



## Carbonized Jute Sorbent for Oil Cleanup

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Over 90 million tons of textile waste is produced every year. A large share of waste comes from the goods made of cellulose fibers. Recently, special attention has been directed towards the use of textile cellulose waste for clean-up of oil spills<sup>1</sup>. The major problem relies on their relatively small oil capacity and complex separation of individual cellulose fibers from the treated spills. In an attempt to overcome this drawback, a non-woven sorbent based on recycled jute fibers obtained from the carpet industry was manufactured. Improvement of porosity and hydrophobicity/oleophilicity of the sorbent was achieved by carbonization process in an inert atmosphere. FESEM analysis revealed the fiber reduction of almost 40% induced by fiber degradation while EDX analysis confirmed the increase in the carbon content by 75% after carbonization. Oil capacity in water medium, buoyancy, oil retention and reusability of non-carbonized and carbonized sorbents were evaluated by testing four different oils (crude oil, diesel oil, two motor oils). After carbonization process, the oil sorption capacity was doubled in comparison with non-carbonized sorbent independent of oil viscosity. Carbonized sorbent not only remained afloat after 24 h of staying in water, but it sorbed a negligible amount of water unlike non-carbonized sorbent. In addition to good buoyancy, oil retention on carbonized sorbents ranged from 64-80% after 30 min of draining. Larger uptake was achieved with oils of higher viscosity, but their retention was worse. Oil sorption capacity after 5 repeated sorption/desorption trials was significantly larger in the case of carbonized sorbent since it retained 80-88% of its initial oil sorption capacity depending on tested oil.

**Keywords:** Oil cleanup, Jute, Sorption, Carbonization

### References

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