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NOTE

Synthesis of 2-Phenylimino-3-Phenyl Thiazolidine Δ^2-2-Thio-6-*p*-Methoxy Phenyl (4,5-d)-Pyrimidine

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In the present communication the authors describe the synthesis and characterization of 2-phenylimino-3-phenyl thiazolidin Δ^2-2-thio-6-*p*-methoxy phenyl (4,5-d) pyrimidine.

The survey of literature concludes that most of the compounds having pyrimidine or thiazolidinone nucleus possess pharmacological action, *e.g.*, they are sedative, antitubercular, antiinflammatory or anaesthetic etc.

Thiazolidinones are also used as sedatives[1, 2], local anaesthestics[3, 4], hypnotics[5–7], analgesics[8] or antitubercular and antispasmodic[9] or anticonvulsants[10] etc. Thiazolidinones are employed in the synthesis of merocyamine dyes which are used in photographic film industry[11]. The compounds such as 5-arylidin-3-phenyl-2-phenylimino thiazolidin-4-ones are reported to give fast colour when dyed on wool[12].

Pyrimidine derivatives play a vital role in many biological processes, their ring system being present in the nucleic acids, several vitamins and coenzymes and uric acid and other purines. Synthetic members of the group are also important as synthetic drugs (*i.e.*, barbituric acid derivatives) and chemotherapeutic agents (*i.e.*, sulfadiazine).

The pyrimidine nucleus[13–15] occurs in a considerable number of natural products of vital importance to living organisms as unidine, cytidine, thymidine, deoxycytidine, 5-methyl deoxycytidine and 5-hydroxy methyldioxycytidine.

In view of the less availability and importance of condensed ring compounds of thiazolidinone and pyrimidine ring system, it is desirable to study in detail the chemistry of thiazolidino pyrimidines. For this at first the substituted thiazolidine was prepared after reaction of substituted thiourea and chloroacetic acid followed by the elimination of H_2O and HCl molecules. This reaction formed the thiazolidinone ring which resulted in a benzylidene derivative after reaction (condensation) with an aromatic aldehyde. The benzylidine derivative was allowed to condense with thiourea under suitable conditions resulting in a

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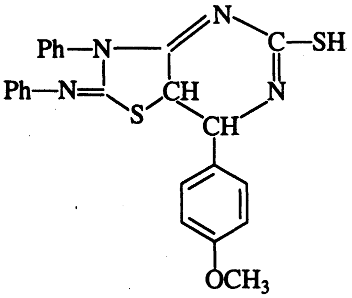
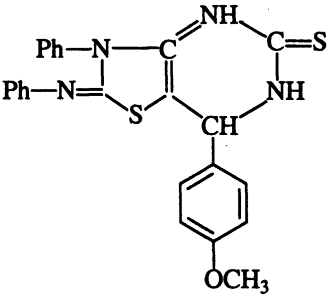
thiazolidine condensed pyrimidine ring compound. The benzylidine derivative has α-β-unsaturated carbonyl moiety which forms the pryimidine ring after condensation with thiourea by the way of attack on electrophilic carbonyl carbon followed by elimination of water. The thiourea undergoes intramolecular rearrangement to yield pyrimidine I.

The other possible alternative arising by 1,4 addition of thiourea results in the formation of pyrimidine II. But in literature it is reported that pyrimidine I structure is more stable and more likely to form II. Most of the pyrimidines formed by the reaction of α-β-unsaturated carbonyl compounds with urea or thiourea result in pyrimidine I through the intermolecular rearrangement of intermediates, urea or thiourea.

It is taken for granted that pyrimidine II is formed during the reaction. Then the adjoining thiazolidine ring is converted into thiazoline which can easily be made to produce thiazole ring by possible tautomerisation. Thus the resulting compound may be thiazole ring condensed pyrimidine.



Pyrimidine I



Pyrimidine II

The structure of this 2-phenylimino 3-phenyl thiazolidine Δ^2-2-thio-6-*p*-methoxy phenyl (4,5-d) pyrimidine has been established on the basis of analytical and spectrophotometric results which are described below. This is soluble in hot acetic acid and sparingly soluble in ethanol and acetone and insoluble in nonpolar solvents such as benzene, ether, petroleum ether etc.

Thiocarbanilide (Diphenyl Thiourea)

A mixture of aniline (40 mL), carbon disulphide (40 mL) and dry ethanol (63.5 mL) was heated in a fume chamber on a boiling water bath for 8 h till, the contents solidified. Thereafter the solvent was removed by distillation and the solid residue collected and washed with dilute hydrochloric acid (1 : 10). The crystals of diphenyl thiourea were dried and crystallized from ethyl alcohol when they were obtained as colourless ndedles. m.p. = 155°C (lit. 154°C), yield 40 g.

2-Phenylimino 3-Phenyl Thiazolidin-4-one

In a one-litre round bottom flask fitted with a reflux condenser a mixture of thiocarbanilide (60 g), monochloroacetic acid (27.5 g) and rectified spirit (225 mL) were refluxed for 2 h. the product after cooling was left in contact with dilute hydrochloric acid for 1 h, washed by decantation successively with dilute hydrochloric acid, water and cold alcohol and finally crystallized from alcohol. m.p. = 177°C (lit. 176°C), yield 22 g. The absorption peaks in infrared spectra was found at 2940, 1625 and 1480 cm^{-1} for $\nu(CH_2)$, $\nu(C{=}O)$, $\nu(C{=}N)$ respectively. The UV specta was found as (chf)λ_{max} 267, 295 nm.

2-Phenylimino 3-Phenyl-5-*p*-Methoxy Benzylidine Thiazolidin-4-one

In a 250 mL round bottom flask 2 phenylimino 3-phenyl thiazolidin-4-one (6 g), *p*-anisaldehyde (*p*-methoxy benzaldehyde) (6 mL) and fused sodium acetate (6 g) in glacial acetic acid (45 mL) refluxed for 3 h on a water bath. After 20 min of refluxing all the contents of the flask dissolved and a clear solution resulted. After a few minutes deep yellow crystals started appearing. The crystals were filtered, after cooling washed with alcohol and crystallized from glacial acetic acid. m.p. = 200°C, yield 8 g. Found (%) C = 70.97, H = 4.49 and N = 8.21. $C_{23}H_{18}N_2O_2S$ required (%) C = 71.50, H = 4.63 and N = 7.25. Absorption peaks in IR spectrum were found at 2910, 1700, 1585, 1450, 1260 and 760 cm^{-1} for $\nu(CH)$, $\nu(C{=}O)$, $\nu(C{=}N)$, $\nu(C{-}N)$, $\nu(C{-}S{-}C)$ and ν(Monosubstituted benzene) respectively. UV spectrum was found as (chf)λ_{max} 265, 297, 360 nm.

2-Phenylimino 3-Phenyl Thiazolidine Δ^2-2-Thio-6-*p*-Methoxy Phenyl (4,5-d) Pyrimidine

In a 250 mL round bottom flask 2-phenylimino 3-phenyl-5-*p*-methoxy benzalidine thiazolidin-4-one (1 g), thiourea (1 g), glacial acetic acid (10 mL) and fused sodium acetate (.5 g) were taken. The entire contents were refluxed for 8 h. After 1 h of refluxing all the contents in the flask dissolved and a clear solution resulted. After 10 min deep yellow crystals started appearing gradually. The crystals were filtered, after cooling washed with alchohol and crystallized from glacial acetic acid. Yield 2.3 g, m.p. = 231°C (lit. 230°C). Found (%) C = 63.65, H = 4.32 and N = 12.20. $C_{24}H_{20}N_4S_2O$ required (%) C = 63.96, H = 4.95 and N = 12.61. Absorption peaks in IR spectrum found at 1570, 1490, 1380, 1250 and 740 cm^{-1} for $\nu(C{=}N)$, $\nu(C{-}N)$, $\nu(C{-}SH)$, $\nu(C{-}S{-}C)$, ν(Monosubstituted benzene) respectively. UV spectrum was found as (chf)λ_{max} 263, 292, 380, 415 nm.

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