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23. The Effect of the Oiling on Viscose Rayon Yarn. (II)

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In our previous report, it was recognized that the torsional resistance and the coefficient of friction decreased with the oiling of the viscose rayon yarn. These results were published at the meeting of the Engneering Union in Kansai District in Oct., 1951.

The present work has been carried out to separate the effect of the oiling on the torsional resistance and the coefficient of friction for viscose monofilament and yarn. Avitex-R was used as the oiling agent. The test sample was made as follows: viscose monofilament or yarn is immersed in 10 g./l. emulsion at 40°C for 1 hr., squeezed out to 200 % weight, dried at 60°C for 5 hrs., then dried at room condition. The increase in weight in both cases was 0.91 %.

1. The experiment on monofilament (10 den.). As shown in Table 1, the coefficient of friction decreased remarkably with the oiling, while the torsional resistance remained practically the same.

Table 1.

Sample	Coefficient of* friction
Untreated	0.7235
Treated	0.4302

* The coefficient of friction between the filament intersected respectively at the right angle. [conf. Ichiro Sakurada and Waichiro Tsuji, *Rayon World* (Japan), **7**, 620 (1932)].

2. The experiment on yarn (10 den. × 10). The torsional resistance of the yarn, constructed by bundling of 10 monofilaments used in 1, decreased remarkably as can be seen from Table 2. [The torsional resistance in Table 2 is represented by the torsional angle (degree) at each number of twist per mm.].

Table 2.

Number of twist turns/50mm	5	10	15	20	30	40	60
Number of twist turns/mm	0.1	0.2	0.3	0.4	0.6	0.8	1.2
Untreated	23.12	51.90	67.09	82.90	116.34	153.00	221.65
Treated	21.63	37.88	52.16	65.20	90.25	114.84	174.99

Number of test: 20, Load: 10g., Temp.: 13-18°C, R.H.: 60-70%.

From the above results it seems probable that the decrease of the coefficient of friction is the chief factor for the decrease of the torsional resistance of the viscose rayon yarn treated by this oiling agents, considering the fact that the Young's modulus is not decreased by those treatments.

In the case of raw silk, it was found, as reported in the previous work, that the torsional resistance decreased with oiling. Another experiment was carried out using polyamide "Amilan" monofilament and the decrease of both the torsional resistance and the coefficient of friction was recognized by using Pansofter as an oiling agent. In the case of Amilan, it seems that not only the coefficient of friction is decreased but also the softening of the fiber itself is resulted by oiling.

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24. Studies on the *Propionibacterium*. (IV)

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Delwhiche (*J. Bact.* **56**, 811 (1948)) has shown that *Propionibacterium pentosaceum* converts succinic acid into propionic acid and carbon dioxide at pH 5.2. Fromageot and Bost (*Enzymologia*, **4**, 225 (1938)) obtained the same result in presence of glucose at pH 6.4.

It is found in the present paper that yeast extract is necessary for decarboxylation of succinate by *P. arabinosum*, and that the effect of yeast extract appears in its inorganic constituents.

The medium used for growing bulk contained 1 g. of glucose, 1 g. of peptone, and 0.5 g. of Difco Yeast Extract in 200 ml.; the initial pH was 7.0. The medium was inoculated with 10 ml. of 24 hrs. subculture of *P. arabinosum*. After 36 hrs. incubation at 30°, the bacterial cells were centrifuged; washed with 100 and then 50 ml. phoshate buffer and finally suspended in 5 ml. of water. The yield of the fresh cells were found to be between 0.8–0.9 g. (nearly 86 mg. on dry basis). The fresh suspension thus obtained was used in every experiments.

The decarboxylase activity was determined by manometric measurement of carbon dioxide evolved. As a rule, cell suspension (0.5 ml.), phosphate buffer (final concentration was 1/30 *M*) and any other additions except substrates were placed in the main chamber of the cup, while the substrate solution was put into the side chamber. The total volume of fluid in the manometer cup was adjusted to be 3.0 ml.; air space in the cup was displaced by CO_2, and the temperature of water bath was kept at 30°.