

Characterization of coffee pulp effluent for its pollution potential and nutrient potential and its impact on soil and water environment

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SUMMARY

The bio-chemical nature and nutrients content of coffee pulp effluent generated in the coffee pulping units of Hassan, Coorg and Chikamagalur districts of Karnataka and the impact of long term discharge on ground water quality and soil properties were studied in and around pulping units. The effluent was highly acidic in nature and had high soluble salts content, BOD, COD, suspended and dissolved solids. The effluent had more number of fungal and bacterial colonies and less number of actinomycetes population. The beneficial microbes like N-fixers and phosphate solubilizers were in substantial number but was low in major nutrients and high in micronutrients contents. The study on impact of long term discharge of coffee pulp effluent on soil health and near by surface or ground water quality indicated that available nutrients content of effluent discharged fields was slightly higher as compared to fields not receiving any effluent and has not polluted the near by water bodies.

Key words :

Coffee pulp effluent, Bio-chemical nature, Nutrients, Water quality, Soil health.

In the era of globalization and industrialization, there is increasing demand for good quality produce and pollution free environment. On the contrary, many of the industries make use of large quantities of good quality water and discharge the entire quantity in the form of waste water with the objectionable odour, taste and harmful constituents which may pose threat to water and soil, the two most important natural resources which hold the key for our safe living.

The traditional coffee tract of India lies in Western Ghats which is the birth place of many rivers and rivulets, which traverse through coffee estates and are the lifeline of the people of not only that region but also plain area of many states. Pollution of soil and water bodies by the effluent discharged from coffee processing units is an environmental problem in all the countries which follow wet method of coffee processing, and India is not an exception. In India presently around 75 – 80 % of *arabica* and 10 – 15 % of *robusta* coffee is processed by wet method. In recent years, the processing of *robusta* coffee by wet method is on the increase due to growing demand for *robusta* parchment in international markets. In wet processing of coffee, water is used for conveying and separation of sound fruits from floats and dried berries, pulping of fruits, washing and soaking of parchment coffee. The problem of water pollution will be aggravated in coffee tracts because the processing period

coincides with the dry season when the flow in natural water bodies will be at minimum level.

In the bio-diverse Western Ghats of Karnataka, coffee is being grown over decades and recently emphasis is being given to production of quality coffee by subjecting coffee fruits to pulping. In this process, a huge volume of pulp effluent is generated which is posing problems of disposal as it has high pollution potential. In contrast to this, the pulp effluent is a rich source of nutrients and organic matter (Anand Alwar, 1998) and hence can be used as a resource for growing crops during the lean season. In this context, an attempt has been made to characterize the pulp effluent in terms of its pollution potential and nutrient potential. Also extent of pollution of ground water and soil due to indiscriminate discharge of pulp effluent over years has been studied.

MATERIALS AND METHODS

Characterization of coffee pulp effluent:

Coffee pulp effluent samples were collected from 22 different pulping units in Hassan, Coorg and Chikamagalur districts of Karnataka state, India; at monthly intervals during the coffee processing season of 2003 - 04 (December to March). The effluent samples collected were analyzed for pH, EC, chlorides, carbonates, bicarbonates, suspended and dissolved solids, BOD and COD as well as major and micronutrients content by following

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