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Novel oil absorbing composite product for oil spill cleanup applications

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Low oil sorption capacity is the major obstacle in using naturally occurring raw materials like rice straw and corn cob for oil spill cleanup. Oil sorption capacity could be increased by increasing the hydrophobicity of the material. Hydrophobicity was increased by surface modification of these materials by either acetylation or benzoylation. FTIR spectroscopy was used to measure the degree of acetylation or benzoylation. Oil absorbancy studies were conducted for different oils such as discarded oil, coconut oil, petrol, diesel and toluene. Oil absorbency of acetylated straw has significantly increased compared to raw rice straws. Acetylated and benzoylated corn cob samples also showed remarkable increase in oil absorptivity compared to unmodified corncob.

Waste tyre pieces were modified by decreasing the cross-linking density by physical treatments such as grinding and heat treatments. The degree of cross-linking was measured by standard swelling tests. The treated tyre pieces showed increased oil absorptivity compared to the untreated tyre samples.

Modified materials have been used to prepare an oil absorbing pouch/mat which could be used easily to clean oil spills independent of the type of the oil. Corn cob and rice straw are two major agricultural wastes which have no or little commercial value in Sri Lanka. Waste tyres are the most plentiful polymer waste in Sri Lanka and have no commercial value. Hence, reuse of these valueless waste materials to clean the environment becomes a vital social focus.

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