

### 27.2.3.1. Methimazole

Methimazole is a thioureyllene anti-thyroid agent which inhibits thyroid hormone production by interrupting the integration of iodine into tyrosyl residues of thyroglobulin.

**Molecular Formula:**  $C_4H_6N_2S$

**IUPAC Nomenclature:** 1-methyl-2,3-dihydro-1H-imidazole-2-thione

**Properties:** Methimazole occurs as a white to pale buff coloured crystalline substance with a starch-like appearance and touch, and a faint characteristic odour. It is soluble in chloroform and alcohol; faintly soluble in ether and petroleum ether; and slightly soluble in benzene.

**Uses:** Methimazole is used for treating hyperthyroidism, goitre, psoriasis, and Grave's disease.

**Stability and Storage Conditions:** Methimazole is light sensitive, thus should be stored in tightly-closed, light-resistant containers at temperature below 40°C (preferably at 15-30°C).

**Types of Pharmaceutical Formulation:** Tablets.

**Brand Name:** Methimez-10.

### 27.2.3.2. Methylthiouracil

Methylthiouracil was presented in the mid-1940s, at the same time as propylthiouracil. It is a thionamide anti-thyroid drug which is used for treating hyperthyroidism.

**Molecular Formula:**  $C_5H_6N_2OS$

**IUPAC Nomenclature:** 6-methyl-2-sulfanylidene-1H-pyrimidin-4-one.

**Properties:** Methylthiouracil occurs as a white crystalline powder with the smell of onions and a bitter taste. Its saturated aqueous solution is either neutral or slightly acidic. It is very slightly soluble in cold water and ether; faintly soluble in alcohol and acetone; almost insoluble in benzene and chloroform; and readily soluble in aqueous solution of ammonia and alkali hydroxides.

**Uses:** Methylthiouracil is used for treating hyperthyroidism. It is no longer used in most countries, but may have a limited use in some eastern European countries.

**Stability and Storage Conditions:** Methylthiouracil should not be exposed to light and should be stored in refrigerators.

**Types of Pharmaceutical Formulation:** Tablets.

**Brand Names:** Metiluracils Nizfarm, Alkiron, Basethyrin, Methacil, Thyreostat, and Prostrumyl.

### 27.2.3.3. Propylthiouracil

Propylthiouracil is a thiourea anti-thyroid agent. It inhibits the peripheral conversion of thyroxine to tri-iodothyronine, and inhibits thyroxine synthesis.

**Molecular Formula:**  $C_7H_{10}N_2OS$

**IUPAC Nomenclature:** 6-propyl-2-sulfanylidene-1,2,3,4-tetrahydropyrimidin-4-one

**Properties:** Propylthiouracil occurs as a white crystalline powder with a starch-like appearance, bitter taste, and no odour. Its saturated solution is neutral or slightly acidic to litmus. It is almost insoluble in ether, chloroform, and benzene; and readily soluble in aqueous solution of ammonia and alkali hydroxides.



**Uses:** Propylthiouracil is used for treating hyperthyroidism.

**Stability and Storage Conditions:** Propylthiouracil is light sensitive and should be stored in tightly-closed containers at temperatures below  $40^{\circ}\text{C}$  (preferably at  $15-30^{\circ}\text{C}$ ).

**Type of Pharmaceutical Formulation:** Tablets.

**Brand Names:** Propyl-thyracil and Apo-propylthiouracil.