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Development of a **Textile** with **Silica** coating for environmental friendly control of insects in **Agricultural** production

Deliverable [12]: *[Data's of coated fabrics characterization and comparison with alternative coated fabric surfaces]*

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Abbreviations:

ITA: Institut für Textiltechnik, Germany

UTH: University of Thessaly, Greece

ThraceNG: Thrace Nonwovens & Geosynthetics S.A.

P&S: Powder and Surface GmbH

D [12]: [Data of coated fabrics]



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D [12]: [Data of coated fabrics]



1. Summary

The present deliverable describes the coating of different fabrics with SiO₂ particles, their characterization and the comparison with the coated nets. For this purpose, various fabrics were used, woven and non-woven, and then characterized in terms of light permeability, air permeability and tensile strength. The data collected revealed that all samples obtained a sufficient amount of SiO₂ meaning that plasma treatment is suitable technique for SiO₂ deposition on many different kinds of fabrics. Although direct comparison between dissimilar fabrics is not correct, data analysis showed that both spunbond and needlepunch fabrics exhibit reduced light and air permeability after coating. The tensile properties were not significantly affected by the coating and in some cases even small improvements were recorded. In general, spunbond fabrics recorded lower property values compared to the needlepunch fabrics, but this is not related to the coating with SiO₂ particles but to the inherent structural characteristics of the spunbond. This should be always kept in mind when comparing different fabrics. The overall properties (air and light permeability and tensile) of both non-woven fabrics are by far lower compared to the nets'. This also proves the correctness of the selection of nets as the fabric of choice for the specific agricultural application.

2. Experimental Part

It should be noted here that, coating of fibers was not done, because of the abrasion generated during the weaving process on looms. Abrasion was so extended that was removing significant amount of silica particles from yarns' surfaces and spreading them into the air like dust (aerosol) creating a dangerous and unhealthy environment for both the working personnel as well as the production machinery. Therefore, coating performed only on already weaved nets – fabrics.

The coated fabrics characterization involved optical microscopy and silica particle uptake. The comparison with alternative coated fabric surfaces, with dissimilar structure and diverse applications like those in Table 1 below, involved the comparison of these properties.

Table 1. Coated Samples that were produced for comparison

Sample S/N	Sample Name
1	TPC 130 (Groundcover fabric 130 gsm)
2	MS-140 ANTISPINA (HDPE monofilament net 140 gsm)
3	TS-120 Shading (HDPE Tape net 120 gsm)
4	Nonwoven Needlepunched (100 gsm)
5	Nonwoven Spunbond (90 gsm)

D [12]: [Data of coated fabrics]



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The deliverable is available upon request

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D [10]: [Data of the fiber's characterization]

