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YARN ABRASION RESISTANT PROPERTY TEST OF DIFFERENT QUALITIES AND GRADES OF SILK YARNS

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ABSTRACT

The natural yarns are eco-friendly in nature, where it is bio-degradable and environmental friendly. Recently textile industry has started adopting natural materials for the healthy environment. By considering good physical, mechanical, chemical and thermal properties the natural yarns are used in textiles. Strength has a great effect on slub yarn performance in production and usage. The main aim of this study is to determine the quality, durability and strength of the 3 different quality and grades of the yarns, the yarns are subjected to many the yarn abrasion resistance test. As a result, the parameters that have an effect on the nos. of abrasion of yarns the abrasion property of the 3 yarns will show gradual higher and lower scales.

Keywords: Silk yarn, quality, abrasion, grades, strength.

INTRODUCTION

Silk yarns are the natural protein fiber from silkworm. 100% silk yarns fall into animal-based category and are made from the cocoons woven by silkworms. The thread of silk yarns each cocoon ends up amounting to only one strand of silk thread. Depending on the water the quality of yarns are categorized into different types of grades of silk yarns. The yarns used for the study were collected from tiruppur district. The silk yarns are the spun yarns. The silk has a breathability property because of lightweight, and the other properties of silk yarns are elasticity is good when they're treated well, and good at keeping their shape, absorbency is also good, it has a thermal regulation, the drying speed is faster, and the lustre

of this yarn is rich[11]. Silk is one of the strongest natural fibers, but it loses up to 20% of its strength when met. If elongated even a small amount, it remains stretched. 'A' grade is the highest

'A' Grade silk yarn	'B' Grade silk yarn	'C' Grade silk yarn

Figure 1: 3 grades of silk yarns

MATERIALS & METHODS

Yarn abrasion resistant test refers to the ability of materials to withstand wearing down caused by scuffing, rubbing, scratching, etc. The abrasion test is used to determine the quality of yarns to enhance the abrasion resistance. The test measures abrasion cycles to failure on inter-wrapped yarn at various applied tensions. Depending on the abrasion of yarns in all 3 qualities and grade of silk yarns the strength of each sample of yarn is determined as on each nos. of abrasion given on the yarns.

Figure 2: Yarn abrasion resistance tester

Working principle of yarn abrasion test: The abrasion roller continuously rotates about its own axis so that an abrasive action is not impaired by abraded yarn residue in the emery paper. The computer controls the test procedure and logs the yarn breaks.

In which all the 3 different qualities of silk yarns of 'A', 'B' & 'C' grades are subjected under pressure to find the deviation of abrasion values and minimum and maximum abrasion values of each sample used.

'A' Grade quality of silk yarn: Grade 'A' silk yarn is the highest quality of yarn in all selected quality of silk yarns, so the highest quality is stated as 'A' grade of silk yarns. This type of yarn is most lustrous yarn than other silk yarns selected for the study. The 'A' quality yarn is subjected to nos. of 10 abrasion tests to determine the yarn abrasion resistance.

'B' Grade quality of silk yarn: Grade 'B' silk yarn is the average quality of yarn in all selected quality of silk yarns, so the average quality is stated as 'B' grade of silk yarns. This type of yarn is average lustrous yarn than 'A' grade silk yarn. The 'B' quality yarn is subjected to nos. of 10 abrasion tests to determine the yarn abrasion resistance.

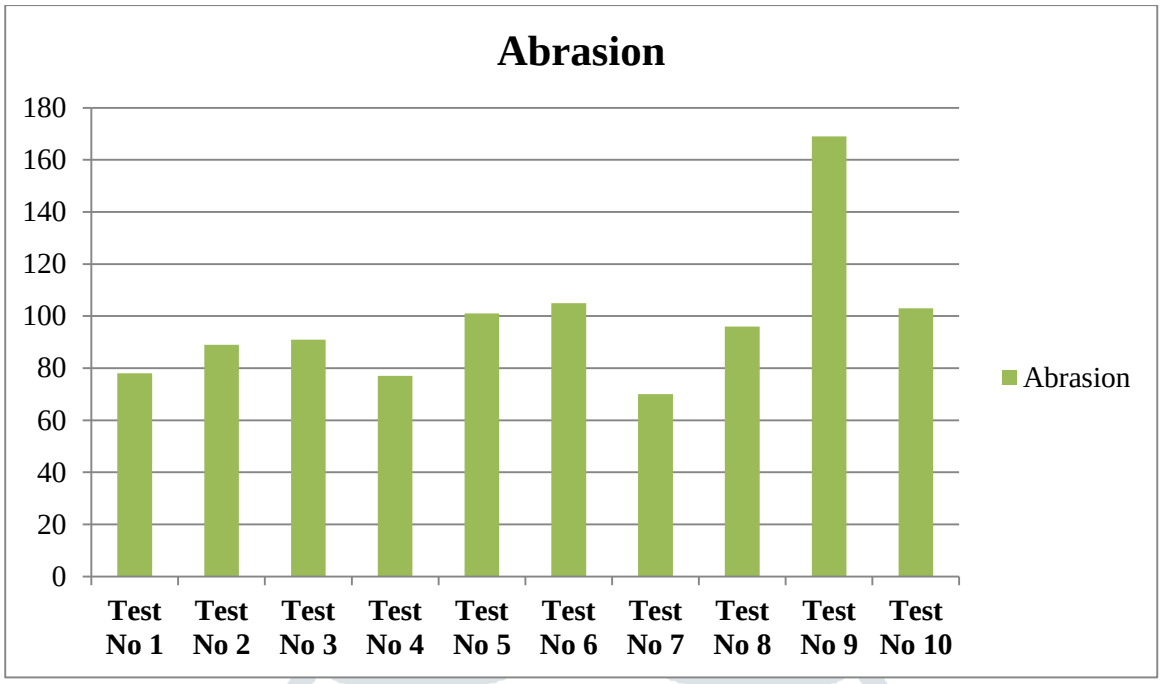
'C' Grade quality of silk yarn: Grade 'C' silk yarn is the lowest quality of yarn in all selected quality of silk yarns, so the lowest quality is stated as 'C' grade of silk yarns. This type of yarn is least lustrous yarn than 'A' and 'B' silk yarns selected for the study. The 'C' quality yarn is subjected to nos. of 10 abrasion tests to determine the yarn abrasion resistance.

RESULT & DISCUSSION

The naturally produced yarns do have properties of their own like physical, mechanical properties etc. So in those properties the physical property is abrasion resistant property, in the process where each type of sample yarn is put under pressure in abrasion tester for 10nos. of test. Were the results of each quality of yarns showed the higher and lower scales of deviations for every no. of abrasion given on the yarn samples.

Test No	Abrasion
1	78.00
2	89.00
3	91.00
4	77.00
5	101.00
6	105.00
7	70.00
8	96.00
9	169.00
10	103.00

Table 1: Abrasion resistant test of 'A' grade of silk

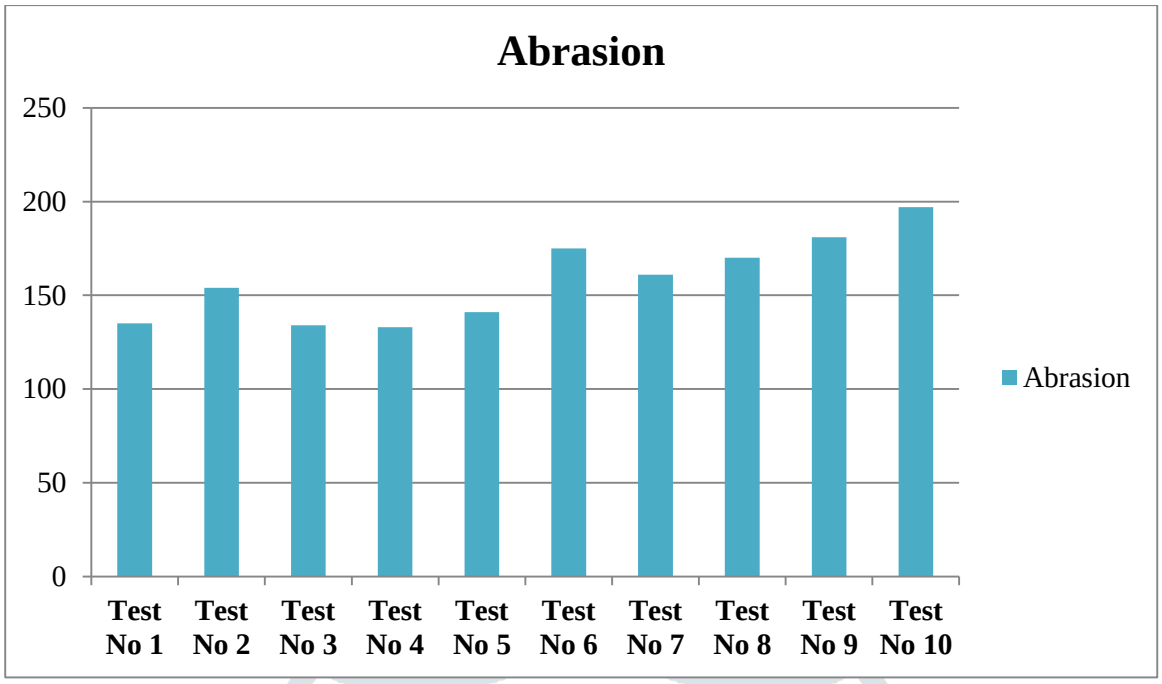


Graph 1: Variations of abrasion resistant test values of 'A' grade silk yarns

Thus, the sample of 'A' grade silk yarns were subjected to 10nos. of abrasion test, in which the abrasion resistant of yarn varies higher rate in test no. 9 and other all nos. of test the abrasion resistant seems to vary gradually in higher or lower.

Test No	Abrasion
1	135.00
2	154.00
3	134.00
4	133.00
5	141.00
6	175.00
7	161.00
8	170.00
9	181.00
10	197.00

Table 2: Abrasion resistant test of 'B' grade of silk

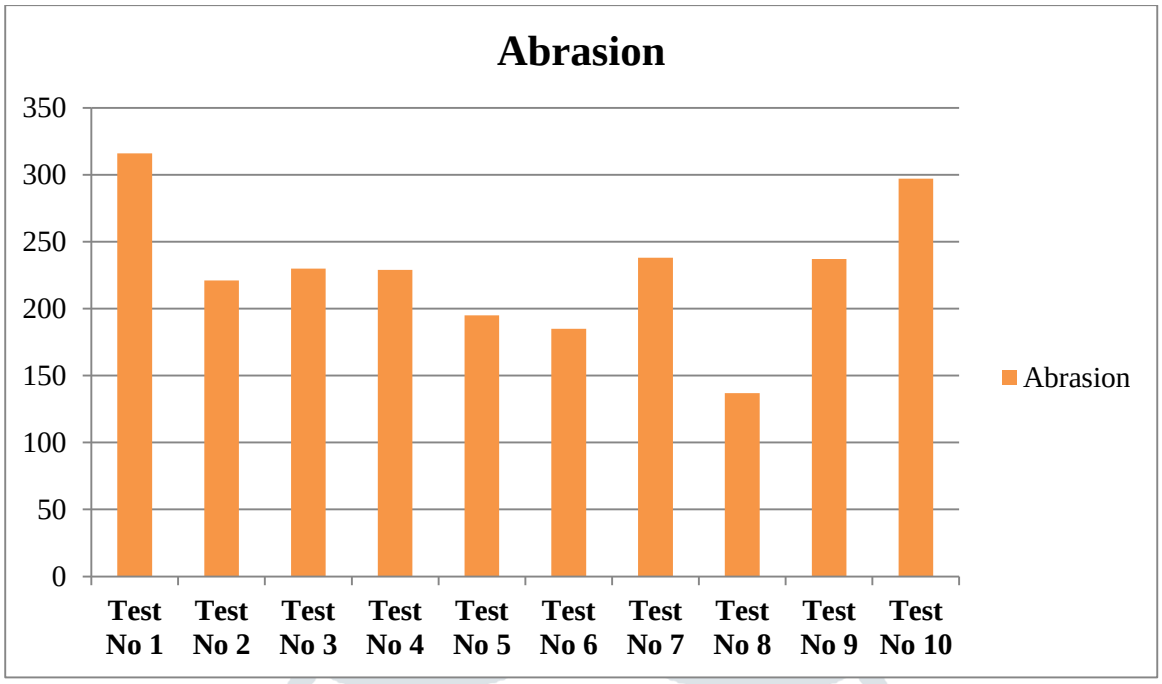


Graph 2: Variations of abrasion resistant test values of 'B' grade silk yarns

Thus, the sample of 'B' grade silk yarns were subjected to 10nos. of abrasion test, in which the abrasion resistant of yarn varies higher rate in test no. 10 and other all nos. of test the abrasion resistant seems to vary gradually in higher or lower.

Test No	Abrasion
1	316.00
2	221.00
3	230.00
4	229.00
5	195.00
6	185.00
7	238.00
8	137.00
9	237.00
10	279.00

Table 3: Abrasion resistant test of 'C' grade of silk



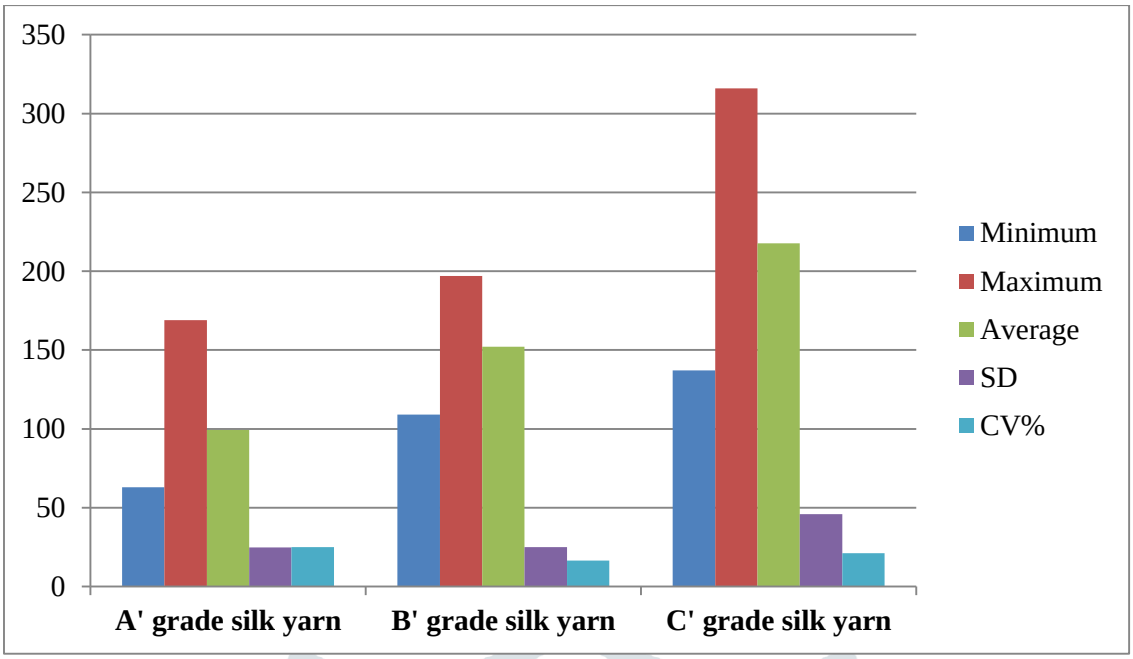
Graph 3: Variations of abrasion resistant test values of 'C' grade silk yarns

Thus, the sample of 'A' grade silk yarns were subjected to 10nos. of abrasion test, in which the abrasion resistant of yarn varies higher rate in test no. 1 and other all nos. of test the abrasion resistant seems to vary gradually in higher or lower.

All the silk yarns of different quality are subjected with the abrasion resistance test and on each grade of 'A', 'B' & 'C' of silk yarns the minimum abrasion resistant value and maximum resistant value was taken and the average abrasion resistant value of the each different quality is calculated. Using the average value the standard deviation SD and co-efficient CV% is calculated for each different type of grade silk yarns.

S.No	Sample type	Minimum	Maximum	Average	SD	CV%
1	'A' grade silk yarn	63.00	169.00	99.25	24.845	25.032
2	'B' grade silk yarn	109.00	197.00	152.05	24.945	16.406
3	'C' grade silk yarn	137.00	316.00	217.75	45.922	21.089

Table 4: The calculated deviation and CV% values of abrasion resistant test of 3 samples



Graph 4: The average, SD and CV% values of abrasion in all 3 grades of silk yarns

Thus, all the 3 qualities of silk yarns were subjected to the abrasion resistant test, the minimum, maximum, average, standard deviation & the co-efficient of the abrasion test values where calculated, in which the 'C' grade of silk yarns seems to give the values of average, standard deviation and co-efficient % in higher rate in comparative to the 'A' and 'B' grade of yarns.

CONCLUSION

The spun yarns of silk yarns which comes from natural protein fiber of 3 different qualities where categorised as 'A', 'B' & 'C' grades. All the 3 different quality and grades of silk yarns were subjected to abrasion resistant test of 10nos. in each type of sample, and the average value, standard deviation and co-efficient CV% values where calculated using minimum abrasion value, maximum abrasion value. In which the regular and gradual change of abrasion resistant value was seen in all the 3 qualities of silk yarn samples, and the abrasion test value is higher in rate in 'C' grade of silk yarn comparing to the 'A' and 'B' grade of silk yarns. So the standard deviation and co-efficient CV% value is higher in 'C' grade of yarn. So the 'C' grade of silk yarn faster gets abrasion than 'A' and 'B' grade of yarns. The 'A' grade of yarn is good in quality in abrasion, it is the abrasion resistant yarn than 'B' and 'C' grade of silk yarns. The abrasion-test results that predicts the probability of occurrence of abrasively weak place in the yarn[5]. So the end product or end use of all the 3 grade and qualities of yarns can be converted based on this abrasion resistant property of yarns.

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