4.1.1 General Introduction and Literature Review

Semicarbazones are of great interest because of their chemistry and potentially beneficial biological activities, such as antitumour, antibacterial, antiviral and antimalarial [1-3]. The antiviral activity of semicarbazones appears to be related to their metal-chelating ability and interruption of cell cycle [4].

Recently Dimmock and Pandeya [5-8] reported semicarbazones as novel anticonvulsant entities. The structural requirements in the semicarbazone series are: a lipophilic aryl ring, a distal aryl ring and a hydrogen-bonding domain. The lipophilic aryl ring with chloro, bromo or nitro groups has been found to be essential for anticonvulsant activity. The distal aryl ring is also implicated at the binding site. The hydrogen-bonding domain in semicarbazone series has been suggested by Dimmock to be the terminal –NHCONH₂. Pandeya et al. suggested this hydrogen-bonding domain to be adjacent to the lipophilic aryl ring, but it was not confirmed as some of the compounds with –CH₂- in place of –NH- were showing activity.

According to Pandeya, p-nitrophenyl substituted semicarbazones [Figure 4.1.1 (A)] and phenoxy acetyl hydrazones [Figure 4.1.1 (B)] were found to be active anticonvulsant [9].

![Figure 4.1.1](A) ![Figure 4.1.1](B)
A new series of phenolic Mannich bases of aminoquinoline semicarbazone and (thio)semicarbazone derivatives (Figure 4.1.2) were synthesized and evaluated in vitro against falcipain-2 and the W2 strain of *Plasmodium falciparum* [10]. All aminoquinoline semicarbazones showed antimalarial activity with IC\(_{50}\) in the range of 0.08–1.0 µM.

![Figure 4.1.2](image)

Semicarbazones having the structure \(R_2C=NNH(C=O)NH_2\), are generally obtained by condensation of aldehyde or ketones with semicarbazide HCl. Semicarbazone is the common intermediate for the preparation of 1,2,3-thiadiazoles and 1,2,3-selanodiazoles.
4.1.2 Present Work

This section deals with the synthesis of various semicarbazones, synthesized by treatment of various ketones with semicarbazide HCl in ethanol in the presence of sodium acetate, Scheme 4.1.1. In the present work we have prepared semicarbazones of substituted acetophenones (A), 2-indanone (B) and 2, 3-dihydro-2-aryl-benzopyran-4-ones (C) (Figure 4.1.3).

![Scheme 4.1.1](image)

**Figure 4.1.3**

4.1.2.1 General Experimental Procedure

Semicarbazide hydrochloride (0.12 mmole) and sodium acetate (0.15 mmole) was taken in a round bottom flask and dissolved in 20 mL distilled water. The contents were warmed on water bath until clear solution is obtained to liberate free base. To this reaction mixture, ketone (0.1 mmole) in ethanol was added drop wise and the resulting mixture was heated to reflux, few drops of concentrated hydrochloric acid were added and heating...
under reflux was continued till the completion of the reaction. Progress of the reaction was monitored by TLC. After completion of reaction, products were separated on cooling the contents and pouring it on crushed ice, separated by filtration, dried and recrystallized from ethanol (95%).

4.1.2.2 Result and Discussion

Semicarbazones of substituted acetophenone, 2-indanone and 2, 3-dihydro-2-aryl-benzopyran-4-ones were prepared by reacting them with the simicarbazide hydrochloride using sodium acetate as a catalyst. Semicarbazone is the common intermediate for the preparation of 1, 2, 3-selanodiazole. These semicarbazones have been used as intermediates for the synthesis of 1, 2, 3-selanodiazole, described in section 4.2 of this thesis. Semicarbazone of 2-indanone [1-(1H-inden-2(3H)-ylidene)simicarbazide, entry a] is the novel compound.

4.1.2.3 Spectral data

(1H-inden-2(3H)-ylidene)semicarbazide
Pale yellow, Melting Point: 214-216 °C (Crystallization Solvent- Ethanol 95%)

IR (KBr): $\nu_{\text{max}}$

3480, 3190, 3020, 1680, 1600 cm$^{-1}$.

$^1$H NMR (400 MHz, CDCl$_3$): $\delta$

3.69 (s, 2H, CH$_2$), 3.82 (s, 2H, CH$_2$), 7.22 (s, 2H, NH$_2$), 7.28-7.36 (m, 4H, ArH), 7.44 (s, 1H, NH) ppm.

LCMS of (4a): $m/z = 190$ (M-H)$^+$. 

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Mass
4.3.5 References


