

CHAPTER II

STATEMENT OF THE PROBLEM

Cross-linking cellulose with resins has become one of the most important finishing process for imparting wash and wear and durable press properties to cotton fabrics and are widely accepted in textile industry. The reagents which have been widely used are mostly derivatives of urea or melamine. The crease resistant and durable press properties can be imparted only at a cost, a decrease in one or more of the desirable properties of cotton. Generally loss in strength and elongation and reduced abrasion resistance have been noticed.

Clothing requires not only many functional properties for practical use of the improved fabrics, but also safety for the consumer. The free formaldehyde liberated during processing and from resin finished fabrics in storage has now been taken up as an important problem in clothing hygiene. It was reported that the free formaldehyde is responsible for dermatitis and skin diseases (1).

Since the early days of finishing treatments with amino-plasts the use of additives like urea, sodiumbisulphite, dicyanadamide have been emphasized for the reduction of free formaldehyde from finished fabrics. The presence of these additives in pad bath was considered as acceptors or scavengers

of formaldehyde which is free in the bath. Till recently the effective use of urea has been explored, however with the increasing concentration of urea in the bath, decrease in wrinkle recovery was reported. The urea solution spray technique on hot fabric was considered effective without any adverse effect on wrinkle recovery (1).

It was indicated from the literature reviewed that the free formaldehyde from resin finished fabrics may be reduced either by modification of existing resins or by using non-formaldehyde resins (1). However, it was felt that the conventionally used resins in their unmodified form may be effectively used to meet certain lower levels of free formaldehyde content in the finished fabrics by the selective use of additives as co-reactants in the pad bath.

In the earlier work carried out in the clothing and textile department, with which the present author was also connected, the formaldehyde along with commonly used hydroxy compounds like, starch, carboxy-methyl cellulose were used. The study indicated lowered wrinkle recovery. While in the other work conducted in the department starch, polyethylene glycols and polyvinyl alcohol were used along with urea-formaldehyde resin. In this study also decrease in wrinkle recovery was observed. Polyethylene-glycol with urea-formaldehyde also did not show any improvement in wrinkle recovery.

As already mentioned, since the reaction of ethylene glycol type polyhydroxy compounds was not concluded, the present work was planned to study changes in physical properties as well as formaldehyde content of finished cotton fabrics at varying conditions of curing.

The specific objectives of the present study were :

1. To study the effect of diethylene glycol, polyethylene glycol-200 and polyethylene glycol-400 as pad bath additives along with melamine formaldehyde on the modification of wrinkle recovery and strength elongation characteristics.
2. To analyse free, liberated and total formaldehyde in the finished fabrics of different treatments given in I.
3. To study the relationship between the properties studied in relation to formaldehyde.
4. To suggest a possible explanation for the role of formaldehyde in the above treatments.