Executive Summary of GAP/EMG/DST/SORFPM/103/2015-16

Project Title: Studies on the Addition of Low Cost Bio-Adsorbent to Industrial and Agricultural Waste for Mitigation of Cr (VI) from Waste Water in Sukinda Chromite Mines, Odisha

Project No: **GAP/EMG/DST/SORFPM/103/2015-16**

Executive Summary: Sukinda chromite valley of Odisha state is endowed with highest reserve of chromite ore in India and producing 95% of the chromite ore of the country. The OB dump around the mine leaches Cr(VI) and other impurities to ground water as well as surface water resources during rainy season and damaging the topography of the area. Due to soluble nature of Cr(VI) it is highly toxic pollutant and is teratogenic, carcinogenic and mutagenic in nature. It causes various health diseases like skin irritation, allergy, ulcer, nausea, vomiting, kidney, liver & gastric damages, lungs cancer and severe diarrhea. Primary objective of this study is physico chemical analysis of water quality of sukinda chromite mines and mitigation of Cr (VI) from aqueous solution by using agricultural wastes. The physico-chemical characteristics of different water samples collected during 2016-2017 from Damsal Nalla shows that the pH of surface water samples was found between 6.72 to 7.4 and Cr (VI) concentration in surface water sample were found between 0.067 to 0.215 mg/L and 0.024 to 0.336 mg/L in 2016 & 2017 respectively exceeding the permissible limits of 0.05 mg/l for drinking water. Similarly the pH of ground water samples collected 2016-17 shows that the pH of water samples varied between 5.35 to 7.36 and 5.82 to 7.8 respectively while Cr(VI) concentration ranging between 0.001 to 0.277 mg/L for 2016 which is exceeding the permissible limits of 0.05 mg/l (IS: 10500). For the mitigation of Cr(VI) different agricultural wastes has been used and it was found that Sugarcane Bagasses removes 97% of Cr(VI) at pH 1.0, dose 0.5g in 90 minutes while Orange Char removes 98% of Cr (VI) in 120 minutes at pH 1.5 with 0.3 g dose. WH removes 99.8% Cr (VI) at pH 2.0 in 120 minutes by 0.5 g dose. Apart from agricultural waste products some industrial by product like activated fly ash removes 98% of Cr (VI) at low pH of 1.5 by using 1.0 g dose in 120 minutes. The best removal has been achieved by water hyacinth which is very economical and can be applied on industrial scale. In this study,

Waste agricultural material + waste water = Treated water we find.