



Research Article

Combinatorial Therapeutic Approaches to DNA/RNA and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine Nanocapsules with Surface Conjugated DNA/RNA to Targeted Nano Drugs for Enhanced Anti-Cancer Efficacy and Targeted Cancer Therapy Using Nano Drugs Delivery Systems

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Abstract

In the current study, combinatorial therapeutic approaches to DNA/RNA of human cancer cells and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules with surface conjugated DNA/RNA of human cancer cells to targeted Nano drugs for enhanced anti-cancer efficacy and targeted cancer therapy using Nano drugs delivery systems were investigated.

Introduction

The birth of stereoselectivity probably dates back to 1890, when Emil Fischer recognized that the reaction of L-Arabinose ($C_5H_{10}O_5$) with Hydrogen Cyanide (HCN) provided about 66% of one of the two possible diastereomers, namely, L-Mannonoitrile [1-20]. In this way, asymmetric induction was discovered, and thus one of the corner stones of diastereoselective synthesis laid down. The stereochemistry of elimination reactions of secondary and tertiary alcohols are meaningful with respect to both regioselectivity and/or stereoselectivity (anti vs. syn) only when it is obtained under the conditions where primary products are produced with minimum secondary isomerization [21-40].

We believe that we have found just the right system which can shed more light on the mechanism for the dehydration and/or substitution reactions over heterogeneous catalyst Cadmium Oxide (CdO), homogenous Triphenylphosphine

(Phosphorustriphenyl) in DNA/RNA of human cancer cells and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules (Figure 1) with surface conjugated DNA/RNA of human cancer cells to targeted Nano drugs for enhanced anti-cancer efficacy and targeted cancer therapy using Nano drugs delivery systems [41-91]. Additionally, we have investigated the effect of temperature, pressure, Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2) on the structure, reactivity and selectivity of Cadmium Oxide (CdO). Quantum Chemical Calculations (QCC) are utilized to simulate the structure, spectra and transition state of Cadmium Oxide (CdO) with adsorbed homogenous Triphenylphosphine (Phosphorustriphenyl) on DNA/RNA of human cancer cells and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules with surface conjugated DNA/RNA of human cancer cells to targeted Nano drugs for enhanced anti-cancer efficacy and targeted cancer therapy using Nano drugs delivery systems.

Materials, Research Method and Experimental Techniques

Cadmium Oxide (CdO) is efficient catalysts for esterification reaction. Its success is based on the possibility to prepare it with strong Brønsted acidity and good resistance to high reaction temperatures. Moreover, Cadmium Oxide (CdO) has applications in different area of chemical industry such as cosmetics, artificial perfumes, flavours, pharmaceuticals, plasticizers, solvents, leather, painting and as the dehydrating agents.

A series of catalysts with varying Phosphoric acid (H_3PO_4) contents were prepared by impregnating calculated amounts of H_3PO_4 dissolved in Deionized water (DI water, DIW or de-ionized water) on Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2) supports. All the catalysts were characterized by Energy Dispersive X-Ray Analysis (EDXA), Energy Dispersive X-Ray Microanalysis (EDXMA),

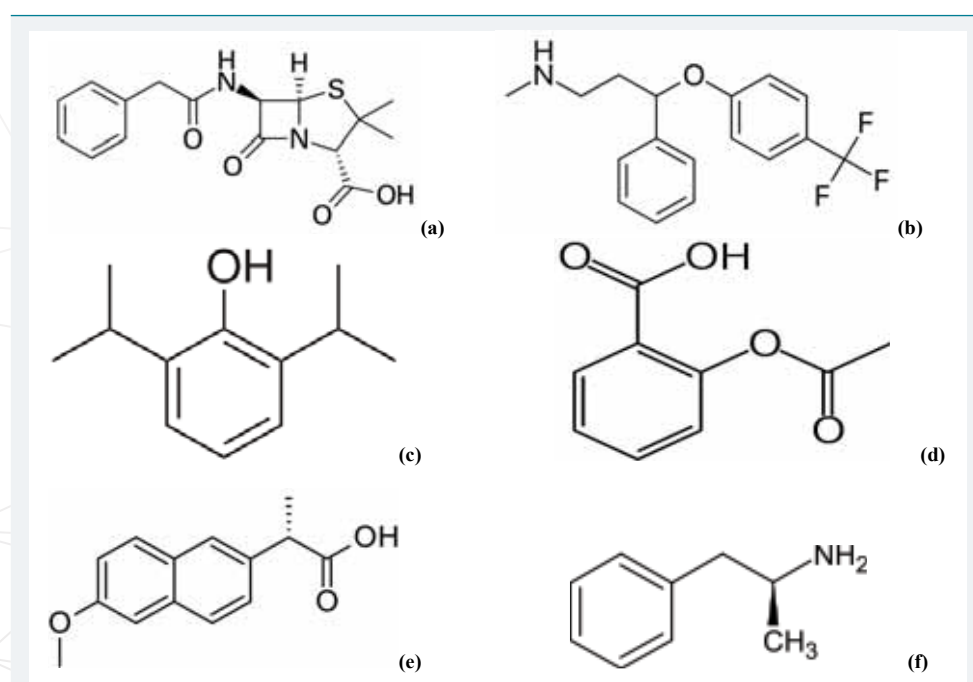


Figure 1: Molecular structure of (a) Benzylpenicillin (Penicillin G), (b) Fluoxetine Hydrochloride (Prozac and Sarafem), (c) Propofol (Diprivan), (d) Acetylsalicylic Acid (ASA) (Aspirin), (e) Naproxen Sodium (Aleve and Naprosyn) and (f) Dextromethamphetamine nanocapsules [1-91].



Scanning Electron Microscope (SEM), Brunauer-Emmett-Teller (BET) analysis, X-Ray Diffraction (XRD), Transmission Electron Microscope (TEM), Differential Thermal Analysis-Thermal Gravim Analysis (DTA-TGA), Energy-Dispersive X-Ray Spectroscopy (EDX), ^1H NMR, ^{13}C NMR, ^{31}P NMR, UV-Vis, HR-Mass, Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy (ATR-FTIR) and FT-Raman spectroscopies and Pyridine adsorption-desorption measurements. Then, the reaction of acetic acid with 1-butanol and 1-hexanol were carried out over these catalysts in vapour-phase. The effect of temperature from 200 to 400°C, the initial molar feed ratio, acid: alcohol molar ratio, the amount of loading H_3PO_4 over Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2), injecting rate of feed and the reaction time were also investigated. The optimized conditions for each alcohol were obtained and monitored by Gas Chromatography-Mass Spectrometry (GC-MS).

Optimized conditions of reaction were 0.1g of 45% H_3PO_4 /Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2), $T=584\text{K}$, molar ratio ($\text{RCO}_2\text{H}:\text{ROH}$) of 2:1 and for 1-hexanol and Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2), $T=497\text{K}$, molar ratio of 1:1, and for 1-butanol; time on stream of reaction was 23h. All the product esters showed selectivity close to 100%. From the studies on the esterification of acetic acid over Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2) and H_3PO_4 /Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2) with different amounts of Triphenylphosphine (Phosphorustriphenyl) on DNA/RNA of human cancer cells and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules with surface conjugated DNA/RNA of human cancer cells to targeted Nano drugs for enhanced anti-cancer efficacy and targeted cancer therapy using Nano drugs delivery systems, the reaction shows higher conversion for 1-hexanol rather than 1-butanol. The increase in the nanocapsules chain length of alcohol increases the hydrophobicity of alcohol, then the more hydrophobic alcohol will adsorb better to hydrophobic catalyst. H_3PO_4 increases hydrophobicity of Cadmium Oxide (CdO) and has a main effect on total conversion.

Results and Discussion

Catalytic hydrogenation is the most useful and widely applicable method for the reduction of chemical substances and belongs to the basic process of modern chemical industry. It has found numerous applications in the fuel industry, the synthesis of polymers and plastics, the food industry, the production of alcohols, carbonyl compounds and amines as well as in the manufacturing of fine chemicals, flavors and fragrances, agrochemicals and pharmaceuticals. Majority of industrial catalytic hydrogenations is still carried out using heterogeneous catalysts due to the process advantages such as stability, easy separation and wide range of applicable reaction conditions. The homogenous catalysts, which have been further developed during the past years, have extended the scope of catalytic hydrogenation especially in the field of highly stereoselective transformations. However, new developments continue to appear also in the field of heterogeneous catalysis, particularly in cases where a high chemo-, regio-, or stereoselectivity has to be achieved.

The selectivity aspects of catalytic hydrogenation over heterogeneous catalysts will be discussed and documented with several examples. All three types of selectivity (chemo-, regio- and stereoselectivity) will be addressed with special emphasis on the



applicability of the catalytic procedure. The scope of chemoselective hydrogenation will be demonstrated by selective hydrogenation of unsaturated nitriles. It was found that the $C\equiv N$ group can be hydrogenated prior to the $C=C$ bond. Hydrogenation of Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules will represent an example of regioselective hydrogenation. In this case, only one of the two $C=C$ bonds present in the molecule should be reduced to obtain desired product. Finally, an example will be given on stereoselective hydrogenation. One example will describe the diastereoselective hydrogenation applied in the DNA/RNA of human cancer cells and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules with surface conjugated DNA/RNA of human cancer cells to targeted Nano drugs for enhanced anti-cancer efficacy and targeted cancer therapy using Nano drugs delivery systems.

Conclusion

This study will deal with characteristic and historical aspects of heterogeneous catalysis, major challenges at present and ideas/prospective for the future. It will include the synthesis of major bulk and fine chemicals, of petrochemicals, the researchers in depollution and in biomass uses and its derived chemicals. Particular emphasis will be put on: (i) Activation and selective oxidation of Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules; (ii) Heterogeneous catalysis for fine chemicals; (iii) Asymmetric catalysis; (iv) Environment and biomass catalysis; (v) High throughput researches for combinatorial catalysis and (vi) Projection for catalysis in the last decade.

Case studies have been chosen to exemplify the different fields of interest. The case of Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules selective oxidation to the corresponding olefins or oxygenates will be presented such as the up-grading C_1 to C_5 nanocapsules, which is of paramount importance for fundamental and industrial interests, namely: how such inert nanocapsules rather cheap raw nanomaterials can be activated and up-graded. The case of Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules oxidation on basic catalysts based on Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2) were presented. A high combinatorial therapeutic approach for catalyst preparation was given. Environment catalysis for Selective Catalytic Reduction (SCR) Reaction was described. Finally, combinatorial therapeutic approaches to DNA/RNA of human cancer cells and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules with surface conjugated DNA/RNA of human cancer cells to targeted Nano drugs for enhanced anti-cancer efficacy and targeted cancer therapy using Nano drugs delivery systems were investigated.

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