

# **CONTENTS**

|  |    |
|--|----|
| <b>INTRODUCTION.</b> .....   | 1  |
| <b>SYNTHESIS OF ISOTHIOCYANATES.</b> .....   | 1  |
| A) From heterocyclic reagents with ring cleavage. ....   | 1  |
| B) From heterocyclic reagents without ring cleavage. ....  | 5  |
| C) Miscellaneous syntheses of isothiocyanates. ....  | 9  |
| <b>REACTIONS OF ISOTHIOCYANATES.</b> .....   | 10 |
| (1) Reaction with amino acids and their derivatives. ....  | 10 |
| (2) Reaction with hydrazines and hydrazides. ....  | 17 |
| (3) Reaction with amides. ....   | 21 |
| (4) Cycloaddition reactions. ....  | 23 |
| (5) Condensation with carboxylic acids. ....   | 27 |
| (6) Reaction with ylides. ....   | 29 |
| (7) Reaction with carbonanion. ....  | 30 |
| (8) Formation of thiocarbamate or dithiocarbamate and its<br>cyclization. ....   | 33 |
| (9) Reactions involving an activated C = C bond. ....  | 35 |
| (10) Other reactions. ....   | 38 |
| <b>DISCUSSION.</b> .....   | 41 |
| Aim of the work. ....  | 41 |
| <b>PART(I).</b>  |    |
| <b>SYNTHESIS OF TETRABROMO PHTHALIMIDO-<br/>        ACETYL ISOTHIOCYANATE AND TETRABRO-<br/>        MOPHTHALIMIDO- BENZOYL ISOTHIOCYANATE.</b> | 42 |

## **PART (II)**

### **REACTIONS OF TETRABROMOPHTHALIMIDO ACETYL ISOTHIOCYANATE. ....**

|   |    |
|---|----|
| (1) Reaction with phenyl isocyanates. ....  | 44 |
| (2) Reaction with benzylidene arylamines. ....                                    | 48 |
| (3) Reaction with cinnamic acid derivatives. ....                                 | 50 |
| (4) Reaction of oxadiazinonethione derivative (3) with<br>urea and thiourea. .... | 52 |
| (5) Reaction of oxazinethione derivative (5a) with urea<br>and thiourea. ....     | 54 |
| (6) Reaction of oxazinethione derivative (5a) with<br>hydrazine hydrate. ....     | 56 |
| (7) Reaction of oxazinethione derivative (5c) with urea<br>and thiourea. ....     | 58 |
| (8) Reaction of oxazinethione derivative (5c) with<br>hydrazine hydrate. ....     | 62 |

### **REACTIONS OF 2-, 3-, AND 4-TETRABROMO- PHTHALIMIDO – BENZOYL ISOTHIOCYANATES. ....**

|   |    |
|---|----|
| (1) Reaction with anthranilic acid. ....                                      | 64 |
| (2) Action of acetic anhydride on (11a-c). ....                               | 66 |
| (3) Reaction of isothiocyanates (2a-c) with glycine. ....                     | 67 |
| (4) Reaction of isothiocyanates (2a-c) with benzoyl<br>glycine. ....          | 69 |
| (5) Action of acetic anhydride on (14a-c). ....                               | 73 |
| (6) Reaction of isothiocyanates (2a-c) with p-nitrobenzoyl<br>hydrazine. .... | 74 |
| (7) Action of acetic anhydride on (16a-c). ....                               | 76 |

|   |     |
|---|-----|
| (8) Cycloaddition reaction of isothiocyanates (2a-c) with<br>benzylidene aryl – amine. .... | 78  |
| (9) Cycloaddition reaction of isothiocyanates (2a-c) with<br>cyanocinnamitrile. ....        | 82  |
| (10) Reaction of (19a-c) with thiourea. ....  | 84  |
| (11) Reaction of (19a-c) with hydrazine hydrate. ....                                       | 88  |
| <b>BIOLOGICAL ACTIVITY</b> .....  | 90  |
| <b>EXPERIMENTAL</b> .....   | 93  |
| <b>FIGURES</b> .....  | 113 |
| <b>REFERENCES</b> .....   | 114 |
| <b>ARABIC SUMMARY</b> .....   |     |