25 m^2/g, respectively, which could have been due to the sintering of material at high temperatures. The doping of the Zn ion on MgO and ZnO also caused an increase in surface area from 10.4 m^2/g to 14.89 m^2/g and 4.72 m^2/g to 12.13 m^2/g, respectively Hence, the doping of the Zn ion and calcination were critical factors responsible for the increase in basic strength and surface area.

Transformation Products by Photolysis

The observed behavior is similar to the rate of photolysis reported in previous studies. The estrogen mixture shows significant degradation under UV radiation exposure, especially with UV-A and UV-C radiation. Nonetheless, the TOC removal was not as fast as the removal of estrogens. This may result from the presence of excipients compounds in the commercial

estradiols formulation, consisting of lactose monohydrate, microcrystalline cellulose, magnesium stearate and polyvinyl alcohol, which are not easily mineralized by UV photolysis. In addition, the transformation products by photolysis are expected to degrade at slower rates, since the aliphatic derivatives of the photolytic degradation of estrogens can be more stable than the aromatic rings under UV irradiation conditions. Although solar radiation only contains a small proportion of UV-C, the collective contribution of the other UV components can be sufficient for breaking chemical bonds in the estrogens molecules **[4]**. The effect of solar photolysis is usually significant for the degradation of the estrogens parent compound in natural waters. However, in heterogeneous photocatalysis, the absorption of UV photons by the photocatalyst, in well-designed reactors, is several orders of magnitude higher than the absorption of photons by the molecules in solution, therefore the effect of photolysis can often be neglected when the contaminants and TOC removals are modeled.

In this study we evaluated three new unsymmetrical porphyrins and corresponding compounds with symmetrical structure, from the point of view of their effects exerted in vitro on MTS reduction by human breast carcinoma MCF-7 cells and human PBMCs **[5]**. Results revealed that the new assymetric and symetric porphyrins were non-toxic against tumor MCF-7 cells and PBMCs in the concentration range 0.2 µM–2 µM, making them valuable candidates for further development as photosensitizers for PDT of tumors. Moreover, the investigated assymetric porphyrins tended to restore the response of normal and tumor cells affected by DMSO, while symetric compounds had a lower modulatory action.

References

1. Eric H (2005) Chemistry of Star-Forming Regions. J Phys Chem 109 : 4017–4029.
2. Wilkins CL (1983) Hyphenated Techniques for Analysis of Complex Organic Mixtures. Science 222: 291–6.
3. Miller KE, Synovec RE (2000) Review of analytical measurements facilitated by drop formation technology. Talanta 51: 921–33.
4. Guetens G, DeBoeck G, Highley MS, Wood M, Maes, RAA et al. (2002) Hyphenated techniques in anticancer drug monitoring: II. Liquid chromatography–mass spectrometry and capillary electrophoresis–mass spectrometry. J. Chromatogr. A 976 : 239–47.
5. Schermelleh L, Carlton PM, Haase S, Shao L, Winoto L et al. (2008) Subdiffraction Multicolor Imaging of the Nuclear Periphery with 3D Structured Illumination Microscopy. Science. 320: 1332–6.