SUMMARY.

A large number of quinazoline and quinazolone derivatives synthesised are potential biologically useful compounds. In the present thesis, synthesis of 3-aryl-2-mercapto-quinazol-4-ones have been described and three of them have been investigated as possible reagents for gravimetric and colourimetric estimation of divalent copper. The thesis opens up with the introduction in which the general experimental investigations in the field of sulphur containing quinazolone chemistry have been briefly reviewed. Of the two parts, first part is further divided into four sections for the sake of convenience. In the second part, the formation of the complexes of 3-aryl-2-mercapto-quinazol-4-one derivatives with divalent copper is described.

PART I
SYNTHESIS OF 3-ARYL-2-MERCAPTO-QUINAZOL-4-ONES

Though quinazolines and quinazolones are extensively investigated, 2-mercapto-quinazol-4-one derivatives have been comparatively less studied. A number of them are described in the following sections.

Section (i): Synthesis of 3-Aryl-2-mercapto-quinazol-4-ones.

Anthranilic acid was condensed with substituted mono-phenyl-thiourea derivatives to obtain 3-aryl-2-mercapto-quinazol-4-ones. The same products were also prepared by using phenyl isothiocyanate in place of thioureas. Further, these quinazolones were oxidised to quinazol-2,4-diones. Their structures were confirmed by the actual synthesis from anthranilic acid and mono-phenyl ureas.
Section (ii): Synthesis of 6-Bromo-3-aryl-2-mercapto-quinazol-4-ones.

5-Bromo anthranilic acid required for this work was prepared by the bromination of anthranilic acid. The 6-bromo-3-aryl-2-mercapto-quinazol-4-ones were synthesised as before by condensing 5-bromo anthranilic acid with mono-phenyl thioureas as well as phenyl isothiocyanates. These compounds were oxidised to the corresponding 2-mercapto group free 6-bromo-3-aryl-quinazol-2:4-diones as before. Their structures were confirmed by the synthesis.

Section (iii): Synthesis of 6-Iodo-3-aryl-2-mercapto-quinazol-4-ones.

5-Iodo anthranilic acid required for this work was prepared by iodination of the anthranilic acid. This 5-iodo acid was condensed with monophenyl thioureas and phenyl isothiocyanates and 6-iodo-3-aryl-2-mercapto-quinazol-4-ones were obtained. They were oxidised to the corresponding diketo derivatives, the structures of which were confirmed by the synthesis from 5-idoanthranilic acid and monophenyl ureas.

Section (iv): Synthesis of 6-Nitro-3-aryl-2-mercapto-quinazol-4-ones.

5-Nitro anthranilic acid as such did not condense with phenyl thioureas or phenyl isothiocyanates as it happened in the other 5-substituted acids described in previous sections. However, it was observed that its N-acetyl derivative easily condensed with simultaneous deacetylation during the quinazol-4-one formation. 6-Nitro-3-aryl-2-mercapto-quinazol-4-ones thus obtained were oxidised to yield des-thio quinazolones which were also prepared from 5-nitro-N-acetyl anthranilic acid and
mono-phenyl ureas in the usual manner.

These reactions are shown as under.

\[
\begin{align*}
\text{Sec. i.} & \quad X = H \quad R = H \quad \text{Ar} = \text{Phenyl} \\
\text{Sec. ii.} & \quad X = \text{Br} \quad R = H \quad \text{o-}, \text{m-}, \text{p-Tolyl}, \\
\text{Sec. iii.} & \quad X = \text{I} \quad R = H \quad \text{o-}, \text{p-Anisyl}, \\
\text{Sec. iv.} & \quad X = \text{NO}_2 \quad R = \text{Ac} \quad \text{o-}, \text{m-}, \text{p-Chlorophenyl}.
\end{align*}
\]

All 2-mercapto quinazolones obtained were condensed with bromo benzene and benzoyl chloride to yield 2-thiophenyl and 2-thiobenzoyl derivatives respectively. They also gave disulphides when their acetic acid solution was treated with iodine solution. In these reactions, hydrogen atom of the mercapto (-SH) group was displaced. These conversions provided the proof that the compounds exist as 'thiols' (C-SH) rather than 'thiones' (C=S).

**PART II**

**THE USE OF 3-PHENYL-2-MERCAPTO-QUINAZOL-4-ONE DERIVATIVES FOR ESTIMATION OF DIVALENT COPPER.**

It was observed during the work that the unsubstituted 3-phenyl-2-mercapto-quinazol-4-one gave a precipitate with a solution of divalent copper. This point was investigated in
details in this part. It was found that 3-phenyl and 6-bromo-3-phenyl-2-mercapto-quinazol-4-ones were useful for colourimetric estimation of copper when present in a solution in micro-gram quantities. On the other hand, 6-iodo-3-phenyl-2-mercapto-quinazol-4-one was useful as gravimetric reagent for the same purpose. These reagents compare favourably with or are superior to the other reagents useful for copper.

A detailed examination of these reagents has been carried out by the standard instruments.
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G. R. Dave

(G. R. Dave)