INTRODUCTION PART I
C.M. Suter in his review on the relationship between the structure and bactericidal activity of phenolic compounds concluded that (i) introduction of halogen into the nucleus of phenolic compound increases without exception the bactericidal potency in the order of \( p \rightarrow m \rightarrow o \), that (ii) the rise in bactericidal action is noticeable if n-alkyl group is introduced in the phenol nucleus and that (iii) the combined effect towards augmenting the antibacterial potency will be more promising if n-alkyl group and a halogen are introduced in the phenol nucleus.

W. Hausam tested a number of phenols containing methyl and chloro substituents for their germicidal activity employing Staphylococcus aureus. He observed that introduction of chlorine, maximum upto two, gives effective compounds and further halogenation had little effect. The activity is mainly associated with halogens at para position.

It has been shown by Emil Klarmann et al., that p-alkoxyphenols inhibited the growth of B. typhosus, the inhibiting action
being maximum in case of n-amyl ether and goes on decreasing in case of higher homologues.

However, Ryuzaburo Nodzu et al., *J. Pharm. Soc. Japan*, 74, 875 (1954); Chem. Abs., 42, 9542 (1955) observed during their extensive study on the relationship between alkoxyphenols and antitubercular activity, that the activity goes on increasing as the size of the alkyl group increases and reaches maximum at \( \text{C}_{12} \text{H}_{25} \) when tested against *Mycobacterium tuberculosis*.

During the investigation of alkoxynitroanilines as sweetening agents by Elmar Profft, *Deut. Chem.-ztg.*, 2, 194 (1950); Chem. Abs., 45, 7544 (1951) it was observed that the toxicity of such compounds 'in vivo' tests increases with the increase in the weight of the alkoxy side chain. However, n-propoxynitroaniline was found to have least toxicity and moderate sweetness, while higher homologues were more toxic though some of them were sweeter than n-propoxynitroaniline.

So, in view of the above considerations, it can be concluded that introduction of alkoxy group, especially at para, halogens at meta or para and alkyl group at para will help in augmenting the bactericidal potency of the resulting phenols and the compounds of least toxicity will be those having alkyl chain less than five carbon atoms.
Compounds containing SH group like cysteine, glutathione which are "essential metabolites" have been shown to be necessary for the growth of bacteria belonging to the group Staphylococcus by Fildes P., *Lancet*, 1, 955 (1940). It has also been observed by Alessandro and Comes in *Farm. sci. e tec.*, 2, 151 (1948); *Chem.Abs.*, 42, 6880 (1948) that the thiophenols interfere with the essential metabolite compounds containing SH groups. This may be responsible for the inhibition of the growth of bacteria. So thiophenols are expected to show pronounced antibacterial activity both "in vitro" and "in vivo". For example,

(a) Hammet and his co-workers in *J. Exptl. Med.*, 50, 445 (1929); *Proc. Soc. Exptl. Biol. Med.*, 27, 20 (1929) observed that thiocresols not only accelerate the rate of healing of wounds of long standing but also exert a bacteriostatic action not shown by other compounds used as tissue proliferants.

(b) Ballio and Cingolani in *Boll. soc. ital. biol. sper.*, 29, 622 (1953); *Chem. Abs.*, 49, 9152 (1953) tested a number of thiophenols containing NO₂, J₁, NH₂, SO₂NH₂ and COOH groups against *S. aureus* and observed that chlorothiophenols were superior to simple thiophenol while
amino, sulphonamido and carboxythiophenols were less active than thiophenol.

(c) Dosser and Richter [J.Am.Chem.Soc., 56, 1132 (1934)] prepared some halogeno-thiocresols which were found to be powerful bacteriostats against B. typhosus and S. aureus.

Metallic salts of aryl mercaptans especially those of zinc, mercury and copper find their way in industry as good fungicides for dermatophytes [Soo-hoo and Grunberg, J.Investigative Dermatol, 14, 169 (1950); Chem.Abs., 45, 9726 (1951)] as good bactericides in agriculture [Kato and Kumamoto, Japan 1000, 1957 Feb.; Chem.Abs., 52, 7609 (1958)] and as bactericides [Ernst Schraufstatter, Z.Naturforsch, 5b, 190 (1950); Chem.Abs., 44, 8999 (1950)].

Besides the use as bactericides, substituted thiophenols have also been used as plasticising materials in masticated smoked rubber [Takuzo Kimijima, J.Soc.Chem. Ind., Japan, 45, 369 (1942); Chem.Abs., 44, 3148 (1950)] and to improve the plasticity of elastomeric materials [Arthur A. Baum, U.S. 2,770,604. 1956 Nov.; Chem.Abs., 51, 5459 (1957)].

So in the light of the above observations it was contemplated to prepare the thiophenols and their metallic
salts having alkyl, alkoxy, chloro and bromo as substituents at various positions in order to study their bacteriostatic properties.

All these thiophenols have been tested in a preliminary way on E.coli and S.aureus and the results have been indicated in the report of Bacterial tests.