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Furan Derivatives and Their Role in Pharmaceuticals

Rashitova Shahnoza Shuhrat qizi
Teacher of the Department of General Sciences Asia International University Bukhara, Uzbekistan
rashitovashahnozashuhratqizi@oxu.uz

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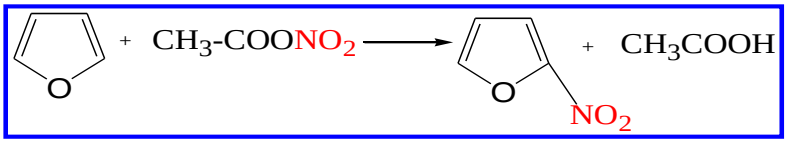
Annotation: Furan is a five-membered heterocyclic compound containing one heteroatom (oxygen). Furan itself is not used in medicine, but its derivatives, particularly furfural (furan-2-carbaldehyde), are used as medicinal substances. Nitrofurans have similar chemical structure, physical and chemical properties, and pharmacological effects. They are active against gram-positive and gram-negative bacteria, some viruses, Trichomonas, and Giardia. In many cases, they inhibit the growth of microorganisms resistant to sulfonamides and antibiotics.

Two main groups of furan preparations are used in medicine: furan derivatives (such as amiodarone, furosemide, griseofulvin) and nitrofuran derivatives (such as nitrofural, furazolidone, nitrofurantoin, furagin, and furazidine). These preparations are used to treat various infections and fight microorganisms. For example, nitrofural, furadonin, and furazolidone are effective not only against bacteria but also protozoa and certain pathogens. These substances are used in treating skin wounds, burns, and intestinal infections.

Keywords: Furan, nitrofuran, furfural, amiodarone, furosemide, griseofulvin, nitrofural, furazolidone, furadonin, furagin, microorganisms, antibacterial agents, medicine, pharmaceutical preparations.

Introduction

Furan is a five-membered heterocyclic compound containing one heteroatom (oxygen). Furan is a colorless liquid with a chloroform-like odor. Furan itself is not used in medicine, but various derivatives of its derivative furfural (furan-2-carbaldehyde) are used as medicinal substances in medicine.



Nitrofurans are similar in chemical structure, physical and chemical properties, and pharmacological effects. They are active against gram-positive and gram-negative bacteria, some viruses, Trichomonas and Giardia. In many cases, they inhibit the growth of microorganisms that are resistant to sulfonamides and antibiotics.

Two groups of furan preparations are used in medicine:

1. Furan derivatives: amiodarone, furosemide, griseofulvin.

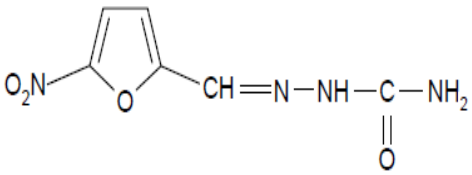
2. Nitrofuran derivatives: nitrofural (furatsilin), furazolidone, nitrofurantoin (furadonin), furazidine (furagin), furaltadone (furazolin).Furatsilin.

Nitrofural (Furacilinum, Nitrofural)- Mr=198,14

Description: Odorless, slightly sweet, yellow or slightly greenish-yellow crystalline powder.

Melting point 230–236 C. Very slightly soluble in water, slightly soluble in 96% alcohol, insoluble in ether, soluble in alkali and DMFA. Antibacterial agent.

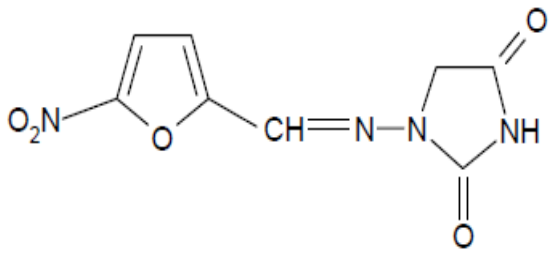
5-Nitrofurfural-semicarbazone



Uses: purulent wounds, bedsores, burns of the IN-I degree, minor skin injuries (including abrasions, scratches, cracks, cuts). Local: used for blepharitis, osteomyelitis, paranasal sinuses, pleural empyema (cavity washing), acute external and middle otitis, angina, stomatitis, gingivitis.

Furadonin -Odorless, slightly sweet, yellow or orange crystalline powder. Melting point 258–263 C . Very slightly soluble in water (1:8000) and 95% alcohol (1:2000), slightly soluble in acetone. Antibacterial agent. Dosage form: tablets.

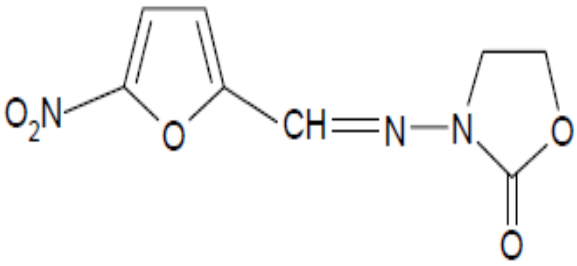
N-(5-nitro-2-furfurylidene)-1- aminohydantoin

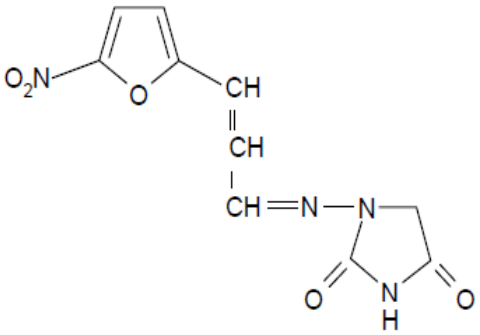


Furazolidone - used for uncomplicated urinary tract infections (cystitis, urethritis, pyelitis, pyelonephritis) caused by sensitive microorganisms, for the prevention of infections during urological operations and examinations (cystoscopy, catheterization). Odorless, slightly sweet,

yellow or slightly greenish-yellow crystalline powder. Melting point 253–258 C (parch). Almost insoluble in water (1:25000), slightly soluble in 95% alcohol. Antibacterial, antiprotozoal agent. Dosage form: tablets.

N-(5-nitro-2-furfurylidene)-3-aminooxazolidone-





2 N-(5-nitro-2-furyl)-allylidene-aminohydantoin

Furagin-Odorless, slightly sweet, yellow or orange crystalline powder. Insoluble in water and 95% alcohol. Antibacterial agent. D/sh: tablet.Furagin is used for chronic and acute urinary tract infections, uncomplicated lower urinary tract infections caused by Escherichia Coli, which is responsible for 95% of cases. bladder infections. Furagin is active against the following strains of gram-positive bacteria: staphylococci (staphylococcus aureus), fecal streptococci, Staphylococcus epidermidis and gram-negative bacteria enterobacteria (Salmonella, Shigella, Proteus, E. coli).

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