



BIOMIN, INC.

State of the art water filtration media

We will lower operations costs by 50%, and bring them into compliance with discharge regulations.

P. O. Box 20028 . Ferndale, MI 48220

(248) 544-2552. Fax: (248) 544-3733

E-Mail: biomin@aol.com

Web: www.biomininc.com

Technical Advisory #11

BIOMIN'S "TIP OF THE MONTH": Bone Char's Superiority For Removing Heavy Metals

Column tests using OILSORB organoclay, zeolite (clinoptilolite) and bone char (hydroxy apatite) were conducted at the University of Virginia to determine the capacity of each sorbent for adsorbing heavy metals by ion exchange. The methodology and bar graphs of the results can be seen at: www.biomininc.com, under "Products" for "metals removal".

Water was saturated with six metals simultaneously and passed through each sorbent column. Sorbent capacity is listed as % by weight of the sorbent:

	<u>Cd</u>	<u>Cr3</u>	<u>Cu</u>	<u>Ni</u>	<u>Zn</u>	<u>Pb</u>	<u>Total</u>
Bone Char:	0.53	1.54	1.11	0.18	0.41	0.41	4.37
Zeolite:	0.08	0.14	0.30	0.23	0.104	0.05	0.067
Oilsorb:	0.004	0.02	0.01	0.002	0.003	0.01.	0.04

Then column tests were run with each metal separately:

	<u>Cd</u>	<u>Cr3</u>	<u>Cu</u>	<u>Ni</u>	<u>Zn</u>	<u>Pb</u>	<u>Fe</u>
Bone Char:	6.4	1.45	4.25	1.0	2.90	6.82	1.70
Zeolite:	4.79	0.12	1.64	0.17	0.90	4.79	0.60
Oilsorb:	0.08	0.03	0.06	0.06	0.06	0.23	0.14

Bone Char was tested for removing zinc from hard water (200 mg/l Ca). Results: Regular water: 3.3%; Hard water: 2.9%. Zeolite was tested with ammonia: Results: 1.0%.

Results for sodium cyanide: Bone Char: 0.1%, Zeolite: 0.02%, Oilsorb: 0.06%.

Hexavalent chrome was removed with Colorsorb Organoclay: 0.50% by weight.

Conclusion: Bone Char is the best sorbent for metals removal, particularly because it operates well in hard water. Zeolite is well suited for ammonia removal. All these sorbents are placed into activated carbon vessels, and require no special care. Some regeneration is possible, particularly with the zeolite.

IMPORTANT: Oilsorb organoclay is the only existing media which removes heavy metals and organic hydrocarbons simultaneously (10,000 lbs. of Oilsorb organoclay removes 6 lbs. zinc or 23 lbs. of lead).