|  |  |  |  |
| --- | --- | --- | --- |
| Title | Morphological Properties and Nutrient Status of Different Waste Derived Slow Pyrolyzed Biochars | | |
| Author(s) Name | Golam Rabbani, Md. Faruque Hossain, Zakia Parveen | | |
| Contact Email(s) | [hossainfaruque@hotmail.com](mailto:hossainfaruque@hotmail.com); mfhossain@aiub.edu | | |
| Published Journal Name | World Journal of Agriculture and Soil Science | | |
| Type of Publication | Journal | | |
| Volume | 5 | Issue | 5 |
| Publisher | Iris Publishers | | |
| Publication Date | November 20, 2020 | | |
| ISSN | 2641-6379 | | |
| DOI | 10.33552/WJASS.2020.06.000630 | | |
| URL |  | | |
| Other Related Info. |  | | |
| **Keywords:** Characteristics; Nutrient content; Waste; Slow pyrolyzed; Biochars | | | |
| Citation: Rabbani, Golam & Hossain, Md. Faruque & Parveen, Dr. (2020). Morphological Properties and Nutrient Status of Different Waste Derived Slow Pyrolyzed Biochars. 10.33552/WJASS.2020.06.000630. | | | |

|  |  |
| --- | --- |
| Abstract |  |
| Slow pyrolyzed (500±50 °C) ten different waste derived biochar viz. animal bone, corn stover, wood chips, sewage sludge, sugarcane bagasse, green coconut palms, nutshells, potato peels, water hyacinth and organic waste were analyzed to know their physicochemical properties and nutrient contents. Results provided the fact that water hyacinth biochar had the best nutrient status along with excellent physical properties like water holding capacity (509%) and CEC (300 cmolc kg-1) whilst potato peel biochar was the second best among all categories. The average particle size of wood chips biochar 0.82 μm2 was the largest along with the maximum pore depth. However, the region of this biochar occupied by remarkably small particles, which was 47.42%. The corn stover biochar, on the other hand, had the smallest average particle size (0.18 μm2) and the lowest particle area (9.19%). Biochar wood chips (51.3%) and biochar potato peels (49.4%) had the highest organic C value, while biochar nutshell had the lowest (15.31%), respectively. Nutrient content varies depending on the variation in the feedstock mostly N, P, K, and S in total content. Animal bone biochar (3.89%) and biochar nutshells (3.32%) exhibited the highest total N content. Total N biochar content derived from potato peel, water hyacinth, and organic matter had around 3 ppm, which was much higher than the remaining biochar content. In the analysis, high phosphorus concentrations resulted in biochar derived from animal bone feedstock (8.44%), whereas other biochars such as potato peel, water hyacinth, and organic waste were less than 1%. The biochar potato peel and the biochar water hyacinth had higher total K content than other biochars. All the biochars exhibited equal total S concentration. Biochar derived from animal bone (2.34%) and potato  peel (2.72%) had a higher percentage of total K compared with other biochar. Biochar related wastes showed a very low concentration of heavy metals such as Cr, Pb, Cd, and Ni. The highest chromium content resulted in biochar sewage sludge (0.746 ppm). The concentration of total chromium was similar to that of both sugarcane bagasse biochar and nutshell biochar. The overall amount of lead and cadmium in all of the biochar was below the detection mark. In comparison, the biochar sewage sludge contained a high amount of nickel (1.06 ppm) relative to other biochars. This is perhaps due to the high amount of pollutants present in the sewage sludge feedstock. | |

**Please specify which Sustainable Development Goal (SDG) (s) falls under your research:**

|  |  |  |  |
| --- | --- | --- | --- |
| Goal 1 | No Poverty | Goal 2 | Zero Hunger |
| **Goal 3** | **Good Health and Well-Being** | Goal 4 | Quality Education |
| Goal 5 | Gender Equality | Goal 6 | Clean Water and Sanitation |
| Goal 7 | Affordable and Clean Energy | Goal 8 | Decent Work and Economic Growth |
| Goal 9 | Industry, Innovation and Infrastructure | Goal 10 | Reduced Inequalities |
| Goal 11 | Sustainable Cities and Communities | Goal 12 | Responsible Consumption and Production |
| Goal 13 | Climate Action | Goal 14 | Life below Water |
| Goal 15 | Life on Land | Goal 16 | Peace, Justice and Strong Institutions |
| Goal 17 | Partnerships for the Goals |  |  |