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Statistical Analysis of the Properties of Some Romanian-Made Polyester Fibres

The present survey makes use of some checking criteria of hypotheses, as well as of the theory of correlation in the study of the influence of radiations on the polyester fibres.

World statistics on the dynamics of the production of man-made fibres show that top place is held by the polyester fibres, this being due to their important properties, namely:

— very durable and high tensile strength both when wet and drying;

— very resistant to rubbing and thus unreplaceable by other fibres except the polyamide fibres such as relon, nylon, rilsan, etc.;

— quick-drying because of very low hygroscopicity;

— resistant to bending and practically creaseless thanks to their elasticity;

— are easily felted, can be unravelled, are soft and woolly to the touch and prove good heat insulation capacity.

Because of their fine properties, the polyester fibres are fit for multiple use.

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The properties of the polyester fibres were for the first time studied and analyzed by exposure to nuclear radiations by Armstrong, Arthur, Gilfilan Linden, Heger and others.

We have based our researches on this new working system, yet using our own methodology. We have thus analyzed the behaviour of the polyester fibres of the teron type under the influence of nuclear energy. The fibres were

exposed to thermal neutrons and γ rays emitted by Co^{60}. The radiation of fibres with neutrons was effected at three levels of dose intensity, namely:

$1.53 \times 10^{16} n/cm^2$; 7.65×10^{16} n/cm^2 and 1.44×10^{17} n/cm^2,

while the irradiation of fibres at the source of Co^{60} was effected in four environments: water, air, vacuum and nitrogen. The irradiation doses were:

1.6×10^7 r; 5.5×10^7 r and 9.4×10^7 r.

The fibres exposed to γ radiation in the reactor received a 3×10^6 dose of roentgen.

The following cases resulted from the combination of these methods:

21 — fibres irradiated with thermal neutrons, minimum intensity;
22 — idem, medium intensity;
23 — idem, maximum intensity;
311 — fibres irradiated with γ rays — Co^{60}, in water, minimum intensity;
312 — idem, medium intensity;
313 — idem, maximum intensity;
321 — fibres irradiated with γ rays — Co^{60}, in air, minimum intensity;
322 — idem, medium intensity;
323 — idem, maximum intensity;
331 — fibres irradiated with γ rays — Co^{60}, in vacuum, minimum intensity;
332 — idem, medium intensity;
333 — idem, maximum intensity;
341 — fibres irradiated with γ rays — Co^{60}, in nitrogen, minimum intensity;
342 — idem, medium intensity;
343 — idem, maximum intensity;
4 — fibres irradiated with γ rays, in the reactor.

At the moment when the irradiated fibres lost their radioactivity, they were submitted to other analyses. Thus, the tensile strength and elongation at rupture properties of the fibres were determined with the help of a hydraulically-driven machine of the Schopper type.

Another analysis determined the tensile strenght and elongation at rupture of the teron-type fibres after their previous exposure to light for 250 hours. The "Xenotest—WL" apparatus served as light source.

By means of these analyses the behaviour to radiations of the teron fibres was established, both in varied environments, at different intensities of doses and to the kind of radiations. A comparison of the results leads to a series of conclusions on the influence exercised by the exposure to light of the irradiated fibres.

Of particular importance for the establishment of the quality of the teron-type polyester fibres is to determine their tensile strength and elongation at rupture. The behaviour of the teron fibres during their exposure to nuclear radiations differs according to the kind and intensity of radiations, the environment in which the irradiation is performed and the working method used (the determining of the characteristic's level in dry, in wet and when exposed to light). In getting to know the behaviour of teron fibres, the possi-

bility arises of improving some quality features. With a view of finding the influence of various factors on the tensile strength and elongation at rupture, the level of characteristics was measured of groups of 50 elementary samples, after irradiating the fibres in water, air, vacuum and nitrogen, three mentioned working methods being at the same time used. The averages of the values obtained at the 50 elementary samples represent the level of characteristics which is determined by the influence of the experimenting methods, namely by the environment in which the irradiation is effected and the working method used. Hence, in order to show off the influence of these factors, a comparison of these selection averages is needed.

By drawing a comparison between the average of the control samples obtained from the fibres whose strength is determined after wetting and exposure to light, with the average of the control samples from fibres whose resistance is determined when dry, the influence of wetting and exposure to light on the tensile strength and elongation at rupture is spotlighted. Let n_1 and n_2 be the magnitude of the control sample, the magnitude of the given sample respectivelly, $\bar{x}_1$ and $\bar{x}_2$ the selection averages which are compared, s_1^2 and s_2^2 the dispersions of the two selections. A criterion t is used for comparison of the averages. In case the dispersions are not significantly different, t is obtained from the relation

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}. \qquad (1)$$

In case the dispersions are significantly different the following relation * is used:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}. \qquad (2)$$

If magnitude t obtained by applying relation *(1)* or *(2)* to the analyzed data is lower than the tabular magnitude corresponding to the number of degrees of freedom and to the significant level $q = 0.05$, it is appreciated that

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* In relation *(1)* s is the generalized average square deviation of the two solutions:

$$s = \sqrt{\frac{s_1^2 f_1 + s_2^2 f_2}{f_1 + f_2}}$$

where $f_1 = n_1 - 1$ and $f_2 = n_2 - 1$. In case of relation *(1)* t pursues a Student distribution with $f = f_1 + f_2 = n_1 + n_2 - 2$ degrees of freedom, while in case of relation *(2)* t pursues a Student distribution with $f = \frac{1}{\frac{c^2}{f_1} + \frac{(1-c)^2}{f_2}}$ degrees of freedom.

Magnitude c is calculated from relation: $c = \frac{\frac{s_1^2}{n_1}}{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$.

CALCULUS SCHEMA FOR

Working method	Tensile strenght	Dispersion	Ratio of dispersions F_i	Tabular value F_{f_1,f_2}	$\frac{s_1^2}{n_1}$	$\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}$	$C=\frac{\frac{s_1^2}{n_1}}{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}$	C^2
In dry	63.30	99.07	—	—	1.9814	—	—	—
In wet	60.56	183.19	1.84	1.95	3.6138	5.6452	—	—
Exposed to light	36.84	193.16	1.94	1.95	3.8632	5.8446	—	—
—	Elongation at rupture	Dispersions						
In dry	27.32	28.18	—	—	0.5633	—	—	—
In wet	36.20	107.0	3.82	1.95	2.1560	2.7196	0.2072	0.042931
Exposed to light	17.68	18.79	2.44	1.95	1.3758	1.9394	0.2906	0.084449

the difference between the two averages $d=\bar{x}_1-\bar{x}_2$ is accidental and does not result from a significant difference between the given sample and the average of the control sample. If the t value calculated from the investigation data is higher than the tabular value corresponding to the significant level 0.05, yet does not exceed the value of t_q corresponding to the significant level $q = 0.01$, the hypothesis of the equality of averages is considered uncertain. Finally, in case the calculated t exceeds the value of t_q, corresponding to the significant level $q = 0.01$, it is considered that the difference between the two averages is significant and results from the influence of essential factors.

The computation schema in view of comparing the control samples obtained for the three working methods is given in table 1.

With the view of determining the significantly deviated dispersions, the ratio of the $F=\frac{s_1^2}{s_2^2}$ dispersions is calculated (the highest dispersion figures in the ratio numerator). This calculated ratio is compared with a tabular value $F_{f_1,\,f_2,\,p}$ corresponding to the number of degrees of freedom f_1 and f_2 and to a certain probability $\left(p=1-\frac{q_1}{2}\right)$. If the calculated value is lower than the tabular value $F_{f_1,f_2,p}$, the hypothesis on the equality of dispersions is accepted, hence for comparing the average relation *(1)* is used. When the calculated value F is higher than the tabular value, the hypothesis on the equality of dispersions is rejected; consequently, relation *(2)* is used. This latter situation occurred for the elongation a trupture feature, in case of the "dry" and "exposed to light" methods.

Table 2

COMPARISON OF AVERAGES

$\frac{c^2}{f_1}$	$1-c$	$(1-c)^2$	$\frac{(1-c)^2}{f_2}$	$\frac{c^2}{f_1}+\frac{(1-c)^2}{f_2}$	$f=\frac{1}{\frac{c^2}{f_1}+\frac{(1-c)^2}{f_2}}$	$\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}$	$\bar{x}_1-\bar{x}_2$	t	Tabular value $t_{0.05}$	Tabular value $t_{0.01}$
—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	2.37	2.74	1.15	1.98	2.62
—	—	—	—	—	—	2.41	−26.46	**10.97**	1.98	2.62
—	—	—	—	—	—	—	—	—	—	—
0.00087	0.7928	0.6285	0.01282	0.01361	73	1.64	−8.88	**5.41**	1.99	2.63
0.00172	0.7094	0.5032	0.01026	0.01198	83	1.39	9.64	**6.93**	1.99	2.63

An analysis of the results obtained in table 1 shows that when exposed to light the teron fibres lower both their tension strength and elongation at rupture, while when the fibres are wetted the elongation at rupture increases (as against the fibres at which the determination proceeded in dry). A comparison between the average value of the characteristic features of the irradiated fibres and the average value of the control test spotlights the influence of the irradiation dose on the tensile strength and elongation at rupture.

The results in tables 2 and 3 are obtained by making use of criterion t for a comparison of the averages.

The ratio of the dispersions $F_1 = \frac{s_1^2}{s_2^2}$ was compared with the tabular value corresponding to the number of degrees of freedom $f_1 = n_1 - 1 = 49$, $f_2 = n_2 - 1 = 49$ and the probability level $p = 1 - 0.01 = 0.09$ $F_{49;\ 49;\ 0.99} = 1.95$.

The following conclusions can be formulated in analyzing the results obtained in table 2 and table 3:

— The tension strength and the elongation at rupture of the irradiated fibres, determined in dry, have no significant deviations as against the control samples, in most of cases.

— The wetting of fibres prior to their irradiation to diverse doses contributes to a reduction of the tensile strength and elongation at rupture; also, a large number of significant deviations of the averages is obtained. It is worth mentioning that most of the deviations resulted from irradiations with average doses, 312, 322, 332, 342 (see tables 2 and 3).

Table 2

RESULTS OF COMPARISON OF AVERAGES OF TENSILE STRENGTH

Tests	In dry		F_i	t	In wet				Exposed to light				Tabular Value	
	Average ultimate tensile strength	Dispersion			Average tensile strength	Dispersion	F_i	t	Average tensile strength	Dis-persion	F_i	t	$t_{0.05}$	$t_{0.01}$
Control sample	63.30	99.07	—	—	60.56	183.19	—	—	36.84	193.16	—	—		
21	—	—	—	—	56.30	120.52	1.51	1.73	37.30	128.13	1.51	—0.18		
22	—	—	—	—	—	—	—	—	26.72	100.9	1.91	**4.16**		
311	61.36	69.95	1.41	1.06	—	—	—	—	41.06	230.01	1.19	—1.45		
312	63.62	102.61	1.03	—0.16	48.22	87.64	2.09	**5.31**	32.32	192.34	1.00	1.63		
313	65.08	58.97	1.68	—1.00	60.24	120.15	1.52	0.13	35.60	80.29	2.41	0.52		
321	57.30	103.77	1.04	**2.98**	—	—	—	—	49.46	133.01	1.45	**—4.94**		
322	57.14	83.51	1.18	**3.22**	51.76	86.01	2.12	**3.79**	44.16	179.10	1.07	**—2.69**		
323	59.60	184.90	1.86	1.55	—	—	—	—	—	—	—	—	1.98—1.99	2.62—2.63
331	59.64	212.94	2.14	1.47	51.90	144.50	1.26	**3.38**	39.10	110.09	1.75	—0.91		
332	60.12	195.40	1.97	1.31	51.00	64.98	2.81	**4.30**	46.64	207.09	1.07	**3.46**		
333	64.40	63.22	1.56	—0.61	58.36	133.09	1.37	0.87	44.74	263.83	1.36	2.61		
341	52.62	83.51	1.18	**5.59**	—	—	—	—	49.48	138.62	1.39	**—4.91**		
342	59.86	43.47	2.27	2.04	50.22	157.65	1.16	**3.96**	56.10	144.30	1.33	**—7.45**		
343	63.20	147.18	1.48	0.04	57.42	101.11	1.81	1.31	46.10	199.10	1.03	**—3.31**		

Table 3

RESULTS OF COMPARISON OF AVERAGE OF ELONGATION AT RUPTURE

Tests	In dry				In wet				Exposed to light				Tabular value	
	Average ultimate tensile strength	Dispersion	F_i	t	Average tensile strength	Dispersion	F_i	t	Average tensile strength	Dispersion	F_i	t	$t_{0.05}$	$t_{0.01}$
Control sample	27.32	28.18	—	—	36.26	107.80	—	—	17.68	68.99	—	—		
21	—	—	—	—	34.16	36.32	2.96	1.20	21.68	51.36	1.33	—2.58		
22	—	—	—	—	—	—	—	—	17.00	60.36	1.13	0.42		
311	30.36	48.60	1.72	—2.47	—	—	—	—	15.12	60.59	1.13	1.59		
312	19.88	31.40	1.11	**6.82**	29.48	90.75	1.18	**3.37**	16.52	63.19	1.08	0.71		
313	28.36	26.40	1.66	—1.00	28.68	55.93	1.92	**4.15**	12.88	7.00	9.82	**3.01**		
321	25.84	39.81	1.41	1.27	—	—	—	—	20.36	75.46	1.09	1.58		
322	27.96	44.65	1.58	—0.53	27.60	130.30	1.20	**3.94**	21.80	100.00	1.45	—2.25		
323	27.72	39.77	1.41	—0.34	—	—	—	—	—	—	—	—	1.98—1.99	2.62—2.63
331	25.12	35.94	1.27	1.94	20.68	35.40	3.03	**9.10**	14.84	61.56	1.11	1.75		
332	27.48	46.99	1.66	—1.31	20.44	33.02	3.26	**9.38**	22.48	135.40	1.96	—2.36		
333	23.44	43.00	1.52	**3.26**	35.80	51.80	2.08	0.22	26.60	141.61	2.05	**—4.35**		
341	24.60	66.65	2.36	1.98	—	—	—	—	19.28	66.50	1.03	—0.97		
342	23.32	19.20	1.46	4.16	22.84	39.03	2.76	**7.81**	31.60	1.92	1.92	**—6.96**		
343	32.04	61.63	2.18	**—3.52**	32.32	83.48	1.29	1.98	24.56	104.80	1.52	**—3.69**		

N.B. The figures printed in aldine in the tables 2 and 3, are average values, significantly differing from the sample.

— The exposure to light of the irradiated fibres in the four environments is conducive to a growth of the tensile strength and also of the elongation at rupture, as against the control sample fibres; hence, the light has a positive influence on the fibres strenght.

These conclusions are completed if the comparison of the averages is accompanied by a comparison of the dispersions. A practical interest lies in the achieving fibres with higher strength and lower dispersion of the value of characteristics. Diagram 1 provides a suggestive illustration and a comparison easy to do of the results obtained. This diagram permits to establish the averages and selection dispersions with significant deviations as against a critical level determined according to a tabular value. The critical level for each average was determined with the help of the relation.

$L_i = \bar{x}$ control sample $t_{0.01}\, \bar{s}_i$

$$\text{where } s_1 = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}.$$

For finding the critical level * of dispersions the following relation was used:

$$L_s = F_{f_1;\, f_2;\, 0.01\, s^2 \text{ control sample}}$$

The establishment of an inferior limit of the averages and of a superior limit for the dispersions is justified by the fact that the analysis must bring to the fore those processing methods that determine a high value of the average of characteristics and a low dispersion of values.

The horizontal diagram reading permits the spothlighting of the role played by each environment, irradiation dose and working method on the variation of characteristic features: the tensile strength and elongation at rupture.

It is being appreciated, primarily, that the strength of fibres determined in wet is lower than the strength of dry fibres. This conclusion is based on the fact that most of the selection averages are under the established critical level.

Secondly, it has been noted that an improvement of both tensile strength and elongation at rupture over the control sample is obtained following the exposure to light of the irradiated fibres. The analysis of the diagram shows that most of the samples have an average level of the feature which not only is above the critical level, but even exceeds the average level of the feature recorded at the control sample.

The vertical reading of the diagram permits the determination of those working methods, environments and radiation doses which were conducive to as higher as possible tensile strength and elongation at rupture, while the dispersion of values was as lower as possible. It appears that the fibres have a

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* The critical level was established taking into account the fact that when the selection dispersions are higher than the control sample dispersion, criterion F is being calculated upon the relation $F = \dfrac{s_i^2}{s^2 \text{ control sample}}$ and when the dispersions do not have significant deviations as against the control sample dispersion, the calculated value F must be lower than a tabular $F_{f_1,\, f_2,\, p}$; hence $s_i^2 = s^2$ control sample $F_{f_1,\, f_2,\, p}$.

In case the selection dispersions are lower than the control sample dispersion, the calculus of the superior limit is no longer necessary.

fine behav'our when exposed to a minimum (311) and maximum (313) radiation dose in water, and also at irradiation with medium dose (323) in air, in case of the first working method.

Also, worth mentioning are the results obtained at fibres exposed to radiation and then to light, as follows:

— fibres exposed to a minimum flux of neutrons (21)
— fibres exposed to a medium radiation dose in water (312)
— fibres exposed to minimum and average doses in air (312), (322)
— fibres exposed to nitrogen radiation.

The very complex effects of the nuclear radiations on the polyester fibres are well known. The destructive effect of radiations upon the structure of fibres can be determined by microscopic investigation; yet a representation of these structural changes can be achieved as well by the statistical-mathematical analysis of the variations of the characteristics — tensile strength and elongation at rupture. The investigation of the data collected through the selection method shows that there is a correlation between the tensile strength and the elongation at rupture which — when no external factor acts upon the fibres — must be kept. This is illustrated by the data obtained for the control samples:

Table 4

Working methods	Correlation coefficient
In dry	0.54
In wet	—0.197
Exposed to light	0.61

It results that in case the fibres are not irradiated the correlation coefficient is sufficiently high ($r = 0{,}54$), and when exposed to light, there is an increase of the intensity of the link between the two characteristics ($r = 0.61$). The fact that for the "in dry" working method a low correlation coefficient is obtained and the correlation direction is being changed at the same time, demonstrates that the joint between the characteristics has been broken. The same effects can also be noted through the analysis of the correlation diagram for the three control samples (see fig. 2).

Yet the highest effect on the correlation between the two characteristics is carried not so much by the change of working method, but by the change of the radiation dose. A comparison between the correlation coefficients for the irradiated samples in dry (see table 5) shows that all the correlation coefficients are significantly different from the correlation coefficient of the control samples [7, p. 570—586].

Table 5

Samples	Control samples	311	312	313	321	322	323	331	332	333	341	342	343
Correlation coefficient	0.54	—0.014	0.03	—0.179	0.174	0.007	—0.263	0.289	0.12	0.253	0.062	0.166	—0.152

Thus it is proved on this way too that the irradiation generates a change in the structure of fibres which alters the character of the joint between the elongation at rupture and tensile strength.

Worth mentioning is the fact that most of the samples showed correlation coefficients fairly equal following their exposure to light, after irradiation. To compare them, criterion Z is applied, determined with the help of the formula:

$$Z = \frac{u_1 - u_2}{\sqrt{\frac{1}{n_{1-3}} + \frac{1}{n_{2-3}}}} = \frac{1.513 \lg \left[\frac{1+r_1}{1-r_1} - \lg \frac{1+r_2}{1-r_2} \right]}{\sqrt{\frac{1}{n_1-3} + \frac{1}{n_2-3}}}$$

where r_1 and r_2 are correlation coefficients for the control sample and for the sample that is compared with the control sample, while $u = 1.513 \lg \frac{1+r}{1-r}$. Value Z, determined with the help of the above relation is compared with tabular value Z_{q1}, corresponding to the chosen significant level $q_1 = 1 - 2\Phi(Z)$. If the calculated value is higher than tabular value Z_{q1}, the hypothesis of the equality of the correlation coefficients is rejected.

Table 6 shows the calculus for the comparison between the correlation coefficients and the correlation coefficient of the control samples.

Table 6

CALCULUS SCHEMA FOR COMPARISON OF CORRELATION COEFFICIENTS

Tests	Correlation coefficient	$1+r$	$1-r$	$\frac{1+r}{1-r}$	$\lg \frac{1+r}{1-r}$	$u_1 - u_2$	$1.1513 (u_1 - u_2)$	$Z = \frac{u_1 - u}{\sqrt{\frac{1}{47}}}$
Control sample	0.611	1.611	0.389	4.14138	0.61711	—	—	—
21	0.58	1.580	0.42	3.76194	0.57542	0.04169	0.04799	0.309
22	0.61	1.610	0 39	4.1282	0.61574	0.00137	0.00157	0.01
311	0.84	1.840	0.16	11.50	1.06070	−0.44359	−0.51071	**−3.51**
312	0.802	1.802	0.198	9.1010	0.95909	−0.34198	−0.39372	**−2.705**
313	0.456	1.456	0.544	2.6764	0.42749	0.18962	0.21831	1.50
321	0.646	1.646	0.354	4.6497	0.66740	−0 05029	−0.05789	−0.367
322	0.589	1.598	0.402	3.9751	0.59934	0.01777	0.02045	0.14
331	0 663	1.663	0 337	4.9347	0.69325	−0.07614	−0.08765	−0.60
332	0.610	1.610	0.390	4.1282	0.61574	0.01370	0.00157	0.01
333	0.598	1.598	0.402	3 9751	0.59934	0.01777	0.02240	0.121
341	0.650	1.650	0.35	4.7142	0.67247	0.05536	−0.06373	−0.44
342	0.579	1.579	0.421	3.7505	0.57409	0.04302	0.04932	0.34
343	0.570	1.570	0.430	3.6511	0.56241	0.05470	0.06297	0.113

The tabular value corresponding to a significant level of $q = 0.05$ is $Z_{0.05} = 2.24$; hence, only the correlation coefficients for samples 311 and 312 which are significantly different from the control sample are higher than the correlation coefficient of the control sample, which means that the intensity of the joint between the tensile strength and the elongation at rupture has increased.

From the data of table 6 it can be observed that by exposing to light the fibres, after their irradiation, a growth of the intensity of correlation between the two characteristics is obtained at fibres irradiated both in diverse environments (water, air, vacuum, nitrogen) and with different doses, consequently, an improved structure.

The statistical calculus method applied to our example enables the determining of the technical-economic opportunity of using new methods of improving some characteristics of the polyester fibres.

The calculus performed showed:

— the possibility exists to establish a practical procedure for improving the elasticity of teron products based on feeble irradiation with γ rays of Co^{60}, in water (for fishing nets, ropes, etc.);

— the using of irradiation as method of improvement of some qualitative indices of teron fibres entails the determining of the maximum irradiation level, bearing in mind the fact that the nuclear radiations diminish the tensile strength of these fibres;

— on the contrary, the light acts positively on the strength of feebly irradiated textile products. Such is the case of the workers' clothes in the laboratories with nuclear radiations, of spacemen, etc.

These facts have important practical value. We are considering, for instance, the possibility of reconditioning of products, with current practical applications, as for instance, the fishing implements and fishing nets made of polyester fibres. The reconditioning could be better achieved by a feeble periodical irradiation.

Upholding this method is the result of the calculus performed on the irradiated polyester fibres, which in certain conditions, like irradiation environment, dose and, especially, through exposure to light, are gaining considerably in elasticity.

Thus, the fishing nets made of natural fibres — which in wet are losing appreciably their strength, increasing their stiffness, — can be replaced by polyester fibres, more resistant and easily accessible.

Yet, the practical value of the survey does not reduce itself only to this aspect but, generally, the results of the statistical calculus performed upon the above method enable the using in the textile industry of those polyester fibres whose technical features better correspond to the use they are intended for.

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ANALYSE STATISTIQUE DES PROPRIETES DE CERTAINES FIBRES POLYESTERIQUES ROUMAINES

L'auteur fait l'analyse, à l'aide des méthodes de la statistique mathématique, d'une série de caractéristiques de la qualité des fibres polyestériques soumises aux radiations nucléaires.

En vue de déterminer l'influence exercée par différents facteurs sur la résistance à la traction et sur l'allongement à la rupture, on a mesuré le niveau des caractéristiques sur 50 échantillons dont les fibres ont été irradiées à des sources différentes, à intensité différente et dans des milieux différents. Les moyennes obtenues ont été comparées à l'aide du critérium t aux moyennes données par les échantillons de base (fibres non-irradiées).

De même, par l'analyse statistique-mathématique de la corrélation des caractéristiques de la résistance à la traction et de l'allongement à la rupture, on a établit l'effet des radiations sur la structure des fibres de teron.

L'auteur présente aussi une méthode graphique pour l'analyse des données.

Les résultats obtenus ont une grande importance pratique pour l'utilisation des fibres de teron dans l'industrie textile.

СТАТИСТИЧЕСКИЙ АНАЛИЗ СВОИСТВ НЕКОТОРЫХ РУМЫНСКИХ ПОЛИЭСТЕРИЧЕСКИХ ВОЛОКОН

В этой статье анализируется при помощи метода математической статистики ряд качественных характеристик полиэстерических волокон, подверженных ядерных радиации.

С целю определения влияния различных факторов на сопотривление силе тяги и удлинению при разрыве был измерен уровень характеристик в 50 пробах, взятых после облучения волокон из разных источников, с различными дозами напряжения и в различной среде. Средние величины этих проб были сопоставлены при помощи критерия t со средними показательных проб (необлученные волокна).

Также, путем математико-статистического анализа отношения характеристик сопротивления силе тяги и удлинению при разрыве был установлен эффект радиации на структуру волокон терона.

В работе дается и графический метод анализа данных.

Полученные результаты имеют практическое значение для использования волокон терона в текстильной промышленности.