Utilizing sawdust waste in water treatment

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• Pine sawdust as a bio-based raw material for the production of ion exchange resins
  • abundant, low-cost, renewable
• Reactive groups enable chemical modification
  → quaternary ammonium groups
• Removal of toxic anions from water (e.g. NO$_3^-$, SO$_4^{2-}$, PO$_4^{3-}$, arsenic, chromium, vanadium)
• Applications in the treatment of industrial wastewaters (e.g. mining, groundwater, etc.)

Benefits:
• short contact time (10 min)
• wide pH range (3–10)
• wide temperature range (5–70 °C)
• efficient regeneration with NaCl or NaOH solution

Sorption capacities:
• nitrate 32.8 mg N/g (synthetic solution)
• vanadium 130 mg V/g (synthetic solution)
• vanadium 103 mg V/g (wastewater from a chemical plant)

Fig. 1. FESEM micrographs of untreated pine sawdust (left) and modified pine sawdust (right) at 1000x magnification.

Fig. 2. Schematic illustration of the structure of sawdust (LC, lignocellulosic) and the reactive groups.

Fig. 3. Modified pine sawdust in water treatment.

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Literature