



## CELLULOSE FIBER BASED COMPOSITES FOR AUTOMOTIVE APPLICATIONS

*SAPA Spa., via Appia, Arpaia (BN) - 82011, Italy*  
*SÒPHIA HIGH TECH SRL, via Romani 228, Sant'Anastasia (NA) - 80048, Italy*

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### Abstract

Reducing a vehicle's weight is a primary objective as well as a major challenge for the automotive industry. This is the main reason why plastics have been used to substitute heavier materials such as metals. A further challenge faced by the industry is the use of renewable resources in order to minimize the environmental impact of car production. Innovative materials derived from renewable sources help to save energy, reduce reliance on fossil fuels and drastically reduce the carbon footprint. Our research and innovation are focused on natural fibers reinforced polymer composites can offer the same performance as traditional materials but with lower weight and environmental impact. In this article the performance of cellulose fibers was analyzed and compared with traditional filler. From this point of view, cellulose fibers are probably the most interesting for their availability, price and constancy of properties. Recent investigations at SAPA have shown that, compared to other natural fibers, they can guarantee excellent mechanical properties in the molded parts. Experimental activities were carried out within the LIFE Biobcompo Project, whose objective was to reduce the environmental footprint of new vehicles through innovative low density thermoplastic composites derived from renewable (bio-based) sources. The specific objectives of BIOBCOMPO is to develop at industrial level very low density thermoplastic materials which allows to save up to 8% in weight by using natural fillers. The project aims to demonstrate these new technologies at industrial scale, aiming to overcome the problems related to industrialization of the newly proposed solutions. In this paper the application of cellulose-reinforced polypropylene composites for automotive parts is evaluated. Key parameters such as fiber-matrix adhesion, moisture, thermal stability and mechanical properties, are discussed in detail. The results show that the presence of inorganic fillers can improve the dispersion of the cellulose fiber within the polymer matrix and the processability of the composite. A small percentage of talc can help the melt flowability while enhances the composites in stiffness and strength. These bio-based composites are suitable for applications ranging from interior door panels and pillar covers to underbody aerodynamic shields.