Sorption and Filtration Media Mixes and Systems For Passive, Inexpensive Removal and Treatment of Wastewater and Stormwater

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Levels of nitrates, ammonia, and other pollutants in drinking water are strictly enforced by the EPA and must be kept to a minimum. Prolonged exposure and ingestion of nitrate is harmful to infants. High levels of phosphorous in natural water systems such as lakes, ponds and rivers, result in: enhanced growth of toxic algae, reduction of oxygen and ultimately the death of aquatic species. Both nitrates and phosphates (nutrients) are introduced into the environment and groundwater aquifer through the use of fertilizers, pesticides, and the discharge of human, industrial and agricultural waste, in addition to storm water runoff. Current methods to remove these nutrients often require expensive treatment or removal systems, land availability and regular maintenance. These current methods are costly to implement and in some cases have provided limited improvement on the water quality.

Technical Details

Scientists and engineers at UCF have developed efficient and easier means of removing phosphorous, nitrates, and bacteria from domestic wastewater and stormwater runoff. Using proprietary media compositions, methods and systems, contaminated wastewater and stormwater can be treated for beneficial uses. The sorption and filtration media makes use of chemical, mechanical and biological means to remove or reduce the levels of various nutrients and bacteria. Several different mixtures of sorption media were found to reduce high levels (5ppm or higher) of nitrate, nitrite, and phosphates by over 90% after a suitable retention time. By proper utilization of vegetation in retention ponds the quality of water can be improved upon further by remediation and filtration.

The creation of green roofs is another embodiment of this technology, where a roof is designed with sorption media as well as vegetation to reduce runoff and increase water remediation. The water would then be collected from the roof into a cistern and reused for irrigating the roof plants or ground level landscapes. This green roof technology has proven to not only reduce nutrient and contaminant concentration but also neutralize the pH of polluted water. These media and processes require limited electrical energy, minimal maintenance, are both efficient and inexpensive and have a long life expectancy.

Benefits

• Material mixes remove nitrogen and phosphorus, are inexpensive and have an extended lifetime
• Systems are passive, requiring little to no energy for operation and minimal maintenance
• Efficient means of removing nitrates, nitrites, phosphates, fecal coliforms and other bacteria from wastewater
• Green roof systems that include vegetation to cool

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buildings and reuse filtered runoff water
• Customized filtration media mixes are registered under the Bold & Gold® mark.

Applications
• Reduce and remove pollutants from wastewater for reintroduction into the aquifer or other water systems
• On-site wastewater treatment systems:
  ◦ Septic systems and green roofs
  ◦ Nutrient reduction in wastewater streams

Additional Technology Numbers: 31567, 31783, 31376, 31570, 32071, 31665, 32109

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