
Effect of Saline Water Irrigation on Nitrate Reductase Activity in Genotype of Finger millet (*Eleusine coracana* Gaertn.)

#Sanjay Agarwal* Ashok Kumar**
Neha Agarwal*** Alka Singh****

ABSTRACT

The present investigation was carried to study the effect of salinity on the activity of nitrate reductase enzyme in leaves of two cultivars of *Eleusine coracana* Gaertn. i.e. cv. VL-315 and Local Hills. The biochemical study have been carried out in leaf samples collected at 60, 90 and 130 DAS from the crop raised in field irrigated with saline waters (0, 3, 6, 7.2, 10 and 12 dSm⁻¹). Fresh leaves, particularly 3rd and 4th, were collected from the top of the plants for nitrate reductase activity (NRA) because NRA is located in the chloroplast. Now the NRA determination was carried according to method of Klepper et al. (1971). The NR activity invariably and significantly decreased with increasing salinity levels from 3 to 12 dSm⁻¹ in both cultivars at all durations; however, the magnitude of reduction was higher in cv. Local hills than VL-315. Contrary to this, the NRA significantly increased from 60 to 90 DAS in control as well as in salt treated sets of both cultivars. Since, increase in number of leaves and total leaf area enhanced the photosynthetic activity which accumulated more dry matter hence, promotes the plant growth and grain productivity in VL-315 than Local Hills. The increase in NR activity is correlated with high photosynthetic activity. Therefore, NR activity was higher in cv. VL-315 than Local Hills.

Key Words: Salinity, Nitrate reductase, Enzyme, Productivity, Finger millet

INTRODUCTION

Soil salinity is the prime factor reducing the crop growth, productivity and geographical distribution of the plant. The impact of salinity is most serious in countries where all or most of agricultural production is based on irrigation. High concentrations of soluble salt in the soil affect all major living processes such as growth, photosynthesis, protein, and lipid metabolism (Radi et al., 2013). In India around 13.3 million hectares of land is affected by salinity (Consortium for Unfavorable Rice Environment, IRRI, 2003). Uttar Pradesh alone has about 1.37 million hectares of saline and sodic soils.

Finger millet (*Eleusine coracana* Gaertn.), commonly known as ragi, bird's foot millet and African millet. It

is one of the principle cereal grain contains major source of nutrients and also is a traditional staple food in India and other regions of the world, particularly Asian and African countries (Rotimi, 2011). Finger millet has best quality proteins along with essential amino acids like tryptophan; cysteine and methionine (Sawaya et al., 1984).

Plant metabolism is affected differently by the type of salinity and the responses differ in different plant species. Disruption of plant nitrogen metabolism by salinity was attributed to decreased nitrate uptake, decreased nitrate reductase activity, altered amino acid and slowed protein synthesis. Nitrate reductase is the regulatory enzyme in the nitrogen metabolism and is responsible for the reduction of nitrate to ammonical nitrogen, which is then incorporated in the production of amino acids (Hopkins, 1995). It is therefore understood that an increase in activity of

*Department of Botany, Wilsonia Degree College, Ashiana Phase II, Moradabad-244001, U.P., INDIA

**Department of Botany, IFTM University, Lodhipur Rajput, Moradabad-244001, U.P., INDIA

Department of Biotechnology, Hindu College, Moradabad-244001, U.P., INDIA *Department of Botany, Hindu College, Moradabad-244001, U.P., INDIA

#Corresponding author: sanjay7520@yahoo.co.in
