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Circular economy of biosulfur: nitrogen, food & energy solutions

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My innovative idea is to apply elemental biosulfur in circular systems via three approaches: for nitrogen removal, as food fertilizer and for energy storage. Biosulfur has different characteristics than chemically produced sulfur: a high specific surface area and hydrophilic properties. The biosulfur is recovered as a resource and through its application brought back into the biochemical cycle. Fossil fuel (chemical) sulfur will be phased out soon due the worldwide termination of fossil fuel consumption. Biosulfur can fill this gap, and be even more advantageous through its wide availability, low cost, local production and safe production and use. Therefore, biosulfur can be central in a dynamic supply and demand network. To explore the application potential of biosulfur, laboratory experiments and a literature study will be performed on cooperative nitrogen-sulfur cycling, biosulfur as fertilizer for crop production and purification of biosulfur for energy storage.

Keywords: sulfur, agriculture, fertilizer, wastewater, energy