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Synthesis and Characterization of 1(4-Tolyl)-2(Phenyl thiocarbamido)-1-Ethanol

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Abstract:

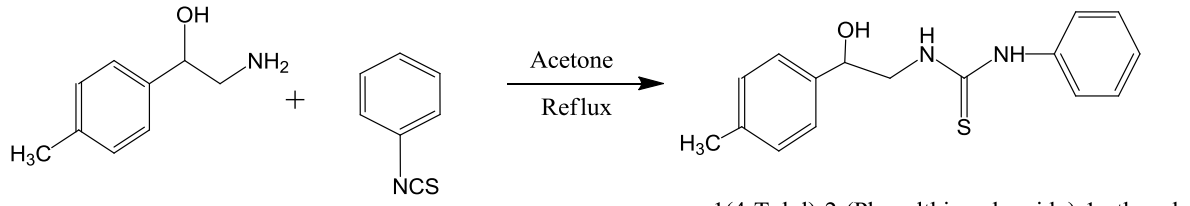
Demand of active drugs molecules synthesis ceaselessly upsurges due to population growth rate. Present research scheme designed to synthesize 1(4-tolyl)-2(Phenylthiocarbamido)-1-ethanolby the interactions of 4-(2-amino-1-hydroxyehtyl) tolene and phenyl isothiocyanate in acetone medium, to isolate 1(4-Tolyl)-2(Phenylthiocarbamido)-1-ethanol. The product thus synthesized in these reactions and characterized on the basis of conventional elemental analysis, chemical characteristics and through IR, PMR, CMR and Mass spectral analysis.

Keywords: 4-(2-amino-1-hydroxyehtyl)toulene, phenyl isothiocyanate, 1(4-Tolyl)-2(Phenylthiocarbamido)-1-ethanol

Introduction:

Population of the world terribly growing along with that basic demands of health and medicine related things. World researchers were pointed their attention toward this aspect and working with challenge toward same. Pathogens are become resistive against existing some drugs moieties thus have a great need to developed more active and potent drugs moieties with good solubility, diffusion and activity that will be demonstrate effective pharmacodynamics and pharmacokinetics of drugs. The literature survey divulges that from last couple of decades' numerous advances, theories and new concepts regarding to synthesis of novel moieties, chemical, physical as well as biological study of benzenoid and non-benzenoid, heteroacyclic and heterocyclic compounds were studied[1-5]. These compounds have their own identity and importance in the chemical and life sciences due to their variety of applications in medicinal, agricultural, pharmaceutical, industrial, biotechnological and biochemical sciences[6-10]. If we think about the drugs we can define the history of medicine by these compounds.

In the view of the utilities of these compounds in various fields and as a part of present research work, recently being undertaken in this laboratory in the synthesis of nitrogen, nitrogen and sulphur containing heteroacycles and heterocycles and to investigate their medicinal, pharmaceutical, agricultural, industrial, biotechnological and biochemical significance[11-18], hence interactions of 4-(2-amino-1-hydroxyehtyl)chlorobenzene and p-tolylisothiocyanate in acetone medium, to isolate 1(4-Chlorophenyl)-2(p-Tolylthiocarbamido)-1-ethanol.



4-(2-amino-1-hydroxyehtyl) Toluene

Phenylisothiocynate

1(4-Tolyl)-2-(Phenylthiocarbamido)-1-ethanol

Methods and Material:

All AR grade chemicals were used throughout experiment.

Synthesis of 1(4-Tolyl)-2(Pheylthiocarbamido)-1-ethanol:

1(4-Tolyl)-2(Phenylthiocarbamido)-1-ethanol was synthesized by refluxing 4-(2-amino-1-hydroxyehtyl) tolene and Phenylisothiocyanate in acetone medium for 2 hours**.** After completion of reaction, to isolated 1(4-Tolyl)-2(Phenylthiocarbamido)-1-ethanol from solvent. After distillation of acetone the product is isolated which is recrystallized from ethanol to get white colour crystalline solid flakes with m.p. 82^0C.

Result and Discussion:

Properties of 1(4-Tolyl)-2(phenylthiocarbamido)-1-ethanol:

The compound is white colour crystalline solid flakes, $C_{16}H_{19}N_2S$ with m.p. 78^0C. It gave positive test for nitrogen, chlorine and sulphur. Desulphurised with alkaline plumbite solution. Soluble in boiled sodium hydroxide, sulphuric acid, 1,4-dioxane, hydrochloric acid and nitric acid and was sparing soluble in boiled water, ethanol, acetone and benzene. Formed picrates having melting point 95^0C.

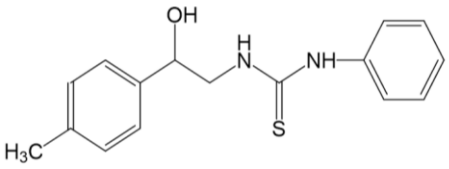
Elemental analysis (%): Found (Calculated) C- 70.81 (71.63), H-7.06 (7.20), N-10.32 (10.13), S-11.81 (11.40),

FTIR spectrum (v cm^{-1}):- The IR spectrum of compound was carried out in **KBr pellets** on **SHIMADZU IR spectrometer**[19-24]**.** 2773. 64-2565.33 (Aliphatic C-H stretching), 2902.87 (Aromatic C-H stretching), 1945.82 (N-C=S stretching), 1589.99-1815.02 (C=N stretching), 1897.95 (C=S stretching), 3050.95 (Two N-H stretching), 3195.83 (Alcoholic O-H stretching), 1180.72-1244.50 (C-O stretching), 1505.55-1294.24 (Aliphatic –H bending), 1070.49-611.43 (Aromatic –H bending).

PMR spectrum data: The PMR spectrum of a compound was recorded in **$CDCl_3$+ $DMSOd_6$** on **Bruker Advance-II 400 NMR spectrometer**[19-20,25-28]. This spectrum distinctly displayed the signals, due to four aromatic protons in the range at δ 7.509 – δ 7.288 ppm of phenyl group, four aromatic protons in the range at δ 7.226 - δ 7.171 ppm, alcoholic –H at δ 3.652, two amino –NH protons at δ 9.7422 ppm, methyne (-CH) proton at δ 2.335, two disteriotopic methylene protons at δ 2.445 ppm and three methyl protons at δ 2.341.

Conclusion:

Recent obtained data from chemical characteristics, elemental and spectral analysis it is clear that the newly synthesized present compound was assigned the structure as 1(4-Tolyl)-2(Phenylthiocarbamido)-1-ethanol**.** This work create scope to studies various chemical, pharmaceutical, agricultural and biological applications of newly synthesized 1(4-Tolyl)-2(Phenylthiocarbamido)-1-ethanol**.**



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References:

1. Tayade D.T., Bhagwatkar A.K., International Journal of Organic and Bioorganic Chemistry, 4(1), 2014,6-9.
2. Popov V.V., Amelichev S.A., Bushmarinov I.S., Konstantinova L.S. Lyssenko K.A., Mikhalchenko L.V., Novikov V.V., Gultyai V.P., Rakitin O.A., Tetrahedron, 69, 2013, 8790-8797.
3. Letska E.V., Turner N.W., Anthony P.F., Tuner and Piletsky S.A., J. Controlled Release, 08(1), 2005, 132.
4. Kim G.Y., Shim J., Kang M., Moon S.H., J. Environ. Monti, 10, 2008, 632.
5. Dandia A.K., Arya K., Sati M., Synthetic Communication, 34(6), 2004, 1141.
6. G. Arabaci, P. Yi, H. Fu, M.E. Morter, Bio-Org. Med. Chem. Letter, 12(2), 2002, 3047-3050.
7. S. Nagar, N.H. Singh, J. Med. Chem., 16, 2007, 178-180.
8. J. Martin, M. Borodie and P. Kwan, British Medical Journal, 22(1), 2000, 5-7.
9. D.J. Faulkner, Tetrahedron Lett, 38, 1993, 21-25.
10. R.C. Panpalia, Ph.D. Thesis, S.G.B. Amravati University, Amravati, 2007.
11. V. Cyril and M. Milam, Chem. Abstr., 86, 1977, 190015.
12. B. Belmut and K. Will, Germ. Offen, 2, 1978, 630, 849.
13. K. Alfred and A. Tentawy, Chem. Abstr., 90, 1979, 54914.
14. D.T. Tayade, Ph.D. Thesis, S.G.B. Amravati University, Amravati, 1996.
15. C.D. Bossinger and E. Tekeshi, Chem. . Abstr., 77, 1972, 343590.
16. D. Park and Co.workers, British Patent, 48, 1960, 245.
17. M. Sedal and F.E. Betiver, S. African Patent, 68, 1964, 03, 47.
18. A.G. Ghaigy (Jr.), Siess Patent, 4, 1980, 186, 265.
19. C.N. Banwell, Elaile and Cash Mc, "Fundamentals of Molecular Spectroscopy", 4th Ed. McGraw Hill International U.K., 2003.
20. J.R. Dyer, "Applications of Absorption Spectroscopy of Organic Compounds", 8th Ed., Prentice Hall, India, New Delhi, 1991.
21. D.V. Pavia, G.M. Lampan and G.S. Kriz, "Introduction to Spectroscopy", 3rd Ed.,Thomson Brooks/Cole, Singapore, 2002.
22. D.H. Williams and I. Fleming, "Spectroscopic Methods in Organic Chemistry", 4th Ed., TataMc Graw Hill Publishing Company Ltd., New Delhi, 1993.
23. A.I. Vogel, "Text book of Practical Organic Chemistry", 4th Ed., E.L.B.S. and Lorgman, India, 1978.
24. L.D. Field., S. Sterhell and J.R. Kalmall, "Organic Structures from Spectra", 3rd Ed., John Wiley and Sons, England, 2002.
25. R.M. Silverstein and G.C. Bassler, "Spectroscopic Identification of Organic Compounds", 5th Ed., John Wiley and Sons Inc., New York, 127, 1991.
26. J.R. Dyer, "Application of Absorption Spectroscopy of Organic Compounds", 8th Ed., Prentice Hall, India, New Delhi, 108, 1991.
27. D.V. Pavia and G.M. Lampan, "Introduction to Spectroscopy", 3rd Ed., Thomson Brooks/Cole, Singapore, 143, 2001.
28. R.M. Silverstein and G.C. Bassler, "Spectroscopic Identification of Organic Compounds", 5th Ed., John Wiley and Sons Inc., New York, 123, 1991.