

Table: Bio-adsorbents utilized for sequestrating heavy metals

Sr. #	Bio-adsorbent	Metals removed	References
1	Nanoscale zero-valent iron/Nickel	Cr (VI)	(Zhu <i>et al.</i> , 2018)
2	Iron/Carbon composite	Cr (VI)	(Wu <i>et al.</i> , 2019)
3	Date palm biochar	Pb ⁺² , Cu ⁺²	(Amin <i>et al.</i> , 2019)
4	Titanium dioxide/ Bacterial cellulose	Pb	(Shoukat <i>et al.</i> , 2019)
5	Activated Carbon	Cr (VI)	(Valentín-Reyes <i>et al.</i> , 2019)
6	Lemon peel	Cu	(Meseldzija <i>et al.</i> , 2019)
7	Biogenic manganese oxide	Sb (III)	(Wang <i>et al.</i> , 2019)
8	Mango kernel	Cr (VI)	(Rai <i>et al.</i> , 2016)
9	Iron-oxide coated cellulose/ hydrotalcite, and Iron oxide coated cellulose/ Hydroxyapatite	Cr (VI)	(Periyasamy <i>et al.</i> , 2017)
10	Nano-Zirconium oxide crosslinked nanolayer of carboxymethyl cellulose	Cr (III), Cr (VI)	(Mahmoud <i>et al.</i> , 2017)
11	DiethyleneTriAminePentaAcetic acid (DTPA) modified cellulose	Hg (II)	(Li <i>et al.</i> , 2019)
12	Sulfated carboxymethyl cellulose Nanofilter	Cr (VI)	(Gasemloo <i>et al.</i> , 2019)
13	Sodium carboxymethyl cellulose based Adsorbent	Pb (II)	(Chen <i>et al.</i> , 2019)
14	<i>SARGASSUM SP.</i>	Ni (II), Cu (II)	(Barquilha <i>et al.</i> , 2019)
15	Fe ₂ O ₃ Coated by SiO ₂	Ni (II)	(Ahmad <i>et al.</i> , 2019)
16	<i>Melia azedarach</i> wood	Cr (VI)	(Chojnacka and Mikulewicz, 2019)
17	<i>Phragmites australis</i>	Cd, Pb, Ni	(Bello <i>et al.</i> , 2018)
18	Modified coconut coir pith	Cr (VI)	(Namasivayam and Sureshkumar, 2008)
19	Silica based hybrid adsorbent	Ni (II)	(Xu <i>et al.</i> , 2016)
20	Citrus Limettioides peel carbon, and Citrus Limettioides seed carbon	Ni (II)	(Sudha <i>et al.</i> , 2015)
21	Pomegranate peel	Ni (II)	(Bhatnagar <i>et al.</i> , 2010)
22	Sugarcane bagass pitch	Ni (II)	(Krishnan <i>et al.</i> , 2011)

23	Cucumber peel	Pb	(Basu <i>et al.</i> , 2017)
24	Cauliflower leaves	Cu, Cr, Pb and Zn	(Gupta and Chandra, 2018)
25	<i>Musa paradisiaca</i> peels	Pb, Cd	(Ibisi and Asoluka, 2018)
26	<i>Pinus halepensis</i> sawdust	Cu, Pb	(Semerjian, 2018)
27	Sulfurized wood biochar	Hg	(Park <i>et al.</i> , 2019)
28	Modified Peanut Shell	Ni (II)	(An <i>et al.</i> , 2019)
29	Fe ₃ O ₄ / <i>Raphia farinifera</i> nanocomposite	Pb	(Overah <i>et al.</i> , 2019)
30	<i>Fucus spiralis</i>	Pb (II)	(Filote <i>et al.</i> , 2019)
31	NaOH modified hickory wood	Pb ²⁺ , Cd ²⁺ , Cu ²⁺ , Zn ²⁺ , and Ni ²⁺	(Ding <i>et al.</i> , 2016)
32	Zn- Sugarcane Bagasse nanocomposite	Cr (VI)	(Gan <i>et al.</i> , 2015)
33	Anaerobically Digested Sugarcane Bagasse	Pb	(Inyang <i>et al.</i> , 2011)
33	Tea Waste Biochar	Fluoride	(Roy <i>et al.</i> , 2018)
34	Cashew nut shell	Cd (II), Pb (II), and Cr (III)	(Coelho <i>et al.</i> , 2014)
35	Citrus maxima peel, passion fruit shell, and sugarcane bagasse	Cu (II), Cd (II), Pb (II), Ni (II)	(Chao <i>et al.</i> , 2014)
36	Lemon Peel	Co	(Bhatnagar <i>et al.</i> , 2010)
37	Raw pomegranate peel	Cu	(Ben-Ali <i>et al.</i> , 2017)
38	Tea Waste	Cu, Pb	(Amarasinghe and Williams, 2007)
39	Tea Leaves	Pb, Fe, Zn, Ni	(Ahluwalia and Goyal, 2005)
40	Coconut Shell	Cu (II)	(Acheampong <i>et al.</i> , 2013)
41	Peanut Husk	Pb ²⁺ , Mn ²⁺ , Cd ²⁺ , Ni ²⁺ , Co ²⁺	(Abdelfattah <i>et al.</i> , 2016)
42	Sago Waste	Pb, Cu	(Quek <i>et al.</i> , 1998)
43	<i>Mangifera indica</i>	Cu ²⁺ , Zn ²⁺	(Nadeem <i>et al.</i> , 2015)
44	Coconut Husk	Ar (III)	(Manju <i>et al.</i> , 1998)
45	Modified Sugar beet pulp	Th (I)	(Zolgharnein <i>et al.</i> , 2011)
46	Barley Straws	Cu, Pb	(Pehlivan <i>et al.</i> , 2009)
47	Hazelnut and almond shell	Pb	(Pehlivan <i>et al.</i> , 2009)
48	Rogers mushroom biomass ' <i>Lepiota hystrix</i> '	Pb, Cu	(Kariuki <i>et al.</i> , 2017)
49	<i>Ficus carica</i>	Cr (VI)	(Gupta <i>et al.</i> , 2013)
50	Modified Orange peels	Pb ²⁺ , Cd ²⁺ , Ni ²⁺	(Feng <i>et al.</i> , 2011)



Fig. Agricultural wastes for water treatment under consideration