



Fly Ash Foe or Friend of Soil - Need to Reassess its Role as Nutrients and Toxicant in Loss of Biodiversity

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Abstract: Humans are weird creatures, anthropogenic activities in the name of upgradation of technology had created problems of degradation of rural, urban, industrial, agricultural and non agricultural land and soil. Disposal of residual waste like fly ash had severely altered the physical, chemical and biota of soil throughout the world and also aquatic ecosystem. Asian and other countries must drastically reduce their populations as the agriculture sector has to bear the load of feeding the ever hungry human. Globally research on utility of fly ash for fertilizer for agriculture needs more research for various soil types which are unproductive and poor in nutrients. Fly ash don't add nitrogen, but other mineral metals reach in the soil from fly ash and reach ground water and other water bodies which get contaminated. The herbs, shrubs and trees and animals life dependent on vegetation get altered due to loss of vegetation, loss of trophic level organism of food chain and food web operating in forest, agro-boys (agriculture, orchards, floriculture, medicinal plant cultivation) and aquatic ecosystems. Fly ash metals destroy microbes which fix atmospheric nitrogen in soil and water resulting in infertility and finally loss of biodiversity; bioconcentration and biomagnification is the underlying mechanisms, cow dung and its powder reduce toxicity of metals present in fly ash which otherwise in proper dosage act as nutrients of soil. Growth of aloe-vera, wheat etc and toxicity effects of fly ash on terrestrial and aquatic molluscs, earthworms, guppy fishes and aquatic plants are being done experimentally in the present research on work. Fly ash use is related with socio-economic status of a country, it needs reassessment. Bio monitoring, agro-monitoring, toxicomonitoring, etc.

Keywords: Fly ash, composition, biota, soil fertility, toxicity, growth.

I. INTRODUCTION

Coal ash and fly ash are effluents pollute soil, water, air, ground water also get polluted (D.R. Saxena, 2021). Coal fly ash particles of different ranges of size, composition, contain metals, polyaromatic hydrocarbons and silica (quartz). According to P.J.A Born (1997) coal fly ash show genotoxic effect, lower toxicity, inflammatory potential and fibrin formation in respiratory organs. According to G.S. Tiwary (2021) due to geotaxis effect of heavy particles of coal fly ash (CFA) it accumulated inside plant's and organism's body (earthworms, aquatic animals) and shows the effect on behavioural changes. Earlier work reviews were compiled in 2002 by Rowe on environment degradation due to disposal of coal combustion residual (CCR). Field studies were done one in lentic habitat on fish and benthic organisms and ten in lentic habitat (Cherry et al. 1979). Reasch et al., 1988, Lemly 1977, Lohler et al., 2001a, 2001b, 2001c, Smith 2003, Reasch 2004, Reasch 2012, Otter et al., three lab work (Wang et al., 2013, Stanley et al., 2013, Chan et al., 2014) all of which were done in Tennessee, valley in 2018 by Tennessee Valley Authority Kingston Fossil Plant ash spill. Fly ash contains arsenic, mercury and selenium (Reasch, 2012). Of late selenium exhibit bioaccumulation in receptor tissues and to disturb reproduction also (Chapman 1999; Deforest Adams 1999); Fair brother et al; 1999, Hamilton 1999, Lemly 1999, Ohlendorf 1999), and a Pelston workshop (Chapman et al., 2010).

II. OBSERVATION

In the present investigation fly ash was collected from MIDC AREA BUTIBORI, NAGPUR. seed of wheat, mustard and black gram were shown on 29/03/2021 at 4:30 PM as control and test on 31/03/2021 morning slightly growth in the form of germination was recorded in control wheat and black gram, but slightly better germination in fly ash treated wheat, gram, and fly ash and cow dung treated wheat and gram was observed and both reached a length of 2 cm and 1 cm respectively in test experiments. On 05/04/2021 control experiment length recorded was wheat (13-14 cm) black gram 09 cm and mustard (01-02 cm). In the fly ash treated plants length measured on 05/04/2021 was wheat (09-10 cm), black gram (12-14 cm) and mustard 5 cm. Mustard seeds are somewhat recalcitrant germinated on 03/04/2021 in the fly ash soil, but no growth occurred in control and fly ash and cow dung soil. In the fly ash and cow dung treated plants growth measured on 05/04/2021 was wheat (09-12 cm), black gram (12-13 cm) and mustard (04-05 cm). But the branches showed dense growth in the both test with fly ash with fly ash & cow dung for black gram (see table no. 1, 2, 3, 4).