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Synthesis and Characterization of Novel BODIPY Derivatives

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Abstract. Among the plethora of synthetic fluorophores available, BODIPY based fluorophores make an important class of compounds bearing high potential applications in various fields -its derivatives have been used as drug delivery systems, biomolecular labels, fluorescent switches, dyes in liquid laser and chemosensors, They have gained much attention in past few years. The structure of the BODIPY molecule can be regarded as an example of the rigid mono-methine cyanine which is synthesized by the complexation of dipyrromethene with boron trifluoride. N-B-N bridging occurs in dipyrromethene ligand as a result of complexation with the BF₂ unit, which leads to the planar π -electron system, in which positive charge can be delocalized over two nitrogen atoms present through equilibrium of resonance structures. In the present work two novel BODIPY dyes are synthesized from readily accessible pyrroles (substituted or unsubstituted). The authenticity of the developed compounds was established using ¹H NMR, ¹³C NMR and HRMS data.

INTRODUCTION

These days, large numbers of organic fluorophores have been developed and majority of the fluorophores exhibit fluorescence in cyan to NIR region, which is due to the property of their π -conjugated system present in their structure. Out of these, the well known and widely studied fluorophores are fluorescein and its derivatives, coumarin, cyanin dyes and BODIPY derivatives [1-2]. Due to their high efficiency; these small organic molecules based fluorophores are commercially available and are used for sensing and biological study. Among the glut of synthetic fluorophores available, BODIPY based fluorophores makes an important class of compounds bearing high potential applications in various fields. They have gained much attention in past few years. It is also termed as difluoroborondipyrromethene or 4,4-difluoro-4-bora-3a,4-diaza-s-indacene.

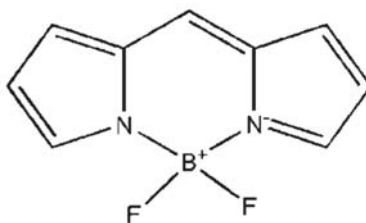


FIGURE 1. Structure of BODIPY core

BODIPY is referred as boradiaza-s-indacene, with all the C atoms present in the tricyclic indacene and the substituents are numbered using the rules set for this tricyclic indacene molecule. The structure of this BODIPY molecule can be regarded as an example of the rigid mono-methine cyanine which is synthesized by the complexation of dipyrromethene with boron trifluoride. N-B-N bridging occurs in dipyrromethene ligands as a result of complexation with the BF₂ unit, which leads to the planar π -electron system, in which positive charge can be delocalized over two nitrogen atoms present through equilibrium of resonance structures.

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Synthesis and applications of zn-porphyrin based light harvesting materials

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Synthesis and Applications of Zn-Porphyrin Based Light Harvesting Materials

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Abstract: This paper aims on the design and applications of zn-porphyrin based light harvesting assemblies. Porphyrin possess a number of worthwhile applications in light harvesting arrays, molecular wires, catalyst, sensors etc. A number of metals can be used for metallation of porphyrins like cobalt, iron, magnesium, ruthenium, etc. Among all, zinc is the most efficient choice for the light harvesting materials generation based on porphyrins. Zn-porphyrin possess an efficient energy transfer process, it also seems interesting in the visible light absorption and also contributes towards solar cell applications. Due to the high energy demand in the society day by day, everyone is in search of a good light harvesting material which has been accomplished by these porphyrin assemblies. The remarkable properties of zn-porphyrin have attracted the researchers to use it as the building block for the design an excellent light harvesting complex. Various polymeric, monomeric covalently as well as non-covalently linked assemblies based on Zn porphyrins have been a major point of discussion here.

Keywords: Light harvesting system, Zinc porphyrin, porphyrin, Antenna, efficient energy transfer, solar cell, absorption.

INTRODUCTION

For the researchers to grasp the knowledge about the various biological complex functions, nature is always the fundamental source of information for them. One such important phenomenon is photosynthesis which puts light on the development of artificial reaction centers. Basically, in the phenomenon of photosynthesis through cellular respiration the light energy is converted into electrochemical energy, further into chemical energy. This energy is stored in the form of various sugars in the carbohydrate molecules, the living organisms then consume this stored energy [1]. This phenomenon of the photosynthetic process has forced the researchers to develop the complex light harvesting system bearing fundamental features [2]. To duplicate the natural photosynthetic system various researchers have put their efforts and time to make an efficient light harvesting system[3]. Several studies were done for the development of efficient systems bearing excellent properties of light harvesting [4]. There should be magnificent cooperation in the chromophores so that to have an effective energy transfer of the excited energy to the reaction center, this is being achieved by the covalent bonding between the chromophores[5]. In order to have a systematic light capturing system the researchers have investigated a number of assemblies consisting of various porphyrin arrays. The main interest of these porphyrin assemblies was the splendid light energy transfer to the reaction center [6]. Most of the vitamins and various enzymes consist of the porphyrin rings. Porphyrin is basically a planar cyclic compound containing four pyrrole rings which are attached with four bridged carbons; it also follows the Huckle rule that is $(4n+2) \pi e^-$ rule. It is being synthesized by the four pyrrole rings with formaldehyde or phenyl aldehyde in the presence of DDQ. The main function of the DDQ in the formation of porphyrin is that it aromatizes the porphyrin ring. Its spectral properties suggested that its IR frequency is about 3500 cm^{-1} because of the N-H stretching whereas UV spectroscopy gives sorbet band as well as Q band. It was observed that the sorbet band has a high peak whereas the Q band has a lower peak. Here the sorbet band is the result of $\pi-\pi^*$ transition and the Q band is the result of $n-\pi^*$ transition. It is well known that according to the symmetry rule that transition within the same symmetry is allowed and the transition within different symmetry is forbidden, this is the reason why the sorbet

Metal-free electrochemical regioselective aromatic C-H bromination of *N,N*-disubstituted anilines using propargyl bromide as the unprecedented bromine source


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Ashutosh Gupta, Ajay
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A review on genetic characterization of indigenous cattle breeds

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ABSTRACT

Indian cattle breeds are diverse and well adapted to 15 different agro-climatic regions. Assessment of genetic diversity and population structure is highly essential for conservation and utilization of indigenous cattle genetic resources. Genome-wide Single Nucleotide Polymorphism (SNP) information is widely used for genetic characterization among the cattle population. Average heterozygosity was estimated as 0.35 among 11 diverse dairy, dual and draft type Indian cattle breeds, which provided scope for their genetic improvement through selection. Indian indigenous breeds are genetically distinct from exotic dairy cattle breeds, whereas a substantially shorter genetic distance was observed among Indian breeds. This supports the evolutionary theory of Indicine zebu cattle and their divergence from Taurine cattle. Principal component analysis revealed that the draft/dual breeds i.e. Vechur, Kangayam and Ongole are clustered separately from dairy type breeds. Population structure analysis identified the presence of highest level of admixture in Vechur cattle, due to which its population is sizably declining. Genetic characterization is essential to preserve the genomic variability which can further be used for genetic improvement of performance traits in a population. Therefore, this review suggests the genetic characterization of indigenous cattle population for formulating conservation policies in order to prevent our native population from extinction.

ARTICLE HISTORY

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KEYWORDS

Cattle; diversity; genetic characterization; population structure; SNP genotyping

1. Introduction

India has richly contributed to the world's total cattle genetic resources as it possesses 193.46 million cattle. The indigenous cattle population is 51.36 million (26.5%) while the indigenous/non-descript population is 142.11 million (73.5%). It is also ranked as the top milk producing country in the world. The total milk production was 198.44 mt in 2019–20 and cattle contribute about 51% to the total milk production (Anonymous 2021–22). The

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Alterations in certain immunological parameters in the skin mucus of the carp, *Cirrhinus mrigala*, infected with the bacteria, *Edwardsiella tarda*

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Abstract The bacterial fish pathogen *Edwardsiella tarda* causes heavy stock mortality, severely hampering fish production, resulting in great economic loss to the farming industry. The first biological barriers that confer immune protection against pathogen entry are the fish mucosal surfaces. The present study was undertaken to investigate the influence of *E. tarda* on certain enzymatic and non-enzymatic parameters in the skin mucous secretions of the fish *Cirrhinus mrigala* using spectrophotometry and zymography. Fish were randomly divided into three groups: control, vehicle control, and infected. A sublethal dose of *E. tarda* (2.2×10^6 CFU/fish) suspended in 50 μ L of PBS was injected intra-peritoneally at 0 day (d). Subsequently, mucus samples were collected at 2 d, 4 d, 6 d and 8 d post-infection. The activities of lysozyme (LYZ), protease (PROT), alkaline phosphatase (ALP),

acid phosphatase (ACP), catalase (CAT), peroxidase (PER), superoxide dismutase (SOD), and glutathione S-transferase (GST) decreased significantly in the skin mucus of the challenged fish, indicating the suppressed immune system and decreased antioxidant capacity of *C. mrigala* to *E. tarda* infection. Lipid peroxidation (LPO) and total nitrate-nitrite were significantly higher at several time points post-infection, suggesting that physiological functions have been impaired following pathogen challenge. The present findings could be relevant for fish aquaculture and underline the importance of skin mucus not only for assessing fish immune status but also for identifying early warning signals of disease caused by pathogens.

Keywords Immunological parameters · Skin mucus · *Cirrhinus mrigala* · Bacteria · *Edwardsiella tarda*

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A study on productive and reproductive management practices of dairy animals in district Varanasi of Uttar Pradesh

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ABSTRACT: The present study assesses the analysis of productive and reproductive management practices of dairy animals in district Varanasi of Uttar Pradesh. Detailed information collected from farmers of five villages from Rajatalab block of district Varanasi were used for the study. The data were collected on various management practices including general profile of dairy farmers. Majority of farmers were from middle age group, had small land holding and medium herd size with main source of income as dairying. Majority of farmers were from medium milk production, consumption and milk selling groups and sold their milk to the co-operatives. Majority of farmers reared indigenous breeds. Mucus discharge and bellowing was the major sign of heat detection rather than use of a teaser. Majority of farmers were relying on artificial insemination for breeding and time of insemination considered was 18 hours after estrus. Most of the farmers were not drying off their milch animals. Breeding of animals after (2-3) months of calving were considered by majority of farmers. Calving interval in cattle and buffaloes was more than 15 and 18 months, respectively.

Key words: Breeding, dairy animals, Indigenous breeds and Management practices

The livestock population in the state of Uttar Pradesh during the period 2007 to 2012 registered positive growth rate of 14.01% in the total number of animals in various species. There is an increase in livestock population over 2007 to 2012 from 60.27 million to 68.71 million mainly triggered by increase in population of dairy animals (19th Livestock Census 2012). The district Varanasi comprises of two tehsils, Varanasi and Pindra respectively. There are eight community development blocks (Vikas Khand) in the district Varanasi. Total numbers of inhabited villages are 1258 in the district Varanasi (423 in Pindra tehsil and 835 in Varanasi tehsil). Varanasi has a sub-tropical humid climate with extreme difference in the temperature between summer and winter ranging from 5-45°C. The average yearly rainfall in district Varanasi is 1110 mm (Source: Wikipedia, The Free Encyclopedia). Cattle and Buffalo population in district Varanasi are 16.52 and 1.30 lakhs respectively (Source: District Statistical Handbook 2018, Bureau of Applied Economics and Statistics, Government of Uttar Pradesh). Animal husbandry and Dairying sector contributes about 23 per cent of the value of output from total agriculture and allied sector. At present, India is achieving an estimate annual milk availability of 406 g/day (Basic Animal Husbandry Statistics, DAHD&F, GOI). Dairying is an important source of subsidiary income to marginal/small farmers and agricultural laborers. Milk production alone involves more than 150 million producers, each raising one or two cows/buffaloes primarily for milk production (Meena *et al.*, 2013). The


productive and reproductive management practices are the most important practices in animal husbandry. Understanding the livestock management practices followed by the farmers is necessary to identify the strengths and weaknesses of the rearing system and to formulate suitable intervention policies (Gupta *et al.*, 2008). With this background this study was undertaken with the objective to assess the analysis of reproductive and productive management practices of dairy animals along with general profile of farmers of district Varanasi of Uttar Pradesh.

MATERIALS AND METHODS

The present investigation was conducted from August to November in the year 2021 in district Varanasi of Uttar Pradesh. The information pertaining to productive and reproductive management practices of dairy animals along with general profile of dairy farmers were collected from five randomly selected villages from the randomly selected block Rajatalab of district Varanasi. The ex-post facto research design was applied in this study. The information was generated from 200 farmers, 40 from each selected village on the basis of criteria that farmer must be a commercial dairy farmer, maintaining proper records, must raise more than five dairy animals and sell milk not less than 5litre/day for 365 days continuously in a year from his own milk herd. The selected farmers were surveyed using structured schedule in the month of August 2021.

REVIEW

Common foods for boosting human immunity: A review

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Pushp Raj Shivahre⁴ | Ram Kumar Singh² | Tejbal Singh² | Deepak Kumar Jaiswal⁵

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Abstract

We are frequently exposed to potentially harmful microbes of various types on a daily basis. Our immune system is an amazing collection of unique organs and cells that defends us from hazardous germs as well as certain diseases. It plays a crucial role in protecting the body against external invaders, including bacteria, viruses, and parasites. Maintaining a healthy immune system requires consuming a balanced diet that provides a variety of macro- and micronutrients. By consuming sufficient amounts of water, minerals such as zinc and magnesium, micronutrients, herbs, and foods rich in vitamins C, D, and E, and adopting a healthy lifestyle, one can enhance their health and immunity, and prevent infections. This article provides a comprehensive review of the scientific literature on common foods known for their potential to boost human immunity. The review begins by discussing the various components of the immune system and their functions. It then delves into the current understanding of how nutrition can influence immune response, highlighting the importance of a well-balanced diet in supporting optimal immune function. The article presents an extensive analysis of a range of common foods that have been studied for their immune-boosting properties. These foods include fruits, vegetables, whole grains, and animal-based foods. Each food category is explored in terms of its specific nutrients and bioactive compounds that contribute to immune support. Foods such as milk, eggs, fruits, leafy greens, and spices like onion, garlic, and turmeric contain beneficial compounds that can enhance the immune system's function, activate and inhibit immune cells, and interfere with multiple pathways that eventually lead to improved immune responses and defense. The available literature on the issue was accessed via online resources and evaluated thoroughly as a methodology for preparing this manuscript.

KEYWORDS

common food, functional food, human health, immunity

1 | INTRODUCTION

The human body possesses multiple defense mechanisms against pathogenic invasion, and one such mechanism is the immune


system—a sophisticated network of cells, tissues, and organs that collaborate to shield the human body from potential harm. Immunity can be categorized into two types: innate or nonspecific immunity, and acquired or specific immunity (Singh et al., 2022). Humans are

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Abstract

We are frequently exposed to potentially harmful microbes of various types on a daily basis. Our immune system is an amazing collection of unique organs and cells that defends us from hazardous germs as well as certain diseases. It plays a crucial role in protecting the body against external invaders, including bacteria, viruses, and parasites. Maintaining a healthy immune system requires consuming a balanced diet that provides a variety of macro- and micronutrients. By consuming sufficient amounts of water, minerals such as zinc and magnesium, micronutrients, herbs, and foods rich in vitamins C, D, and E, and adopting a healthy lifestyle, one can enhance their health and immunity, and prevent infections. This article provides a comprehensive review of the scientific literature on common foods known for their potential to boost human immunity. The review begins by discussing the various components of the immune system and their functions. It then delves into the current understanding of how nutrition can influence immune response, highlighting the importance of a well-balanced diet in supporting optimal immune function. The article presents an extensive analysis of a range of common foods that have been studied for their immune-boosting properties. These foods include fruits, vegetables, whole grains, and animal-based foods. Each food category is explored in terms of its specific nutrients and bioactive compounds that contribute to immune support. Foods such as milk, eggs, fruits, leafy greens, and spices like onion, garlic, and turmeric contain beneficial compounds that can enhance the immune system's function, activate and inhibit immune cells, and interfere with multiple pathways that eventually lead to improved immune responses and defense. The available literature on the issue was accessed via online resources and evaluated thoroughly as a methodology for preparing this manuscript.

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1 | INTRODUCTION

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Salicylic Acid-induced Biochemical Changes in Swarna (MTU 7029) Variety of Rice under Drought Stress

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The major population of the world is dependent on rice for food. Global warming creates drought conditions mostly in north eastern countries. It is a very challenging task to cultivate drought-sensitive variety in drought-prone areas. To overcome this problem we induced changes in the drought-sensitive variety of rice (Swarna MTU 7029) for drought tolerance. Drought condition was exposed for 7 days and 14 days to SA treated and untreated 56 days old rice plants. Rice seeds were presoaked with 0.5mM SA. The experiment was designed in four groups control (untreated), drought -SA, drought +SA, and SA control. On the 7th and 14th of drought stress, SA improved drought tolerance indicator proline, carotenoid, and total soluble sugar. Starch and protein content were augmented in salicylic acid-treated plants compared to untreated rice plants under drought stress. Antioxidants such as SOD, CAT, and APX levels drastically increased in salicylic acid-treated plants during both 7th and 14th days of drought stress. Therefore, salicylic acid improved antioxidative enzymes content in MTU 7029 rice variety after 7 and 14 days of drought stress.

Key words: Drought, Rice crop, Abiotic Stress, Salicylic acid, Antioxidative enzymes, Presoaking

Response of Organic Manures, Inorganic Fertilizers and their Combinations on Growth and Yield of Radish

Anamika Chaurasiya, D. K. Singh, Ankit Singh, Shashi Bala

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ABSTRACT

The present investigation entitled “Response of Organic manures, Inorganic fertilizers and their combinations on Growth and yield of Radish (*Raphanus sativus* L.)” was conducted during the *rabi* season, 2020-21 at the research farm of Department of Horticulture, Udai Pratap Autonomous College Varanasi. The field experiment was laid out in RBD comprising of nine treatments that replicates thrice.

The initial experiment soil was sandy loam in texture, slightly alkaline and fine. It was observed that the application of recommended dose of fertilizers through combination of fertilizer and organic manures like FYM and *Azotobacter* significantly increased the plant growth, yield attributes and economic evaluation of treatments. Among these treatments application of 50% NPK +50% FYM+ *Azotobacter* resulted in significantly higher value of plant height (35.06 cm), No. of leaves per plant (13.49 cm) and length of leaves per plant (30.40 cm) and yield attributes i.e., root length (20.18 cm), root diameter

(3.80 cm), days to harvest (51.43 days), average root weight (117.91g) and root yield (393.79 q/ha). The cost benefit ratio (1:3.48) was also recorded maximum in this treatment. Where as the minimum result in respect to all parameters was noticed under T_0 (control) in radish. The study suggested that application of *Azotobacter* with FYM found more beneficial and significantly improved growth and yield of radish.

In overall investigation, the obtained results specified that the combination of organic manure with inorganic fertilizer showed promising results in the cultivation of radish to all the parameters and proved better for obtaining the higher growth and yield in radish.

Keywords Organic manure, NPK, Radish, Growth and yield, B:C ratio.

INTRODUCTION

Radish (*Raphanus sativus* L.) is an edible root vegetable of the family Cruciferae and it has $2n=18$ chromosome. Radish originated from Mediterranean region. It is grown in both tropical and temperate regions of India. India has area about 200 (000 ha) and production is 3,252 (000 MT) of radish by 2018-19 (NHB). Radish is predominantly a cool season vegetable crop. But Asiatic types can tolerate higher temperature than European varieties. Being a cool season crop, it is sown during winter from September to January in northern plains. In the mild climate of peninsular India, radish can be grown almost all the year round except for few months of summer. It is an

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In overall investigation, the obtained results specified that the combination of organic manure with inorganic fertilizer showed promising results in the cultivation of radish to all the parameters and proved better for obtaining the higher growth and yield in radish.

Keywords Organic manure, NPK, Radish, Growth and yield, B:C ratio.

INTRODUCTION

Radish (*Raphanus sativus* L.) is an edible root vegetable of the family Cruciferae and it has $2n=18$ chromosome. Radish originated from Mediterranean region. It is grown in both tropical and temperate regions of India. India has area about 200 (000 ha) and production is 3,252 (000 MT) of radish by 2018-19 (NHB). Radish is predominantly a cool season vegetable crop. But Asiatic types can tolerate higher temperature than European varieties. Being a cool season crop, it is sown during winter from September to January in northern plains. In the mild climate of peninsular India, radish can be grown almost all the year round except for few months of summer. It is an

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Effect of Plant growth regulators on growth and yield of cabbage (*Brassica oleracea* var. *capitata* L.)

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ABSTRACT

The present investigation entitled "Effect of plant growth regulators on growth and yield of a cabbage (*Brassica oleracea* var. *Capitata* L.)" is an experiment was conducted during 2020-21 at research form of Udai Pratap Autonomous College, Varanasi (U.P.). The nine treatment comprising of T₁ - Control , T₂ - NAA (50ppm), T₃ - NAA (75ppm), T₄ - NAA (100 ppm), T₅ - NAA (120 ppm), T₆ - GA₃ (50 ppm), T₇ - GA₃ (75ppm), T₈ - GA₃ (100 ppm) and T₉ - GA₃ (150 ppm), were evaluated in randomised block design with three replications. The experimental finding revealed that the treatment T₉ showed better response to plant growth and yield attributes. However, maximum yield 400.74 q/ha was obtained with the application of T₉ (GA₃ 150 ppm) followed by T₅ - (NAA 120 ppm). On the basis of economic analysis with the application of GA₃ 150 ppm in T₉ gave maximum cost benefit ratio is 1: 2.57 During 2020-21, respectively and was found most beneficial and feasible for the cultivation of cabbage.

Key words : *Brassica oleracea*, Plant growth, regulators, cabbage

Introduction

Cabbage is uses as salad boiled vegetable, coocked currie, pickle as well as dehydrated vegetable. Cabbage head contains minerals and also rich in vitamin like A, B and C. It is assumed that, half a cup of cooked cabbage has about a third the vitamin C we need for the day. It also gives you doses of fibre, foliate, potassium, magnesium, vitamin K and more. In india west bengal is the leading producer of cabbage 2288.50(000MT) but the productivity is highest in Uttar Pradesh, i.e. 33.44 tonnes/ha. With an 9.06 (000 ha) and Production 302.97 (000 MT) Second largest producer is Orissa with 1058.78 (000 MT) and area 37.74 (000 ha) then Madhya Pradesh in the rank of third in case of Production with 686.91 (000MT) and area 29.89 (000 ha). (Source: National horticulture board, NHB 2017-18).

Plant growth regulators are defined as an organic chemical other than nutrients which in small amount promote, inhibit or other-wise modify the plant physiological processes. It increases the yield and improves the quality by alerting the behavior of plant and number of physiological processes in plant systems. GA₃ has been reported beneficial in cabbage because it is involved in the regulation of growth through both cell division and enlargement NAA is also being used in many vegetable crops at various stages of development for increasing growth and yield by way of cell elongation, cell enlargement, cell division and differentiation. The plant growth regulators used are NAA and GA₃. Use of growth regulators is very crucial increasing the vegetative growth and simultaneously the yield of Cole crops. Therefore the present study was carried out looking to the above finding of different work on PGRs.

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RESEARCH ARTICLE

Assessment of *in vitro* regeneration ability of mango genotypes

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ABSTRACT

Present investigation was carried out with the objectives to assess the *in vitro* regeneration potential of mango through *in ovulo* embryo and shoot tip culture. It was postulated from the present that mango cv. Amrapali exhibited maximum embryo growth during *in ovulo* embryo maturation. However, Kerala-1 showed least number of embryos showing growth during *in vitro* maturation. Amrapali also showed maximum germination (66.66%) of embryos, whereas cultivar Kerala-1 had the minimum germination (38.95%) of matured *in ovulo* embryos. The days taken for emergence of radicle ranged from 23.5 (Kurukkan) to 33.1 (Olour), and period required for emergence of plumule ranged from 28.0 (Kurukkan) to 34.1 (Olour). *In vitro* and *ex vitro* survival was maximum in Amrapali (55.5 %). Survival of shoot tip explants from mango genotypes during *in vitro* culture revealed non-significant difference during first 15 days of culture. However, significant result were obtained at 20 DAC, in which Amrapali genotype showed maximum survival (24.89%), followed by Pusa Arunima (24.21%) and Kerala-1 had the minimum survival (18.79%). It was also evident that necrosis of shoot tip explant during *in vitro* culture was significantly high. The maximum necrosis of explants

was in Olour (21.44%) at 5 days after culture, Kurukkan (25.00% and 34.98%) at 10 DAC and 15 DAC, respectively. Amrapali had the maximum necrosis (46.55%) at 20 days after culture. Shoot tip cultures also suffered from microbial contamination. Maximum microbial contamination found in the Kerala-1 (10.50, 15.44, 19.77 and 39.79%) at 5, 10, 15 and 20 days after culture, respectively. Minimum microbial contamination was found in Kurukkan (6.03, 8.19% and 14.58%) at 5, 10 and 15 DAC, respectively. However, 20 days after culture contamination was comparatively more (34.98%). Amrapali had the lowest percent of contamination (28.36%) at 20 DAC compare to other mango genotypes. From the present study, it is concluded that *in vitro* embryo culture is better strategy for regeneration of mango compared to shoot tip culture.

Key words: Genotypes, *In vitro* regeneration, *Mangifera indica*, Mango, Shoot tip culture

INTRODUCTION

Mango (*Mangifera indica* L.) is considered as 'King of the fruits' in Indian sub-continent. Mango has been widely cultivated in India for thousands of years and majority of commercial cultivars have originated as chance seedling and occupied prominent place in domestic as well as overseas markets. In recent years, varietal wealth of mango has been augmented and several new regular bearing varieties have been developed from research institutions in India. In India, mango propagation is mainly performed using traditional methods of grafting which is time taking and survival of grafts are subjected to several issues like environmental, edaphic and biotic factors. Demand of elite and disease-free planting material is increasing day by day. However, several problems associated with mango *in vitro* culture, such as latent microbial infection, phenol

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Assessment of efficiency of resources used in sugarcane production of Baghpat district of western Uttar Pradesh

Dushyant Kumar, Shiv Kumar, Pukhraj Singh, Nitin Kumar Nag and Lalit Kumar Verma

Abstract

The present study was undertaken to assess the Resource Use Efficiency of Sugarcane production in Baghpat district of western Uttar Pradesh. The district is purposely selected for this study because the Sugarcane crop is dominated the farming system in this region for a long time. The Cobb-Douglas production function is used to estimate the input use efficiency. The coefficient of multiple determinations (R^2) on marginal, small and medium size group of farms accounted for 0.8079, 0.8147 and 0.8167 respectively and indicating that all the explanatory variable viz., human labour, seed, manure and fertilizers and irrigation together contributed 90.66, 93.86 and 96.12 per cent respectively.

Keywords: Sugarcane, cost and return, benefit-cost ratio (BCR), resource use efficiency

Introduction

Sugarcane (*Saccharum* spp.) is the most important commercial crop in the world and at present Brazil, Mexico, India and Thailand are the leading producer country of sugarcane. Sugarcane is grown in diversified climatic conditions i.e., tropical and sub-tropical. Sugarcane cultivation and development of the sugar industry run parallel to the growth of human civilization and are as old as agriculture. The importance and use of sugarcane and sugar in the country's socio-economic milieu are deeply rooted and immense. In the current day, the rural economy set up sugarcane cultivation and the sugar industry has been a focal point for socioeconomic development in rural areas by mobilizing rural resources, generating employment and higher income, transport and communication facilities.

Sugarcane plays a pivotal role in the agricultural and industrial economy of our country. Sugarcane Production was 431.81 million tonnes during the reported period, a similar trend was also observed for other crops ^[1], and indirect employment to 40 million farmers, 3.5 lakhs skilled and unskilled workers in the manufacturing of sugar.

The Agricultural sector also plays a considerable role in the economy of western Uttar Pradesh and predominantly it is an agricultural economy. Among different states of the country, Uttar Pradesh occupies first place in the area of 21.80 lakhs hectares and production of 177.67 million tonnes (2020-21) but in terms of productivity, it ranks eight ^[3]. The input utilization pattern of the farmers among the various crops has also changed and depends upon its price and availability, which directly or indirectly affect the cost of production and profit margin of the farmers.

Sugarcane is an important cash crop in the Baghpat district of western Uttar Pradesh. It's dominated the farming system in this region for a long time. Sugarcane crop covers a large area of 76387 thousand hectares in this district with a production of 5718.88 million tonnes (2016-17) ^[2]. In this district, the main commercial activities of the people living in this region are making and selling Sugar, Gur and Khandsari, which is an agro-based industry. The factor responsible for the cultivation of sugarcane crop increase was irrigation facilities, easy availability of input resources, more profitability in comparison to other crop, availability in the local market, availability of good processing facilities, high-yield variety, and the application of a modern package of practices changed. Sugarcane is an intensive input utilization and varies from region to region and farmer to farmer. The input utilization pattern of the farmers among the various crops has also changed and depends upon its price and availability, which directly or indirectly affect the cost of production and profit margin of the farmers.



METHOD FOR TREATING METHYL HG CONTAMINATED WATER AND SOIL OF HINDON RIVER USING EARTHWORM (AS BIOINDICATOR) AND FLYASH, BIOMASS & ALGAE (AS ADSORBENT)

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Vivek Singh⁴, Dr. Abhishek Singh⁵, Shruti Singh⁶

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Abstract

Mercury contamination in water, soil and air is associated with potential toxicity to humans and ecosystems. Industrial activities (Carbon Continental Company –LalKua-Nainital) such as coal combustion have led to increased mercury (Hg) concentrations in different environmental media. This review critically evaluates recent developments in technological approaches for the remediation of Hg contaminated soil, water and air, with a focus on emerging materials and innovative technologies. Based on approaches including adsorption/desorption, oxidation/reduction and stabilization/containment, the performances of innovative technologies with the aid of these materials were examined. In addition, technologies involving organisms, such as phytoremediation, algae-based mercury removal, microbial reduction and constructed wetlands, were also reviewed, and the role of organisms, especially microorganisms, in these techniques are illustrated. Earthworm intensified the organic loading of wastewater in vermifilter soil bed by the fact that it granulates the clay particles thus increasing the hydraulic conductivity of the system.

Keywords: Hg (II), Methyl mercury, Elemental mercury, Remediation techniques, Novel materials, Earthworm (E. Feotida), flyash, Algae and Biomass.

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Estimation of components of variance, degree of dominance and heritability in Rice (*Oryza sativa* L.)

S. B. VERMA¹, KAYAM SINGH, SASHI BALA², RAJU JATAV³ AND MONIKA BHASKAR⁴
Senior Scientist & Head KVK, Sheopur, RVSKVV, Gwalior M.P.

Abstract

The magnitude of sca variance were much higher than that of gca variance for all the characters. The maximum gca variance (427.35) and sca variance (846.71) was recorded for total spikelet's per panicle and grain yield respectively. The negative s²g was observed for days to 50% flowering. Panicle bearing tillers, panicle length spikelet's fertility %, test weight and grain yield.

Key words: Rice, Variance, Fertility, Additive gene action, Genetic component

Introduction

Rice is the most important food crop of the world. It belongs to the family Poaceae (Gramineae) having chromosome number ($2n=2x=24$). The ultimate aim of the plant breeding is to develop varieties that perform certain functions better than the existing type. The superiority of the improved type is manifested by certain specific gene combinations and how rapidly these combinations can be obtained in single crop variety depend on the system into which the genes available to the plant breeder are organized. Initially, varietal improvement was restricted to the use of the various selection parameter coupled with introgression and or selection of favorable plant types in autogamous plants limited to utilization of fixable gene effect only. Considering the progress made in research and development of hybrid rice technology in China and research experiences of gained at IRRI and other research centers, so far, one can say that hybrid rice technology is one of the possible way to increase varietal productivity in the rice (about 1 ton/hect.) beyond the limits set by improved semi dwarfic rice

varieties, keeping in view, certain traits of hybrids such as dominant gene for resistance stress situation (Senadhira and Virmani 1987 and Kaw and Khush 1985), better use of Physiology efficiency (Mc. Donald *et al.* 1987, Lin and Yuan 1980), stronger and active root system (Virmaniet *al.* 1981) early seedling and vegetative vigour (Akita *et al.* 1986) and adoptability under problematic soil condition (Akbar and Yabura 1975), the study a of rice grains added significant.

Materials and Methods

The present research work was undertaken to the analysis of combining ability for yield and its contributing traits in rice at Genetics and Plant Breeding Farm of Narendra Deva University of Agriculture and Technology Kumarganj, Faizabad. The experimental material used for this investigation comprised of population of 24 F₁S, their parents 3 female, 8 male lines and 1 standard variety. The popular commercial variety used was Sarjoo 52. The F₁ hybrids and their parents seeds were sown in nursery bed by treating with 0.2% Bavistin solution for about a minute and then washed in water. After 25 days single seedling per hill were transplanted with 20 cm row to row and 15 cm plant to plant spacing having 4 rows of 2.5 meter long for each test entry in randomized block design with three replications. The crop was maintained properly at 120:60:60 kg/ha NPK level and Zinc sulphate at the rate of 25kg/he as usual half the nitrogen and entire quantities of phosphorus, potash and zinc sulphate was applied as basal dose and two split application of remaining 60 kg/ha nitrogen was tillering

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Abstract

The magnitude of sca variance were much higher than that of gca variance for all the characters. The maximum gca variance (427.35) and sca variance (846.71) was recorded for total spikelet's per panicle and grain yield respectively. The negative s²g was observed for days to 50% flowering. Panicle bearing tillers, panicle length spikelet's fertility %, test weight and grain yield.

Key words: Rice, Variance, Fertility, Additive gene action, Genetic component

Introduction

Rice is the most important food crop of the world. It belongs to the family Poaceae (Gramineae) having chromosome number ($2n=2x=24$). The ultimate aim of the plant breeding is to develop varieties that perform certain functions better than the existing type. The superiority of the improved type is manifested by certain specific gene combinations and how rapidly these combinations can be obtained in single crop variety depend on the system into which the genes available to the plant breeder are organized. Initially, varietal improvement was restricted to the use of the various selection parameter coupled with introgression and or selection of favorable plant types in autogamous plants limited to utilization of fixable gene effect only. Considering the progress made in research and development of hybrid rice technology in China and research experiences of gained at IRRI and other research centers, so far, one can say that hybrid rice technology is one of the possible way to increase varietal productivity in the rice (about 1 ton/hect.) beyond the limits set by improved semi dwarfic rice

varieties, keeping in view, certain traits of hybrids such as dominant gene for resistance stress situation (Senadhira and Virmani 1987 and Kaw and Khush 1985), better use of Physiology efficiency (Mc. Donald *et al.* 1987, Lin and Yuan 1980), stronger and active root system (Virmaniet *al.* 1981) early seedling and vegetative vigour (Akita *et al.* 1986) and adoptability under problematic soil condition (Akbar and Yabura 1975), the study a of rice grains added significant.

Materials and Methods

The present research work was undertaken to the analysis of combining ability for yield and its contributing traits in rice at Genetics and Plant Breeding Farm of Narendra Deva University of Agriculture and Technology Kumarganj, Faizabad. The experimental material used for this investigation comprised of population of 24 F₁S, their parents 3 female, 8 male lines and 1 standard variety. The popular commercial variety used was Sarjoo 52. The F₁ hybrids and their parents seeds were sown in nursery bed by treating with 0.2% Bavistin solution for about a minute and then washed in water. After 25 days single seedling per hill were transplanted with 20 cm row to row and 15 cm plant to plant spacing having 4 rows of 2.5 meter long for each test entry in randomized block design with three replications. The crop was maintained properly at 120:60:60 kg/ha NPK level and Zinc sulphate at the rate of 25kg/he as usual half the nitrogen and entire quantities of phosphorus, potash and zinc sulphate was applied as basal dose and two split application of remaining 60 kg/ha nitrogen was tillering

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Confidence intervals for the reliability characteristics via different estimation methods for the power Lindley model

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Abstract

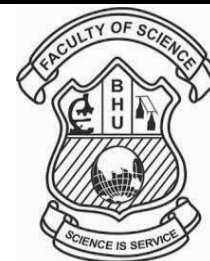
In this article, classical and Bayes interval estimation procedures have been discussed for the reliability characteristics, namely mean time to system failure, reliability function, and hazard function for the power Lindley model and its special case. In the classical part, maximum likelihood estimation, maximum product spacing estimation are discussed to estimate the reliability characteristics. Since the computation of the exact confidence intervals for the reliability characteristics is not directly possible, then, using the large sample theory, the asymptotic confidence interval is constructed using the above-mentioned classical estimation methods. Further, the bootstrap (standard-boot, percentile-boot, students t-boot) confidence intervals are also obtained. Next, Bayes estimators are derived with a gamma prior using squared error loss function and linex loss function. The Bayes credible intervals for the same characteristics are constructed using simulated posterior samples. The obtained estimators are evaluated by the Monte Carlo simulation study in terms of mean square error, average width, and coverage probabilities. A real-life example has also been illustrated for the application purpose.

Keywords: Point estimation, Interval estimation of RC, MCMC method.

2000 AMS Classification: 60E05, 62M09, 62F15.

ABBREVIATIONS

AIC	: Akaike information criterion	MCMC	: Markov Chain Monte Carlo method
ACIs	: Asymptotic confidence intervals	MTSF	: Mean time to system failure
BCIs	: Bootstrap confidence intervals	MLE	: Maximum likelihood estimation
BIC	: Bayesian information criterion	MPSE	: Maximum product spacing estimation
CDF	: Cumulative distribution function	p-boot	: Percentile bootstrap
CIs	: Confidence intervals	PLD	: Power Lindley distribution
C	: Coverage probability	PDF	: Probability density distribution
DFR	: Decreasing failure rate	RC	: Reliability characteristics
HF	: Hazard function	RF	: Reliability function
HPD	: Highest posterior density	SELF	: Squared error loss function
IFR	: Increasing failure rate	s-boot	: Standard bootstrap
KS	: Kolmogrov Smirnov	t-boot	: Student's t-bootstrap
LD	: Lindley distribution	\mathcal{W}	: Width of the intervals
LLF	: Linex loss function		



IMPROVED ESTIMATORS OF POPULATION MEAN USING AUXILIARY VARIABLES IN POST-STRATIFICATION

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Abstract:Through this paper, we present some improved estimators of population mean using auxiliary variables in post-stratification. We have derived the expressions for bias and mean square errors up to the first order of approximation and shown that the proposed estimators under optimum conditions are more efficient than other estimators taken in this paper. In an attempt to verify the efficiencies of proposed estimators theoretical results are supported by empirical study for which we have considered two datasets.

Index Terms:Study variable, auxiliary variable, bias, mean square error and post-stratified sampling

I. INTRODUCTION

Stratified sampling is a method of sampling from a population that can be divided into subpopulations known as strata. This method improves efficiency over simple random sampling when the population is not homogenous. In some cases, it is not possible to divide the population into strata before sampling then post-stratification comes forward. For example

- We cannot specify a population by age group until the census is conducted.
- It is impossible to stratify a population by gender if the sample is drawn using a telephonic interview.

For post-stratification, a simple random sample is drawn and then units are placed in strata. Many authors worked on the problem of post-stratification. Hansen et al (1953) were the first to tackle the problem of post-stratification. Holt and Smith (1979) showed that post-stratification is more efficient than stratification. Other works include the work of Agarwal and Panda (1993), Fuller (1966), Chouhan (2012), Bahl and Tuteja (1991), and Kish (1965) who have studied this technique of sampling.

We have utilized the information on an auxiliary variable in order to improve the efficiency of the estimator of the population mean. Cochran (1940) was the first to introduce a ratio estimator of the population mean. Shabbir and Gupta (2007), Singh et al.

(2013), Singh et al. (2016), and Koyuncu and Kadilar (2009), have considered the problem of estimating the population mean Y by taking into consideration information on auxiliary variables. This article tries estimation of population mean in post-stratified sampling using the information on auxiliary variables.

Let a sample of size n is drawn from a size N using SRSWOR from a population $U = (U_1, U_2 \dots, U_N)$. After selecting the sample, we classify which unit in the sample 'n' belongs to h^{th} stratum such that $\sum_{h=1}^L n_h = n$. Here the assumption is that 'n' is so large that the possibility for 'n_h' being zero is very small.

Let (y_{hi}, x_{hi}) be the observation on i^{th} unit falling in the h^{th} stratum for the study variable Y and auxiliary variable X respectively. Let

$$\begin{aligned} \bar{Y}_h &= \frac{1}{N_h} \sum_{i=1}^{N_h} y_{hi} , \\ \bar{X}_h &= \frac{1}{N_h} \sum_{i=1}^{N_h} x_{hi} , \\ \bar{Y} &= \frac{1}{N_h} \sum_{h=1}^L \sum_{i=1}^{N_h} y_{hi} = \sum_{h=1}^L W_h \bar{Y}_h , \\ \bar{X} &= \frac{1}{N_h} \sum_{h=1}^L \sum_{i=1}^{N_h} x_{hi} = \sum_{h=1}^L W_h \bar{X}_h , \\ \bar{y}_h &= \frac{1}{n_h} \sum_{i=1}^{n_h} y_{hi} , \\ \bar{x}_h &= \frac{1}{n_h} \sum_{i=1}^{n_h} x_{hi} , \end{aligned}$$



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Screening of *Ocimum gratissimum* germplasms in natural field condition against leaf spot disease caused by *Alternaria alternata*

Ravi Pratap Singh and Mayank Singh

Abstract

A field experiment was conducted during *kharif* season (2016-2017) on Tulsi (*Ocimum gratissimum*) crop for screening of resistance in natural field condition against leaf spot disease caused by *Alternaria alternata* at Main Experimental Station, Department of Medicinal and Aromatic Plants, ANDUAT, Kumarganj, Ayodhya. The observed parameters of oil content percent, number of leaves per plant, leaf weight per plant (kg), leaf yield (q/ha) and disease severity percent were recorded in 90 days old plants. The results obtained revealed that germplasm NOB-7 showed maximum oil content (2.14%) while the maximum leaves yield recorded in NOB-1 (14.81 q/ha) with disease severity (15%).

Keywords: Germplasm, oil content, leaf yield, leaf weight, disease severity, *Ocimum gratissimum*

Introduction

The Basil is native of Asia and Africa and grows wild as a perennial on some pacific islands and was brought from India to Europe through the Middle East in sixteenth century, subsequently to America in the seventeenth century.

Three types of Tulsi are encountered with in cultivation, the green leafed (Sri or Rama Tulsi) is the most common, the second type (Krishna Tulsi) bears dark green-to-purple leaves, a third type is a forest variety Vana Tulsi (*Ocimum gratissimum*) that often grows wild. *Ocimum gratissimum* is a herbaceous plant of the *Lamiaceae* family. Tulsi meaning 'the incomparable one' is an important medicinal plant which is in demand. The medicinal properties of Tulsi were known since antiquity. It is used for the treatment of problems related to heart, blood, intestine and snake bite. Eugenol the important chemical constituent of Tulsi is useful for the synthesis of vanillin.

Ocimum gratissimum leaf extract is commonly used in traditional medical practice for the treatments of mental illness, epilepsy, high fever, diarrhoea, pneumonia, cough, and conjunctivitis [1]. It has been estimated that over 50% of medicines have their origins in this natural product [2].

Material and Methods

The experiment was conducted at experimental farm of Medicinal and Aromatic Plants of Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad. Randomized Block Design (RBD) was adopted with three replications. The percent disease intensity (PDI) was recorded during August to October 2017. Twenty-four germplasm obtained from the Department of Medicinal and Aromatic Plants bearing the IC number from IC- NOB-1 to IC- NOB-24 shown in (Table-1) were sown in July, 2016 at Main Experimental Station, Department of Medicinal and Aromatic Plant in Randomized Block Design. The crop suffers from leaf spot disease during different stages of crops but among all the leaf spot disease amounts heavy loss in leaf yield which ultimately effects the oil yield.

The twenty-four germplasms of *Ocimum gratissimum* were screened, disease severity will be recorded using 0-9 scale. Each germplasm was planted in well prepared field at row to row distance 60 cm and plant to plant distance 45 cm. Details regarding the experiment are described in Table-1.

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Growth, yield and quality attributes of guava as influenced by canopy management practices: A review

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Abstract

Guava (*Psidium guajava* L.) is major tropical fruit crop grown throughout the tropical and sub-tropical regions. Guava is native from tropical America; its cultivation has spread to all tropical countries, with India being particularly important. It is a resilient, prolific bearer, and very profitable fruit crop that may be produced successfully in a variety of soil and climatic conditions. As a result, canopy management aids in achieving high quality and productivity. Now a days, there is a global trend in fruit-producing countries to accommodate the largest number of fruit plants possible by employing canopy management and pruning procedures to regulate tree growth and structure, so limiting tree size while yet ensuring high fruit production of desired quality. Pruning not only helps to encourage new shoots after the harvest but has also been adapted for rejuvenation of orchards along with crop regulation. Canopy management includes training and pruning, rootstock and scions, high density planting system and application of plant growth regulators. Guava bears flowers on current season's growth. Therefore, a light annual pruning is considered to be essential to boost up new vegetative shoot emergence. The length of flowering shoots tended to decrease with delay in time of pruning but increased with the increasing severity of pruning irrespective of season. An increase in shoot length due to severity of pruning might be due to elimination of growing points which in turn encouraged the length of remaining shoots. Pruning by heading back encourages new, long, whip-like shoots growth with sparse flowering compared with cutting at fork. Plant architecture management included, training and pruning of guava trees has been found to improve yield and fruit quality. The trees should be kept open for better penetration of sunlight leading to more number of shoot and higher yield.

Keywords: Fruit, canopy, pruning, productivity, quality, season, yield

Introduction

Guava (*Psidium guajava* L.) belong to the Myrtaceae family. The guava fruit has grown in popularity as a result of its excellent nutritional value, attractive aroma, rich flavour, and affordable market availability (Bal and Dhaliwal, 2003) [8]. Guava is a good source of Ascorbic acid (Vitamin C) (250-300 mg/100 g of pulp), contains carotenoids and polyphenols which are the major classes of dietary antioxidant pigments among plant foods (Hassimoto *et al.*, 2005; Jimenez-Escrig *et al.*, 2001) [35, 39]. Due to its astringent properties, mature guava fruits, leaves, roots and bark are used in local medicines to treat gastroenteritis, high blood pressure, asthma, diarrhoea and obesity (Joseph and Priya, 2011) [40]. Besides its high nutritive value, it yielded a heavy crop every year and gave good economics returns involving very little inputs. In general, guava bears in three season's namely rainy, winter and spring seasons in a year. Fruits of rainy season crop are insipid in taste, poor in quality, less nutritive value and attacked of insect pests and diseases. On the other hand fruits of winter season crop are superior in quality, comparatively free from diseases and insect pests and fetch higher prices in the market (Rathore and Singh, 1976) [69].

Guava has a higher proportion of 'shade' to 'sun' leaves and their leaves are found photo synthetically inactive under deeper shade and act as unproductive sink Therefore, vegetative growth, fruit yield and quality are functions of light interception and translocation of light energy into chemical energy. Quality fruit is function of absorption of light and light is directly proportional to the yield of fruit trees (Jackson, 1980; Palmer, 1989) [37, 63]. Light interception was more in guava trees planted, at wider spacing and decrease significantly with the depth of the canopies inspective of the planting densities. It was observed that fruit yield and quality of guava fruits decreased with poor light interception at higher planting densities.



Utilization Pattern of ICT Tools by Paddy Growers in Uttar Pradesh

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Conflict of Interest: None

ABSTRACT

Information and Communication Technology (ICT) in agriculture refers to the process of making available ICTs to assist, enhance, and optimise the dissemination of knowledge among the farmers. This study was conducted during 2018-19 in Sultanpur district of Uttar Pradesh. Due to the district's significant area under rice cultivation, Sultanpur in Uttar Pradesh was chosen as the location of the research. For the sampling a total of 120 farmers, from five villages were selected randomly by using proportionate random sampling technique. ICT utilization among the farmers was the maximum and 45.83 per cent respondents were using ICT tools to a medium extent, and the mobile was the most utilized ICT tool, ranking first with a mean score value of 6.99. In contrast to age, caste, family type, social involvement, and material ownership, this showed non-significant and negative correlations with the extent to which ICT tools were used. The variable 'education' had a very significant and positive correlation with the use of ICT tools that mainly effect the utilization of ICT tools 19. The utilization extent of ICT tools was satisfactory but still there was need of awareness and educational programmes to be introduced in study area.

INTRODUCTION

Information and Communication Technology (ICTs) in agriculture is an emerging field that emphasizes on the enhancement of agriculture and other development in India. The agriculture sector is preparing itself to make optimum use of new information and communication technologies. Agriculture extension is a service that educates farming communities by introducing them to new information and technological advancements so they can raise their yield, income, and living standards. Despite having a significant, educated, skilled, and organised agricultural extension workforce, about 60 per cent of farmers in the nation are still unreached (NSSO, 2005), means they are not being helped by any extension organisation or functionary. Radio and television are the main sources of agricultural information for the 40 per cent of people who have some access to it. Although there are several ICT facilities, the majority of extension agents owned, accessed, and

used radios, televisions, and phones that they had personally purchased from the open market (Ezeh, 2013). ICT improvements can be used to provide farmers with accurate, timely, and relevant information and services, facilitating an environment in which the agriculture occupation is also financially rewarding. However, there are differences between regions in the quantity and quality of telecommunications, information, and the effort of individuals, public and private organisations, as well as a differentiated nature of farmer demand in various areas. This means that not all ICT initiatives are created equal. The rapid growth of ICTs has enormous potential for expanding farmers' information access and, thus, yields and profitability through the adoption of productivity-enhancing technology; yet, the lack of ICT-based technical knowledge is the most significant barrier to the widespread adoption of ICTs (Mahalakshmi et al., 2015). Illiteracy, the availability of relevant and specialized content in their own language, the easy and affordable access of ICT tools,

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Development and Validation of a Scale Measuring the Attitude of farmers towards Climate Smart Agriculture

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

The measurement of attitudes is a critical endeavour in the realm of social and psychological research, enabling a deeper understanding of human behaviours, preferences, and beliefs. Constructing a reliable and valid scale to assess attitudes requires a systematic approach that encompasses various stages, such as conceptualization, item generation, scale refinement, pilot testing, psychometric analysis, and validation. A summated (Likert) rating scale was used to develop the scale. A total of 60 statements, consisting of 45 positive and 15 negative statements, were framed, of which 22 statements (19 positive and 3 negative) were retained in the final scale. The reliability of the scale was calculated by using the split-half method. The validity of the scale was tested by experts' judgment. The psychometric properties of the scale include: the Pearson

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Bayesian Estimation of Parameter For Different Loss Functions Using Progressive Type-II Censored Data

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15 December 2023

In this present work, we are going to show the various useful properties of the existing distribution known as $MG_{Exp}(\epsilon)$ -distribution which have not quoted by the host authors like moments, mean deviation about mean, mean deviation about median, order statistics, count of uncertainty. Estimation procedures have been adopted under Bayesian estimation for progressive Type-II censored case. Simulation study has also been carried out to judge the behavior of the Bayes estimator at the long-run. Performance of the Bayes estimators and their posterior risks of the considered loss functions have been obtained, reported and compared for the considered values of sample size, effective sample size, parameter and removals. The comparison of Bayes estimators of all 6 chosen loss functions have been done on the ground of lowest posterior risks.

keywords: Bayesian estimation, $MG_{Exp}(\epsilon)$ -distribution, loss function, posterior risk, censoring scheme.

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BHEL is Backbone of Indian Economy

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Introduction

BHEL (Bharat Heavy Electricals Ltd.) is India's largest Engineering and Manufacturing enterprise in the energy and Infrastructure sectors. It is engaged in design, engineering, construction, testing and servicing of a wide range of products and services over 180 products.



Innovation

BHEL constantly support development of newer technologies, products, improved processes, better services and management practices.

TEAM WORK

BHEL works together as a team to provide the best solutions and services to their customers.

BHEL's VISION

BHEL's vision is to become a world class innovation & competitive and profitable engineering enterprise providing total business solutions.

Power Sector

BHEL is one of the few companies in the world having the capability to manufacture the equipment for entire range of power plants - thermal, gas, hydro and nuclear, with proven capabilities to execute large size projects. BHEL's offering include:

- Steam turbines, generators, boilers and matching auxiliaries for fossil-fuel applications upto 1000 MW unit size
- Emission control equipment including Flue Gas Desulphurisation systems for SO_x emission control, high efficiency Electrostatic Precipitators for particulate emission control, and Boiler modification and Selective Catalytic Reduction systems for NO_x emission control
- Gas turbines and generators up to 299 MW unit size
- Hydro turbines and generators up to 400 MW unit size
- One of India's largest employers in the engineering space 29,000+ highly skilled employees incl. 8,300 engineer.

Why BHEL was started?

One of the greatest challenges before the Government of India on attaining freedom in 1947 was to provide a strong base in infrastructure and capital goods for economic and industrial development. The Government under the leadership of Prime Minister, Pandit Jawaharlal Nehru realized that there should be a large manufacturing base and adequate technically qualified personnel for sustained economic growth.

Importance of Working Capital Management in Public Enterprises (BHEL)

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Introduction

Working Capital is that part of the capital which is available and used for carrying out the routine or regular business operations. So the amount of working capital in every concern should be neither more nor less than what is actually required. BHEL is back bone of our economy. Working capital is just like the heart of the business. If it becomes weak, the business can hardly prosper and service. It is index of the solvency of the concern. Just like, the circulation of blood is very much important in human life to alive in the same way flow of fund is very much important to maintain the health of the enterprise. Finance is one of the major elements that activate the overall growth of the economy. An efficient financial system calls for the efficient performance of Institutions & financial markets.

The main reasons a business needs finance are :

- Start a business
- To develop & market new products
- To enter new markets
- To Take over or acquisition
- For making new premises
- To pay for day-to-day running business

In short, working capital is the capital with which the business is worked over. Thus, the capital invested & locked up in various current assets, such as stock of raw-materials, work-in-progress, stock of finished goods, account receivable & cash, Bank balances constitutes the working capital.

Working capital is the capital required for maintaining day to day business operations. The present day competitive environment calls for an efficient management of working capital; ineffective management may force the firm to stop its business operations or may lead to bankruptcy.

To meet the current requirements of a business enterprise such as the purchase of services, raw materials etc. working capital is essential. Working capital is used to maintain the goodwill for the business concern. It can able to face the business concern in emergencies such as depression. To managing the working capital (i.e., current assets and current liabilities) is used to maintaining the satisfactory level of working capital (i.e., neither excessive nor inadequate working capital). Profitability of the firm may improve while the working capital is converted into too small.



Financial Self Efficacy: The Role of Financial Literacy and Financial Investment in the Stock Market with a Preview of Financial Innovation

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Abstract

None of the doors are knocked open until and unless one understands the reason besides, behind each and every learning there is an innovation of managing to grasp it. Financial self-efficacy refers to an individual's belief in understanding and managing their finances. Financial literacy or knowledge of financial concepts plays a crucial role in building financial self-efficacy as it empowers individuals to make informed financial decisions. Financial investment in stock markets can increase one's wealth, but it requires a certain level of financial literacy to understand the risks and benefits involved. Investing in stock can also enhance an individual's financial self-efficacy, as they gain experience and confidence in managing their investment. However, it's important to remember that investing in stocks is not without risks and can result in significant financial loss. It is an important factor that can impact an individual's financial well-being especially when it comes to making decisions about stock market investment. According to World Health Organisation, about 16% of the global population is disabled among which India it is reported, had 750 million Internet/Smartphones users in 2020, when this 16% is applied, this works out to roughly 120 million (12 crores) Internet/smartphones users' disabilities. Innovation leads to change, and financial innovation refers to the development of new financial products, services, and technologies that can improve or transform how financial services are accessed, accessed, or consumed. It includes the development of online banking, mobile banking, and the introduction of new investment products such as exchange-traded funds, and digital currencies like artificial intelligence and machine learning to improve risk management and fraud detection.

Introduction

Financial Literacy is the knowledge and understanding of financial concepts and tools. Financial investments in stock markets refer to the purchase of a share in a company with the expectation of making a profit from the growth of the company. It is important to study financial self-efficacy, financial literacy, and financial investment in the stock market for several reasons.

Self-Efficacy and financial literacy impact financial well-being, understanding the relationship between financial literacy, self-efficacy, and financial decision-making can help individuals make better financial decisions and improve their overall financial well-being. Financial literacy and self-efficacy affect investment behaviour, and researchers can develop strategies to encourage individuals to make informed investment decisions. Understanding impact and financial education. It helps policymakers and educators design and implement effective financial programs. Improving investment outcomes, by understanding the relationship between financial literacy, self-efficacy, and investment behaviour, researchers can develop strategies to improve investment outcomes and reduce investment risk for individuals. All the 3 terms provide valuable insights into financial decision-making and help individuals make informed financial choices to improve their financial well-being.

Objectives

The main objectives of the study of financial self-efficacy, financial literacy, and financial investment in stock markets are: -

1. To understand the relationship between financial literacy self-efficacy and financial decision-making.

Digital India : Challenges and Opportunities

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Abstract

Digital India has knocked on the door, of money-closed opportunities into turning a full-fledged Structure of opened windows, in the arena of technologies and the digital world. Digital is a plethora of terms not only in the context of IT but in other sectors too. In the present scenario digital India is reaching villages no doubt it is boosting digital villages, and no doubt it is boosting digital entrepreneurs which was highlighted while addressing the 92nd edition of 'Mann Ki Baat' by PM Narendra Modi that is spreading of internet facilities to villages with the help of digital India. It is one step solution to every problem of citizens.

Introduction: -

The Digital India program is an initiative by the government to accelerate the smooth coordination and linking of facilities and needs between the common public in digital format on 1st July 2015. Digital India removes the bridge hurdles of the physical line of work into paperless and ease of access to information knowledge accessibility through universally accessible digital resources and another mode of communication and technology in the context of making financial transactions electronic and cashless. It gives the citizen of India, one-click access to various facilities available.

The program's main tagline is 'POWER TO EMPOWER', which depicts providing digital universal literacy. Major area coverage in Digital India-

*Infrastructure as a utility to every citizen.

*Governance and services on demand.

*Digital empowerment of citizens.

There were basically **nine pillars** that were covered under Digital India Program

1. Board band highway-This basically includes 3 major sub-components they are-

- a) **Broadband for All – Rural**- The nodal department of this project is a department of telecommunications (DOT), it is to facilitate broadband network connectivity in rural areas.
- b) **Broadband for All – Urban**- The service delivery and virtual network operators would be facilitated in each and every building in urban.
- c) **National Information Infrastructure (NII)**-It would integrate the network with the cloud networking facilities so as to provide high-speed internet connectivity to various government departments up to the panchayat level. It would provide cloud infrastructure in the country such as State Wide area network (SWAN), National Knowledge Network (NKN), etc.

2. Universal access to mobile connectivity-The main motive of this pillar is to initiate mobile coverage in the country, especially in rural areas, according to the digital India website recently updated the total population of villages that doesn't persist mobile accessibility is around 55,619 of the rural population.

3. Public internet access program-The program mainly covers the Common service centers and Post office centers for multi-service centers to facilitate government initiatives across the