

The Saga of Catecholamine and GABA Through Prospecting Stress Tolerance in Plants

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Abstract Plants are subjected to various abiotic stress factors. They respond to these circumstances or in long term response, they change their metabolic systems with the help of newly explored inherent biochemicals. The production of certain primary and secondary metabolites, which are called as neurotransmitters like in animal system induces tolerance to stress situations in plants. Catecholamine and GABA play biochemical and molecular roles to overcome the adverse situations like drought or salinity reported in various plants systems. Stress responses also ignite perception in plant at molecular level. Action potentials, voltage gated channels, a vesicular trafficking apparatus sensitive to calcium signals, plasmodesmata for direct cell–cell transport are some of the preliminary ways in for the easy monitoring of environmental changes. A new field of research, Plant neurobiology, where workers of various disciplines are engaged in simulating the perception and responses of plants in different circumstances and also to environmental input thereby testing the alternative definition of plant intelligence. The chapter reviews the action of two group of chemicals, catecholamines and Gamma-amino butyric acid, GABA, their molecular pattern augmenting tolerance against detrimental climatic effect on plants. These biomolecules are not exclusive chemicals in plants to combat with adverse situations, rather in animals they have their origin.

Abbreviations

GABA	Gamma amino butyric acid
GAD	Glutamic acid decarboxylase
CK	Cytokinin
ABA	Absciscic acid
(TH)	Tyrosine hydroxylase
(L-dopa)	Dihydroxyphenylalanine

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Signaling and Communication in Plants

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WEB BASE GIS SURVEY OF MAJOR AVAILABLE MEDICINAL PLANTS OF JAYNAGAR -1 BLOCK, SOUTH-24 PARGANA, WEST BENGAL, INDIA.

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ABSTRACT Jaynagar-1 is a block of South-24 Pargana district in the Indian State of West Bengal. The town of Jaynagar is an ancient place. The name of Jaynagar came from the name of the local goddess "Joychandi". Gradually during the course of time it became "Joychandinar" and then "Joynagar" or "Jaynagar". Knowledge of medicinal plants and their uses as medicine has been a part of the culture of Bengal since ancient days. Though, very little information exists on the flora in general of our concern area, and medicinal species found within its particular periphery. It is urgent to document this information before such valuable plants gets extinct during the course of urbanization. Identification, mapping using Arc GIS 10.5 and findings of medicinal importance from available literature of the naturally occurring medicinal plants of Jaynagar -1 South-24 Pargana, West Bengal, India is our main concern.

KEYWORDS : Jaynagar , South 24 Pargana, Medicinal Plants, Arc GIS 10.5

1. INTRODUCTION

Traditional medicine is still one of the main resources for majority (80%) of the people in developing countries for treating health issues, particularly because medicinal plants are easily available and cost effective (Dey *et al.*, 2014). India is very rich in biodiversity and is one of the 12 mega diversity centers. In Indian culture, plants are taken as resources as well as with sacred considerations. The plant parts used, preparation of drugs varies from one place to another. Though, the knowledge of herbal medicines is gradually abolishing, but some of the traditional herbal people are still working on the art of herbal healing efficiently (Biswas *et al.*, 2017). These plants are often used by the local inhabitants of the area for treatment of various diseases. It is very interesting that some modern drugs have been deducted from folklore and traditional medicines. Staying close to nature, traditional societies have gathered the unique knowledge about the utilities of wild flora. After several years of observations and analysis, trials, error, human communities have discovered the useful and harmful species of the flora. The importance of traditional knowledge is now increasingly popular all over the world. The pharmaceutical industry continues to explore and confirm the efficacy of many medicines used by traditional communities (Verma *et al.*, 2007). Conservation of medicinal plants from bio-cultural point of view is significant for both conservation of biodiversity and also for the conservation of cultural diversity. Proper conservation of Medicinal Plants need proper mapping of their habitat. Determination of the spatial location is a prerequisite for the exact habitat and conservation of the medicinal plants (Biswas *et al.*, 2017). GIS can be used as a map maker. Plant species exact area can be identified through the software Arc GIS 10.5 for visualizing and analyzing, creating data with a geographic tool.

The use of spatial analysis within GIS proved effective in providing maps of spatial distribution of Medicinal plants in relation to landscape and anthropogenic factors (Biswas *et al.*, 2017). Different functions of GIS could be used to generate digital layers enable us to extract data and to export them for further statistical analysis and comparisons, which would save time and cost of analysis in these studies (Qayum *et al.*, 2014). Utilizing GIS capabilities to identify the species diversity along various altitudes (Behera *et al.*, 2005) and findings of economically important medicinal species were carried out by intersection of different GIS layers of vegetation, biogeography and altitude zones.

2. Materials and Methodology:

The study was conducted in the pre-monsoon season during May, 2018. Based on primary data observation and documentation of the

species which were obtained from field survey of the study area; mostly those species were collected which are unique, having medicinal value and special benefits. The sampling was done among all the trees, herbs and shrubs found in the study area. While collecting data, photographs of certain species were taken for reference.

2.1 Study area:

Jaynagar I is a Community Development Block that forms an administrative division in Baruipur subdivision of South 24 Parganas district in the State of West Bengal, India. Jaynagar I CD Block is situated at 22°10'38"N 88°25'33"E. It has an average elevation of near 8 metres (26 ft). Jaynagar I CD Block is encompassed by Baruipur CD Block in a part of the north Canning I CD Block in parts of the north and east, Kultali CD Block in a part of the east, Jaynagar II CD Block in the south, and Magrahat II CD Block in the west. It is 38 kilometers (24 mi) from Alipore, the district headquarters. As per 2011 Census of India, Jaynagar I CD Block consisting a total population of 263,151, among which 216,829 were rural and 46,322 were urban. There were 134,966 (51%) males and 128,185 (49%) females. Jaynagar I CD Block registered a population growth of 18.21 per cent during the 1991-2001 decade. Decadal growth for South 24 Parganas district was 20.89 percent (Handbook, D. S., 2009).



