Table 27.1. Results of tensile tests performed on degraded cotton samples treated with the three solutions of nanocellulose-based consolidants and information on samples.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Solution | Sample preparation | Sample | Concentration  in solution (% w/w) | Weight uptake (%) | Applications (no.) | Tensile  test conditions | Young’s modulus (MPa)\* |
| **1** | Spray | Untreated | — | — | — | * Preconditioning at 20% RH * Testing under controlled environment (20% RH, 25°C) * Speed = 0.4 N/min. * Warp direction | 2 |
| CNF | 1 |  | 3 | 24 |
| CCNF | 0.25 |  | 3 | 8 |
| CNC | 3 |  | 3 | 36 |
| Brush | Untreated | — |  | — | 2 |
| CNF | 1 |  | 4 | 23 |
| CCNF | 1 |  | 4 | 24 |
| **2** | Brush | MC + CNC (water) | 1.98 |  | 3 | 16 |
| MC + CNC (heptane) | 1.98 |  | Unknown | 7 |
| **3** | Spray | Untreated | — | — | — | * Preconditioning at 60% RH * Testing under controlled environment * Speed = 300 N/min. * Weft direction | 26 |
| SNP | 4.5 | 8.6 | 2 | 55 |

*Sources:* Solution 1—spray preparation: {{Nechyporchuk et al. 2018}}; brush preparation: {{Bridarolli et al. 2020}}. Solution 2—preparation: {{Bridarolli 2019}}. Solution 3—preparation and data: {{Kolman et al. 2018}}.

\*The stiffness (Young’s modulus) reported for solutions 1 and 2 samples was measured in the region of interest (0–2% elongation). The data shown for solution 3 were taken from {{Kolman et al. 2018}} and Young’s moduli calculated from the beginning of the curves (0-4% elongation).

Table 27.2. Variations in storage modulus E' (stiffness) between 20% and 80% RH calculated using values at equilibration (end plateau).

|  |  |  |
| --- | --- | --- |
| **Solution** | **Sample** | **Δ*E'*20%–80% [*E'*20% RH– *E'*80% RH]** |
|  | Untreated | 7.6 ± 0.2 |
| **1** | CNF | 12.9 ± 1.8 |
| CCNF | 9.9 ± 2.1 |
| **2** | MC + CNC (heptane) | 8.3 ± 0.9 |