tion at a temperature of 80 °C for 7 hours and periodically sampled. Styrene and butylmethacrylate were used as copolymers in an equal molar ratio with the starting monomer. As an initiator, AIBN was used in an amount of 3 % by weight of the monomer. After the polymerization was completed, the resulting copolymers were precipitated in a 5-fold excess of hexane, filtered and dried.

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MODIFICATION OF NATURAL PETROLEUM ADSORBENT SPHAGNUM DILL

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Oil, consisting of a mixture of aromatic and aliphatic hydrocarbons, does not dissolve in water due to its hydrophobic properties, thus presents an environmental problem in case of emergency oil spills during oil transportation and refining because it degrades slower than water-soluble compounds.

The basic method to respond problems related to oil spills is sorption [1]. When choosing an adsorbent, it is necessary to consider not only its basic characteristics such as oil absorption, water absorption and buoyancy but also the methods of used adsorbent disposal. To respond oil spills, adsorbents shall be both oleophilic and hydrophobic. Synthetic fiber materials, such as polyethelene, polypropelene and atactic oxidized polypropelene, are good adsorbents of hydrocarbons. The adsorbents which combine liophilic and hydrophobic behavior are cellulose containing materials being able to participate in ion-exchange reactions [2]. The paper demonstrates that adsorption is determined by composition, structure and proportion of components. Natural adsorbents despite their diversity are characterized with high water absorption capacity and relatively low oil absorption capacity in comparison with polymer and inorganic adsorbents. The basic approach to increase adsorbent hydrophobicity is to modify cellulose containing adsorbents by treating them with chemicals: sodium hydroxide [3], Fenton's reagent [4], organic acids and acid amides [5], carbonization [6].

This paper studies target-specific modification of peat moss (*Sphagnum*) and the following three properties of the modified material: water absorption capacity, oil absorption capacity and buoyancy.

Experiment

Oil absorption (OA, g/g) and water absorption (WA, g/g): an oil slick of 0.5 to 5 mm thick was created over water surface in a drum with cross-section area of 250 cm. The sorbent was distributed over the oil slick. As the time passed, the sorbent was dewatered by filtering, and the adsorbed oil was extracted from the sorbent using carbon tetrachloride. Gravimetric method was used to determine the amount of the absorbed oil. Residual amount of oil in the water was determined with an IR spectroscopy method at the wavenumber of 2.926 cm^{-1} and a thin-layer chromatography method.

A gravimetric method evaluating weight difference of the original adsorbent (M) and the water saturated adsorbent (M_1) was used to determine water absorption (W%):

$$W=(M_1-M)/M \cdot 100,$$

where Peat moss carbonization

A peat moss charge (4 g) was placed into a flask; the flask was closed to prevent the access of air into carbonization zone. The time of burning at the steady-state temperature from 100 to 400 °C was 60 minutes. Coalification degree of the peat moss was defined according to the formula: $R=C_\tau/C_0 \cdot 100\%$, where C_0 and C_τ are the weights of peat moss before and after carbonization process respectively. The difference between coalification degrees was determined as follows: $\Delta R=100\%-R$.

The main criteria for using an adsorbent to clean water surfaces in nature are its water absorption capacity and buoyancy.

Table 1. Dependence of water absorption of Sphagnum Dill (300 °C) on particle size

D, mm	0.14	0.5	1	1.4
W, %	0.67	0.94	1.430	1.560

Table 2. Dependence of oil absorption of *Sphagnum Dill* (T = 300 °C) on mesh size

D, mm	0.14	0.5	1	1.4
OA, g/g	15.10	14.40	14.23	13.90

Table 3. Sorbent properties

№	Sorbent material	OA, g/g	WA, g/g	Buoyancy, h
1	PP fiber (21030-16)	4–9.4	0.05	
2	Spilcorb (Canada)	3.96–8	1.6–2.0	48
3	*Sphagnum Dill* (original)	5.8	3.1–4.2	96
4	Acetylated peat moss	7.60–8	1.8–2	120
5	Carbonized peat moss (200 °C)	8.23–9	1.5–1.7	170
6	Carbonized peat moss (300 °C)	14.2–15.7	1.3–1.5	146
7	Activated charcoal	10.75	4.5–5.0	48

Oil absorption, OA (g/g), was determined to evaluate the maximum amount of adsorbed hydrocarbons.

Adsorption capacity of different types of moss and synthetic polypropelene (PP) fiber sorbent is compared in Table 3.

Carbonized *Sphagnum Dill* was found to be similar to Canadian peat mosses Nature Corby and Spilcorb in terms of oil absorption and superior to them in terms of buoyancy.

Hydrophobic materials are considered to be the most efficient adsorbents for organic compounds from water solutions, as their adsorption based mainly on the dispersion force. In compassion with the original moss, carbonized and acetylated peat mosses feature high oil absorption capacity, low water absorption and higher buoyancy. Oil and water adsorptive capacities of sorbents were found to be dependent on their porosity.

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