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Comparative Analysis of Weight Loss% of Different Fabrics (Lycra Pique, Rib and Interlock) Under Different Chemical Concentration

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Abstract- Process loss in textile processing is a must occurring issue due to suitability in the subsequent process& removal of unwanted materials. But there should be a minimum range of process loss% in each process and a data is required to calculate accurate process loss% in each process. Our experiment is to calculate process loss% in a pretreatment process up to enzyme wash and finally treated with silicon wash. If the calculation in process loss% is not accurately calculated, there is serious effect on garment cutting and sewing section due to shortage in fabrics and finally short quantity is become essential that is an economic issue and most unwanted matter in a composite factory. Our finding is different power loss% for different structured fabric for chemical concentration. Here is our focusing issue is that process loss% is not same for different structured fabric even considering same concentration.

Keywords: *weight loss%, fabric structure, chemical concentration, enzyme wash, silicon wash.*

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I. Introduction

Weight loss% can be defined as percentage decay in a material or parentage process loss of that material after the completion of a process. We did this experiment through a enzymatic process of same and different concentration for accordingly same and different structured knit fabrics. So due to same chemical action, attacking performance is not same due to different structured knit fabrics. Knit fabrics' surface is not same due to different structure or looping mechanisms.

Figure : Polo Pique

Figure : 1x1 Rib

Figure : Interlock

Surface properties such as softness and smoothness increase with density. Double knits show higher total hand values than single knits [1]. The tightness or cover factor indicates the relative tightness or looseness of a plain knit structure [2].

We have worked with enzymes and silicon softener as our main chemical agents. Enzymes are very efficient catalysts for biochemical reactions. They speed up reactions by providing an alternative reaction pathway of lower activation energy. The enzyme is used to form a reaction intermediate, but when this reacts with another reactant the enzyme reforms weight loss% is increased proportionally with the amount of enzyme used for the same period of time and vise-versa [3]. The rate of an enzyme-catalyzed reaction depends on the concentrations of enzyme and substrate. As the concentration of either is increased the rate of reaction increases [4].

The amount of enzyme present in a reaction is measured by the activity it catalyzes. The relationship between activity and concentration is affected by many factors such as temperature, pH, etc. An enzyme assay must be designed so that the observed activity is proportional to the amount of enzyme present in order that the enzyme concentration is the only limiting factor [5]. For a given enzyme concentration, the rate of reaction increases with increasing substrate concentration up to a point .Above which any further increase in substrate concentration produces no significant change in reaction rate. This is because the active sites of the enzyme molecules at any given moment are virtually saturated with substrate [5].Weight loss percentage can be calculated as:

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Weight Loss %=(Previous gray weight-Present weight) x100/ Previous gray weight

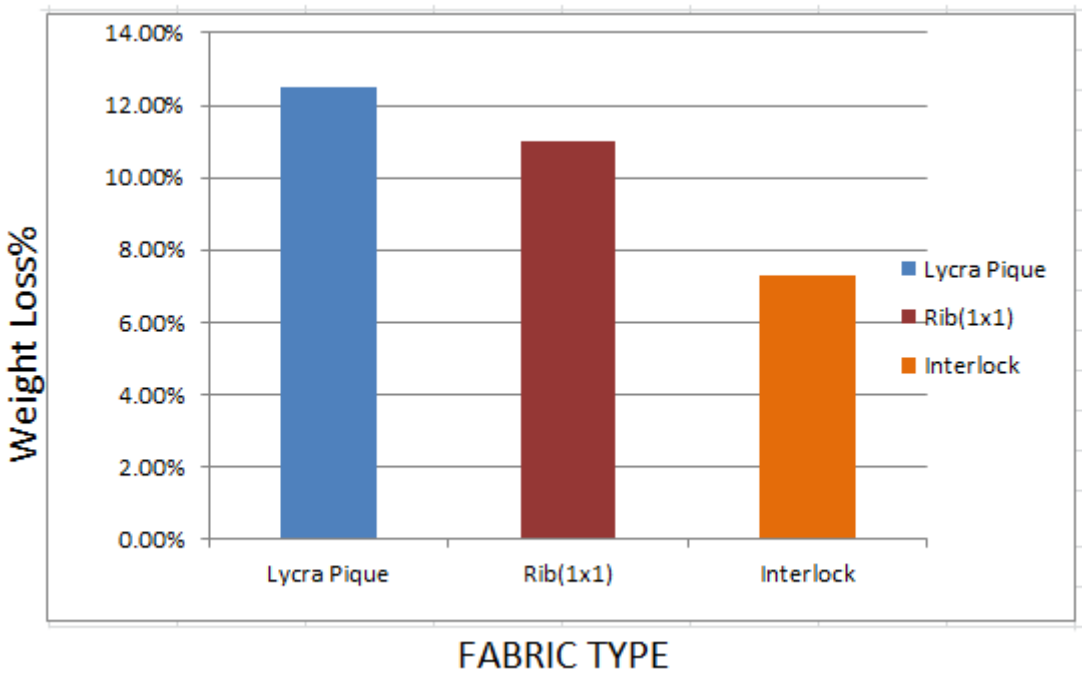
II. Materials and Methods

1. Firstly we considered 3 types of knit fabrics of different lots namely Lycra Pique, Plain Rib (1x1) & Interlock.
2. Then, for the first lot of Lycra Pique we found 12.5% weight loss% due to the action of Enzyme wash (1%) and then treated with silicon softener (1%).
3. Afterwards we found 11.03% and 7.3% loss for Plain Rib (1x1) & Interlock respectively for the same chemical actions.
4. Now we decided to change the chemical concentration % of Enzyme solution by twice compared to before.
5. Then we found the weight loss% with a significant value. We thought may be the result of weight loss% can be twice compared to previous but the result was not that.
6. It was found that weight loss was 16.02% for lycra pique.
7. Following the methods, we found 14.9% and 8.6% for Plain Rib (1x1) &Interlock respectively.
8. We used the following formula for calculating weight loss % : Weight Loss %=(Previous gray weight-Present weight) x100/ Previous gray weight.

III. Result & Discussion

Table: 01 Weight loss% of Fabrics with 1% Enzyme wash

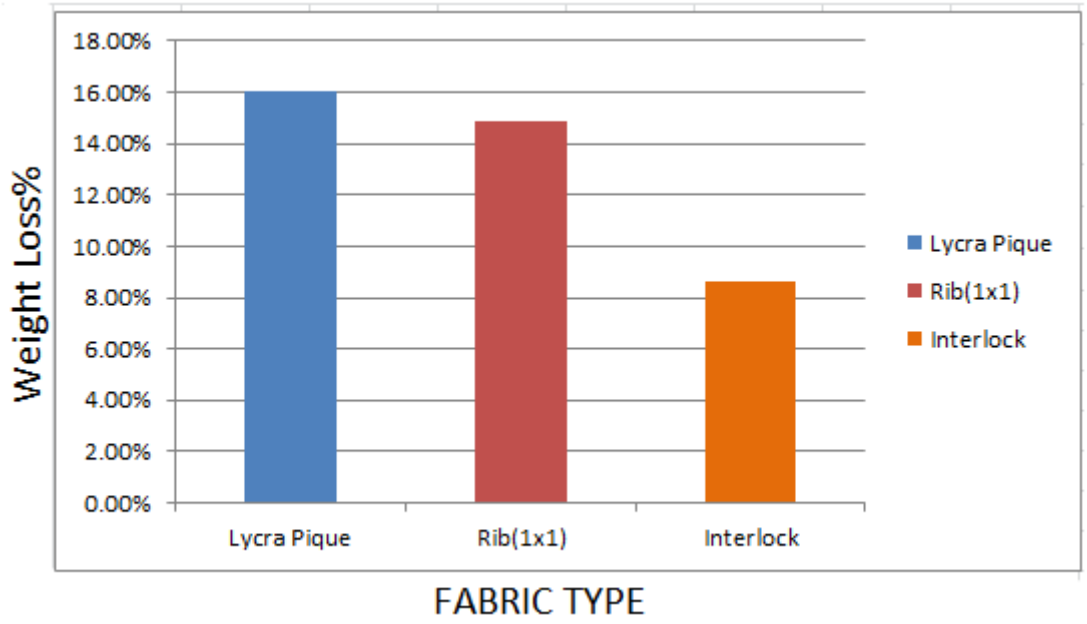
Serial number	Fabric type	GSM(gram per square meter)	Chemical concentration	Weight Loss%
1.	Lycra Pique	170	Enzyme wash (1 gram/liter) + Silicon softener (1%)	12.5%
2.	Plain Rib(1x1)			11.03%
3.	Interlock			7.3%



Graph: 01 Graphical Representation of Weight loss% for 3 different lots of fabrics with 1% Enzyme wash

Table: 02 Weight loss% of Fabrics with 2% Enzyme wash

Serial number	Fabric type	GSM(gram per square meter)	Chemical concentration	Weight loss%
1.	Lycra Pique	170	Double Enzyme wash (2gram/liter) + Silicon softener (1%)	16.02%
2.	Plain Rib(1x1)			14.9%
3.	Interlock			8.6%



Graph: 02 Graphical Representation of Weight loss% for 3 different lots of fabrics with 2% Enzyme wash

IV. Conclusion

In our composite factories, process loss% is considered same even for different structured knit fabrics. As a result problems may be arisen during maintaining accurate supply chain management. Our experimental data is an important guideline for the industries to calculate process loss% for considering not the common knit fabric issues but structural differences in the fabrics which have a significant impact on process loss%.

References Références Referencias

1. http://urpjournals.com/tocjnls/14_13v3i1_4.pdf
2. http://ggfjournals.com/assets/uploads/MIN-151_GIAS_18-21.pdf
3. http://trj.sagepub.com/content/70/12/1033.abstract
4. http://trj.sagepub.com/content/70/1/28.short
5. http://www.worthington-biochem.com/introbiochem/enzymeConc.html\
6. http://www.rsc.org/Education/Teachers/Resources/cfb/enzymes.htm

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