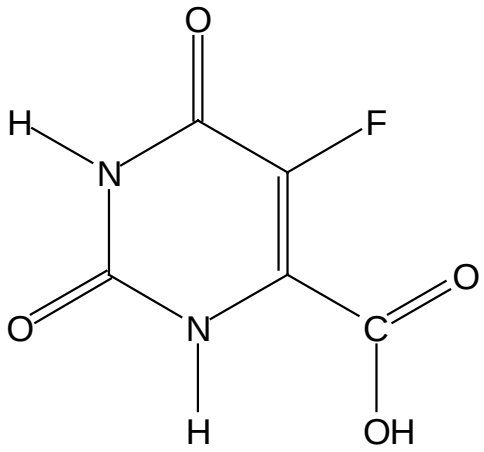
ProductInformation

5-FLUOROOROTIC ACID
Sigma Prod. No. F5013



CAS NUMBER: 703-95-7
SYNONYMS: ENT 26398; 5-Fluoroorotate; Fluoroorotic Acid; NSC 31712; FOA; 4-Pyrimidinecarboxylic Acid, 5-Fluoro-1,2,3,6-Tetrahydro-2,6-Dioxo-(9CI); RO 2-9945; 1,2,3,6-Tetrahydro-2,6-Dioxo-5-Fluoro-4-Pyrimidinecarboxylic Acid[1]; WR -152520[2]; 5-Fluoro-6-Carboxyuracil[2]

PHYSICAL DESCRIPTION:

Appearance: White to white with a yellow cast powder.[3]
Melting Point: approx. 256-259°C[4]
Molecular Formula: $C_5H_3FN_2O_4$
Molecular Weight: 174.1

METHOD OF PREPARATION:

FOA is synthetically prepared[5]. Methods for the synthetic preparation and the mass spectra have been reported.[4,6,7]

STABILITY / STORAGE AS SUPPLIED:

FOA is stable for at least one year when stored desiccated at -20°C.[3]

SOLUTION / SOLUTION STABILITY:

FOA has been dissolved at about 50 mg/ml in 4 M ammonium hydroxide producing a clear solution (sonication or heat may be needed).[3] The monohydrate is partially soluble in water.[2] A concentration of 0.05 mg/ml of FOA was added to a tryptone medium for incubation of cultures at 80°C for four days with apparently no adverse effects to the FOA.[8]

USAGE / APPLICATIONS:

FOA (1 mg/ml) has been used as a selective agent in yeast molecular genetics[9]; in the selection of Ura^- cells in a population of Ura^+ cells; and in the selection of orotidine-5′-phosphate decarboxylase (OMPdecase) mutants of Saccharomyces cerevisiae.[10-12] FOA (0.1 mg/ml) has been used in the positive selection for uracil auxotrophs of the sulfur-dependent thermophilic archaebacterium Sulfolobus acidocaldarius[8].

USAGE / APPLICATIONS: (continued)

The selection of OMPdecase-deficient and orotate phosphoribosyl transferase (OPRTase)-deficient mutants in the Mucor fungus using FOA was reported.[13] The ability of catalytic antibodies to produce 5-fluorouracil from FOA was assessed in a bacterial strain.[14] FOA inhibited the synthesis of mature cytoplasm ribosomal RNA in rat liver cells.[15] FOA is a noncompetitive inhibitor of dihydroorotase.[16] FOA (50% inhibition, 6 nM) was a selective inhibitor of malarial cells of Plasmodium falciparum in vitro and in vivo. Inhibition is possibly due to the binding of the FOA metabolite, 5-fluoro-2'-deoxyuridylate to the Plasmodium thymidylate synthase.[17,18] FOA showed anti-tumor activity against transplanted tumors in rats and mice; a bacteriostatic effect in vitro against various microorganisms, particularly gram-negative bacteria[19]; antimycotic activity against various types of mold.[20]

GENERAL NOTES:

FOA is a derivative of a pyrimidine precursor and is selectively toxic to yeast cells which synthesize orotidine-5'-phosphate decarboxylase[10]. FOA has been used in a positive selection for uracil-requiring mutants(in the presence of large numbers of wild-type cells) lacking OMPdecase or OPRTase activities. This results in efficient strains for effective transformation systems.[10-12]

REFERENCES:

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