

Seasonal dynamics of cyanobacterial toxin producing algal species of two water ponds

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SUMMARY

The water quality and seasonal dynamics of toxin producing algal species were explored in order to evaluate the possibilities of qualitative and quantitative analysis of varied pollution level of two ponds (Kajraha pond and Seth pond) at Kajgaon, Jaunpur. Physico-chemical analysis of two ponds has been made seasonally. Twelve (*Microcystis* sp., *M. protocystis*, *M. incerta*, *M. aeruginosa*, *M. litoralis*, *Oscillatoria* sp., *O. limosa*, *O. princeps*, *Lyngbya* sp., *L. majuscula*, *Anabaena* sp. and *Nostoc* sp.), cyanobacterial toxin producing algal species were isolated from both ponds. Of these, six species (*Microcystis* sp., *M. protocystis*, *M. aeruginosa*, *M. litoralis*, *Oscillatoria limosa* and *Anabaena* sp.) were found to be permanent dominant water blooms in all seasons under physico-chemical conditions. Correlation-coefficient was employed to see the relative importance of various physico-chemical variables on the dynamic abundance of toxin producing algal species in both ponds. Both ponds were found to be moderately polluted and showed a trend of increasing eutrophication. Possible correlations existed between algae and nutrient.

Key words : Toxin producing algal species, Seasonal dynamic, Physico-chemical analysis, Algal blooms, Kajraha and Seth pond

The presence of heavy blooms of toxic cyanobacteria has been experienced worldwide (Sivonen *et al.*, 1990; Carmichael, 1994). Cyanobacteria exhibits remarkable physiological, morphological and biological adaptation and diversification in response to global evolution change, including the development of a modern day toxic biosphere.

The presence of toxin producing cyanobacteria in surface water used as drinking water or for recreational purposes poses a hazard to human being but has long been neglected or at most been treated on a local level. Scums of cyanobacteria accumulating along the shores of ponds and lakes also present a hazard to wild and domestic animals (Frazier *et al.*, 1998). Providing the human population with safe drinking water is one of the most important issues in public health and will gain more importance in the coming millennium.

The community structure and abundance of planktonic algae are dependent on the physico-chemical nature of the water body. Study of planktonic algae is essential as changes in the physico-chemical make up of the water is reflected by them in terms of either change

in the type of association or dominance of a particular species.

In bodies of water the most recognised causative factors for cyanobacterial occurrence are eutrophication, warm water, temperature, high light intensity and stable weather conditions. Surveys of these water blooms have shown that 25 to 95 per cent of them are toxic (Baker, 1994 and Sivonen *et al.*, 1990; Baker and Humpage, 1994).

The importance of the algal distribution particularly their response to environmental changes and nutrient fluctuation is important to understand the factors influencing rise, fall and change in algal dynamic and to study the effect of anthropogenic pressure upon aquatic habitats (Sharma and Sharma, 1992; Harikrishnan *et al.*, 1999).

Some cyanobacterial species have been proved to be as diagnostic field test on which major water management practices, pollution studies and water analysis can be keyed. The subject of our work was to study the dynamic pattern of cyanobacterial species in the water ponds receiving different levels of polluted water. Since the studies are meagre therefore, in the present study an attempt has been made to examine the distribution of toxin producing algal species and its possible relation to nutrient influx in two ponds of this region.

MATERIALS AND METHODS

The present investigation was carried out in two

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