CHAPTER - IV

RESULTS AND DISCUSSION

The prominent features of the s-triazine autibiotic are

a) absence of an amide or imino linkage at 7B position.

b) direct bond between 7B with the electropositive heterocyclic carbon of cyanuric chloride.

It has been proposed that the autibacterial activity of Beta-lactam antibiotics is due to the irreversible acylation of the antibiotic resulting in the inactivation of transpeptidase/carboxypeptidase, The enzyme necessary for cross-linkage in the formation of the bacterial cell wall[1,2]. Further more, it is an interesting observation that the enhancement in antibacterial activity has been roughly co-related with the increase in IR stretching frequency of Beta-lactam carbonyl in bicyclic systems - "higher the stretching frequency better the acylation of the molecule"[3]. It is therefore likely that the increased IR absorption frequency observed for the s-triazine Beta-lactam is due to the presence of "active" chlorine[4] on the cyanuric chloride which should be effective in the acylation and subsequent inactivation of the transpeptidase/carboxypeptidase.

Chemists, colorists has long cherished the idea of obtaining wet-fast colouring on fibrous material by forming covelent bond[5] between the dye molecules and the functional groups of the fibre.

Reactive dyes were developed due to great achievements in the chemistry of fibrous materials and of cellulose, as well as fundamental works on the synthesis of dye stuff amoung which it is necessary first of all to mention the investigation of the mechanism of interaction of cyanuric chloride with cellulose. These works proved the expediency of introducing into the molecules of usual dyes a cyanuric chloride residue, which at the expense of mobile cholorine atoms is capable of chemically interacting with cellulose, protein, and polyamide fibres.

Cyanuric chloride is used as base acceptor in antibiotic preparation[6] and as hydrochlorinating reagent for alcohols[7]. Cyanuric chloride clearly is to be classified as an acyl halide. Amino s-triazine reacts as amides and formation of amide is a stepwise reaction and sodium hydroxide is good acid acceptor[8]. In 1956 ICI manufactured the first reactive[9] dichlorotriazin dye under the name of procion dyes. Begining from that time, the assortment of reactive dyes has been constantly enlarged by the allied efforts of chemists in different countries. There appeared N.Procion, Cibacrone, Remazole, Drimarene, etc. All these reactive dyes are characterised by presence of mobile reactive atoms or groups due to which they may enter into chemical reaction with certain functional groups of fibrous material.

At present the assortment of the reactive dyes comprises a considerable number of groups of dyes having an

absolute structures of active centres, while the chromophore portions of their molecule are very similar. The general formula of the reactive dye is

S - F - T - X

where S = groups imparting solubility to the dye molecule.

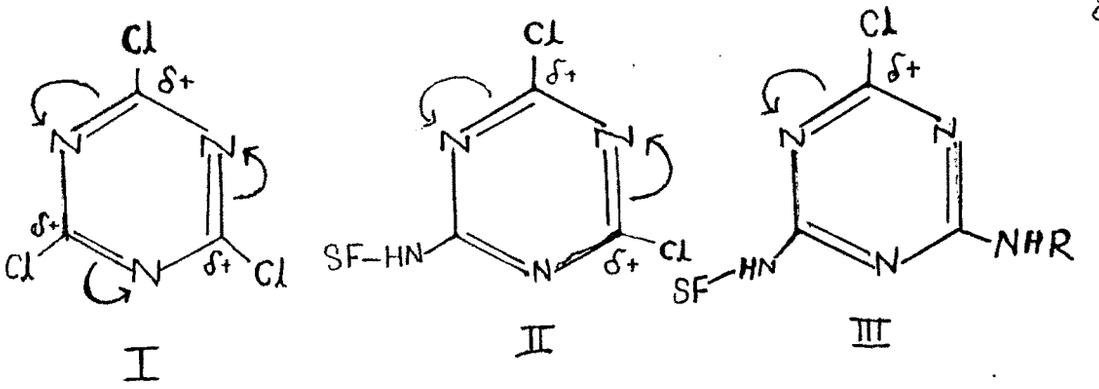
F = chromophore part of the dye molecule

T = carrier of reactive groups

X = reactive groups.

The capacity of reactive dyes to combine chemically with fibrous material in comparatively mild dyeing conditions is due to the specific structures of reactive group carriers, The carriers of reactive groups must have such a structure, that the electrons of the carbon atom taking part in the reaction with fibrous materials are strongly attracted by the other atoms and groups belonging to the dye active centre. As a result of this action the electron couple of the carbon atom is displaced and carbon acquires an excess positive charge i.e. an affinity for the groups acting as donors ($-OH$, NH_2)

The reactivity of the dye will be determined by the affinity of the reactive carbon atom for the electron and this value will depend on the structure of the reactive group carrier. For instance one can examine the structural formula of cyanuric chloride (I), di chloro triazine (II) and monochlorotriazine (III) dyes.



I II III

The atoms of chlorine and nitrogen in cyanuric chloride draw away electrons from the heterocyclic compound carbon atoms which acquire an excess positive charge and consequently an affinity for the electrons. The displacement of electron coules from carbon atom di- and monochlorotriazines dyes is much less than in cyanuric chloride, as in the first of these dyes one and in the second dye two stongly electronegative chlorine atoms are substituted.

Reactive dyes react with the groups of the donor type to which certain primary hydroxyl groups of cellulose and amino groups of protein and polyamide fibres. The substitued 1,3,5 - triazine are also known to possess wide therapeutic activities[10,11,]

One of the important feature for the best antibacterial action of Beta-lactam is that the antibiotic must "irreversibly" inhibit one or more of several enzymes associated with cell wall synthesis, presumably via acylation. The penicillin binding proteins (PBP) for various bacterial species have been indentified. Different

Beta-lactam antibiotics will bind preferentially to different PBPs, resulting in different morphological effects on the bacterium[12,13].

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