IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

A Review On: "Cefixime."

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Abstract

Third-generation cephalosporins in oral formulations have become an increasingly important first-line option for common bacterial infections. Cefixime is one such agent that has excellent activity against a wide range of pathogens, including Haemophilus influenzae, Streptococcus pneumoniae, and Moraxella catarrhalis. Clinical success rates are similar to those of cefaclor, clarithromycin, and other cephalosporins. It should be noted that cefixime also has excellent activity against beta-lactamase-producing strains. The drug's pharmacodynamic properties include a half-life of 3 to 4 hours and a Cmax of 4.4 µg/mL, which is well above the MIC90 for susceptible pathogens and allows for once-daily dosing.In this brief summary, the bacteriological and clinical efficacy of cefixime and its indications are discussed[1].Cefixime is the primary oral third generation cephalosporin. It is powerful and secure in youngsters older than 6 months and in adults. It has bactericidal activity. It is immune to maximum betalactamase gram-poor bacteria, it's far powerful towards 90 % of enterobacteria (Escherichia coli, Klebsiella pneumoniae, Klebsiella oxytoca, Proteus mirabilis, Proteus vulgaris, Citrobacter, Enterobacter, Salmonella spp., Shigella spp. etc.). It is particularly powerful towards Streptococcus pyogenes, streptococcus organization B, C and G, penicillin inclined Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis, Neisseria gonorrhoeae, Pasteurella multocida. Indications for remedy are higher and decrease respiration tract infections, otitis media, straight forward and complex infections of the decrease and higher urinary tract, straight forward gonorrhea and different infections resulting from inclined bacteria[2].

Keywords

Cefixime, Efficacy, Safety, Community-acquired pneumonia ,systematic review.

Definition

Cefixime is a third generation cephalosporin used to treat susceptible Gram negative and Gram positive bacterial infections[12].

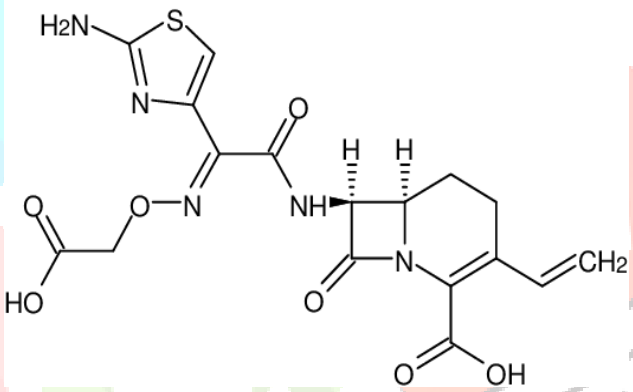
Introduction

Oral cephalosporins are avilable over 25 years. This are used extensively within the therapy of patient infections in adults and kids. Those agents are variably subject to hydrolysis by beta-lactamases. Cefixime is a new orally absorbed cephalosporin and it is initial oral one in the third generation.

Cefixime is not hydrolyzed by the common plasmid-mediated enzymes and by chromosomal 13-Lactamases because inactivate the now a day oral penicillins and cephalosporins, and, for this reason, inhibits a good variety of gram-positive and Gram-negative aerobic bacteria, together with Haemophilus influenzae, Moraxella catarrhalis, Neisseria gonorrheae, Escherichia coli and klebsiella resistant to ampicillin, other oral cephalosporins and trimethoprimsulfamethoxazole.

Its broad spectrum activity permits its use in respiratory and urinary tract infections.This paper is a review of chemical properties, antibacterial activity,pharmacokinetics, clinical pharmacology, indications and adverse effects of cefixime as compared to alternative orally absorbed cephalosporins and to amoxycillin or cotrimoxazole[3].

Structure :



Molecular Formula : $C_{16}H_{15}N_5O_7S_2$

Molecular Weight : 453.44 $g \cdot mol^{-1}$

Synonym :

- Cefixime
- Cefixim
- Cefiximine
- Cefixoral

Synthesis of Cefixime :

Cefixime belongs to 3rd generation cephalosporin's antibiotic medicine. It has been extensively used for the identification of infections like sore throat, otitis, gonorrhea, lower tract infections like respiratory disease, and tract infections.

It shows medication activity by busy with bacterium peptidoglycan synthesis when binding to the βlactam-binding proteins. Cefixime is taken into account as an occasional solubility and low porosity Mefoxin medicine.

It's soluble in dimethyl sulfoxide (DMSO), dimethyl formamide (DMF), ethanol, and fuel however insoluble in water. Low solubility of drug affects bioavailability.

Because of low solubility of cefixime, its bioavailability is merely 30–50% of AN oral dose absorbed and shows most peak serum concentrations inside 2–6 hours[5].

In this study cefixime and azithromycin nanoparticles were prepared by antisolvent precipitation with syringe pump (APSP) and evaporator precipitation nanosuspension (EPN) methods.

The nanoparticles were characterized by XRD, FTIR, SEM, and TGA. X-ray diffraction pattern of cefixime samples showed the amorphous form, while azithromycin samples showed crystalline form. The FTIR spectra of parental drugs and synthesized nanoparticles have no major structural changes detected. The SEM images showed that nanoparticles of both drugs have submicron sized and nanosized particles.

TGA analyses showed that above 30°C the decomposition of cefixime samples starts and their weight gradually decreases up to 600°C, while, in case of azithromycin, 30°C to 250°C, very small changes occur in weight; from above 250°C decomposition of the sample took place to a greater extent.

The antibacterial activities of raw drugs and prepared samples of nanoparticles were determined against Staphylococcus aureus, Shigella, E. coli, and Salmonella typhi by agar well diffusion method. Every time the nanoparticles samples showed better results than parental drugs.

The dissolution rates of raw drugs and prepared nanoparticles were also determined. The results were always better for the synthesized nanoparticles than parental drug[6].

Methods:

Cefixime was synthesized by reaction of *7-amino-3-vinyl-3-cephem-4-carboxylic acid(Abbreviation 7-AVCA) with 2-(2-aminothiazol-4-yl)-2-[(Z)methoxycarbonylmethoxyimino]acetic acid-2-S-mercapto benzo thiazole ester* (abbreviation MICA ester) via amidation and hydrolysis[7].

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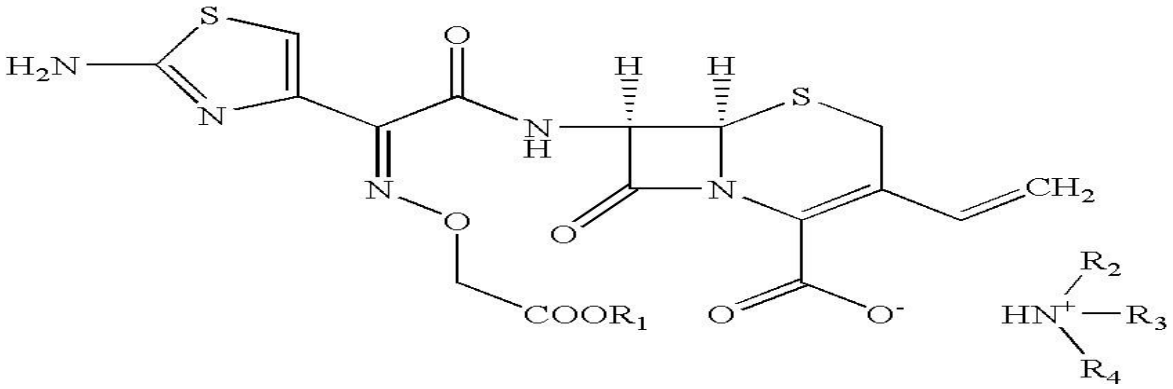


Fig.1 Manufacturing process of cefixime[8].

Evaluation of Cefixime :

Using Dispersible Tablets :

The aim of this study is to formulate a cefixime dispersible tablet and assess the flowability, wettability, disintegration time and in vitro dissolution with impact to a marketed cefixime tablet.

Methods:

Completely different superdisintegrants like croscarmellose sodium (CCS) and crospovidone (CP) were used and evaluated for disintegration time. Seven formulations were ready and evaluated for flowability, hardness, wetting time, disintegration time and in vitro drug release.

Results:

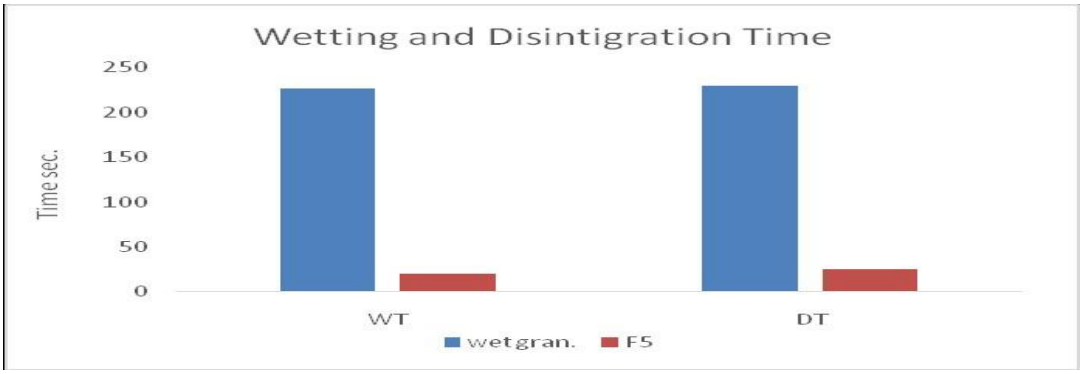
The most effective formulation of superdisintegrants was CP at a concentration of 100 pc (Formula F5) because it gave a speedy disintegration time (25 s) and fewer wetting time (20 s) compared to the opposite formulae.

The formulations (F1-F6) that were ready by direct compression technique had acceptable limit of hardness (5 kg/cm2), whereas F7 that was ready by wet granulation technique, had abundant much hardness (10 kg/cm2).

The chosen formula F5 showed associate improved dissolution rate t80% (0.75 minute), compared to Zimaks® (1.75). This could be attributed to the result of CP that gives quick rates of dissolution of poorly soluble medicine.

It had been found that the dispersible tablets of cefixime established to point out a higher unharness profile all told aspects as compared to the marketed formulation (Zimaks®). Exploitation completely different superdisintegrants or ways of compression have important effects on the hardness and wetting time of cefixime tablets[9].

Fig 2. Evaluation of Cefixime Dispersible Tablets Using Co- Processed Excipients[10].



Uses of Cefixime :

Cefixime is used to treat a good type of bacterial infections. This medication is understood as a cephalosporin antibiotic. It works by stopping the growth of bacteria.This antibiotic treats solely bacterial infections. It'll not work for infectious agent infections (such as common cold, flu). Exploitation any antibiotic once it's not required will cause it to not work for future infections[11].

Conclusion :

Cefixime was found to be superior to ciprofloxacin in terms of efficacy in the treatment of community-acquired pneumonia in adults in Nigeria. However, both antibiotics were well-tolerated by all the patients as there were no reports or documentation of adverse events.

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