Shri Sarda Education Society's
(A Linguistic Minority Educational Institute)

Smt Radhabai Sarda Arts, Commerce & Science College
Anjangaon Surji, Dist - Amravati, Maharashtra

NAACAccredited 'A' with CGPA 3.21

Department of Botany

FIELD PROJECT/ SURVEY REPORT

B.Sc.III SEM-V
2023-2024

Head, Department of Botany
Dr Mangesh Dagawal

Department of Botany

FIELD PROJECT / SURVEY REPORT

Department of conducted field project and Survey related to Herbicides and Biofertilizers use by farmers, Nutrient deficiency and symptoms in Crops, Carbon sequestration, Foliar Spray etc. prescribed by S G B Amravati University Amravati for B.Sc. III (Plant Physiology & Ecology) students. Fifty one students participated in field project and survey.

Participated students in Filed project and Survey:

SN	TITLE OF PROJECT/ SURVEY	CLASS	STUDENT NO
1	**Field Survey on Nutrient deficiency and symptoms in Crops cultivated in Anjangaon Surji region**	B.Sc. III SEM-V	51
2	**Survey on use of herbicides & Pesticides by the farmers and its impact on biodiversity in Anjangaon region.**		
3	**Study on Carbon sequestration by plants in the college campus .**		
4	**Pharmacognostic studies of Medicinal plants *Piper longum* cultivated in anjangaon region .**		
5	**Pharmacognostic studies of Medicinal plants *Chlorophytum borivilianum* cultivated in anjangaon region**		
6	**Foliar Spray**		
7	**Carbon sequestration by plants in along the road side in Anjangaon**		
	Total of B.Sc. III SEM-V		**51**

SMT.R.S.COLLEGE Dist. Amravati ANJANGAON SURJI

Dr Mangesh Dagawal
Associate Professor & Head
Department of Botany
Smt Radhabai Sarda Arts, Commerce & Science College
Anjangaon Surji, Dist. Amravati (MS)

Principal

PRINCIPAL
Smt.Radhabai Sarda Arts,
Commerce & Science College
Anjangaon Surji

List of Students and Project

SMT RADHABAI SARDA ARTS, COMMERCE AND SCIENCE COLLEGE, ANJANGAON SURJI DIST AMRAVATI

DEPARTMENT OF BOTANY

INTERNAL ASSESSMENT 2023-2024

Project Assignment- Field Project - Winter- 2023

B. Sc-III SEM- V

SN	NAME OF STUDENT	Project Assignment/ Field Project / Field Survey - TOPIC –	SUBMITTED ON DATE& SIGNATURE
1	ARCHANA WANERE	Field Survey on Nutrient deficiency and symptoms in Crops cultivated in Anjangaon Surji region	2/11/23
2	GAYTRI DESHKAR		2/11/23
3	ASMITA WANERE		2/11/23
4	DHANSHRI GHOGRE		Ghogare 2/11/23
5	PRITI BODKHE		Bodkhe 2/11/23
6	PRANJALI HORE		Hore 2/11/23
7	KASHISH LAHANE		K.S. Lahane 2/11/23
8	KRUSHNAKANT KADU		2/11/23
9	DEEP PATIL		2/11/23
10	AADESH MISAR		2/11/23
11	OM PRAMOD KHODE	Survey on use of herbicides & Pesticides by the farmers and its impact on biodiversity in Anjangaon region.	31/10/23
12	SWARAJ RUPRAO WANKHADE		31/10/23
13	PRANAV SHARAD KHANDARE		31/10/23

Botany Projet- Field Project - Winter- 2023

14	SANKET SURENDRA BHELE		
15	TEJAS DILIP BHOPLE		31/10/23
16	PRATIK SHRIDHAR KALE		31/10/23
17	ROHIT RAMDAS JADHAV		31/10/23
18	PRATHAMESH SURENDRA NIMKAR		31/10/23
19	SANCHIT VINODRAO KUKADE		31/10/23
20	OM PRASHANTRAO UKHALKAR		31/10/23
21	NATIQUE KAMRAN ZAMEERUDDIN		31/10/23
22	PRAJAKTA BANSOD		31/10/23
23	NIKITA RAIBOLE	**Study on Carbon sequestration by plants in the college campus .**	30/10/23
24	SHITAL HIRE		30/10/23
25	PRIYA BADAN		30/10/23
26	MOHINI KEDAR		30-10-23
27	SEJAL KHALOKAR		30/10/23
28	YASHASVI MORE		30/10/23
29	NIKITA TAYDE		30/10/23
30	KANCHAN LADOLE		30/10/23

31	ACHAL DHULE		30/10/23
32	JAWERIYA FIRDOUS	**Pharmacognostic studies of Medicinal plants *Piper longum* cultivated in anjangaon region .**	30/10/23
33	AYESHA HUMERA		30/10/23
34	ABSAR KHAN		30/10/23
35	BHUMIKA BHAGAT		30/10/23
36	MOHD UZER		30/10/2023
37	ALQUAMA BAIG		30/10/23
38	MAHVISH ANAM	**Pharmacognostic studies of Medicinal plants *Chlorophytum borivilianum* cultivated in anjangaon region .**	30-10-23
39	SANIYA FIRDOUS		Saniya 30/10/23
40	JAVERIYA TABASSUM		30/10/23
41	FARHA PARVEEN		Farha 30-10-23
42	NITESH BHAKARE	**Study on Carbon sequestration by plants in the trees along the road site in Anjangaon (Buststand to College)**	
43	VAISHNAVI YEUL		
44	NILESH DHUMALE		
45	MOH MOHTSIN SHREEF		M. Mohtsin
46	ASMITA RANGIRE		A.M. Rangiee
47	AAKIB PATHAN		Aakib. A. Pathan

Foliar Spray

Botany Projet- Field Project - Winter- 2023

48	DIKSHA ICHE		Deha
49	ASTHA INGLE		
50	SHRUSHTI DESHMUKH		Deshmukh
51	AWAIS SK AZIZ		Awais-SK 30/10/23
52	SAYED NOOR AHMAD		30-10-23
53	KHUSHAL SHAHU		

Name of Teacher Incharge

Dr M J Dagwal
Shri K U Makode
Shri R L Kulkarni

SMT.RADHABAI SARDA ARTS COMMERCE AND SCIENCE COLLEGE ANJANGOAN SURJI

DEPARTMENT OF BOTANY

SESSION:-2023-24

BSC III YEAR [SEM V]

NUTRIENT DIFICIENCY AND THEIR SYMTOMPS

PROJECT

SUBMMITED TO:-
DR.MANGESH DAGWAL SIR

CONTENT

NUTRIENT DIFICIENCY AND THEIR SYMTOMPS

1 NUTRIENT DIFFICIENCE IN CORN

2 NUTRIENT DIFFICIENCE IN SOYABEAN

3 NUTRIENT DIFFICIENCE IN WHEAT

4 NUTRIENT DIFFICIENCE IN BRINJAL

5 NUTRIENT DIFFICIENCE IN MAIZE

6 NUTRIENT DIFFICIENCE IN COTTON

PLANT DEFICENCY

IN ANJANGOAN SURJI

INTRODUCTION

Nutrient deficiency symptoms occur as yellowing of leaves, interveinal yellowing of leaves, shortened internodes, or abnormal coloration such as red, purple, or bronze leaves. These symptoms appear on different plant parts as a result of nutrient mobility in the plant.

Element/statusVisual symptoms Nitrogen (N)

DeficiencyLight green leaf and plant color with the older leaves turning yellow, leaves that will eventually turn brown and die. Plant growth is slow, plants will be stunted, and will mature early.ExcessPlants will be dark green in color and new growth will be succulent; susceptible if subjected to disease and insect infestation; and subjected to drought stress, plants will easily lodge. Blossom abortion and lack of fruit set will occur.Ammonium toxicityPlants fertilized with ammonium-nitrogen (NH4- N) may exhibit ammonium-toxicity symptoms, with carbohydrate depletion and reduced plant growth. Lesions may occur on plant stems, there may be a downward cupping of the leaves, and a decay of the conductive tissue at the base of the stem with wilting of the plants under moisture stress. Blossom-end rot of fruit will occur and Mg deficiency symptoms may also occur.

Phosphorus (P)DeficiencyPlant

growth will be slow and stunted, and the older leaves will have a purple coloration, particularly on the underside.ExcessPhosphorus excess will not have a direct effect on the plant but may show visual deficiencies of Zn, Fe, and Mn. High P may also interfere with the normal Ca nutrition, with typical Ca deficiency symptoms occurring.

Potassium (K)Deficiency

On the older leaves, the edges will look burned, a symptom known as scorch. Plants will easily lodge and be sensitive to disease infestation. Fruit and seed production will be impaired and of poor quality.ExcessPlants will exhibit typical Mg, and possibly Ca deficiency symptoms due to a cation imbalance

Calcium (Ca)Deficiency

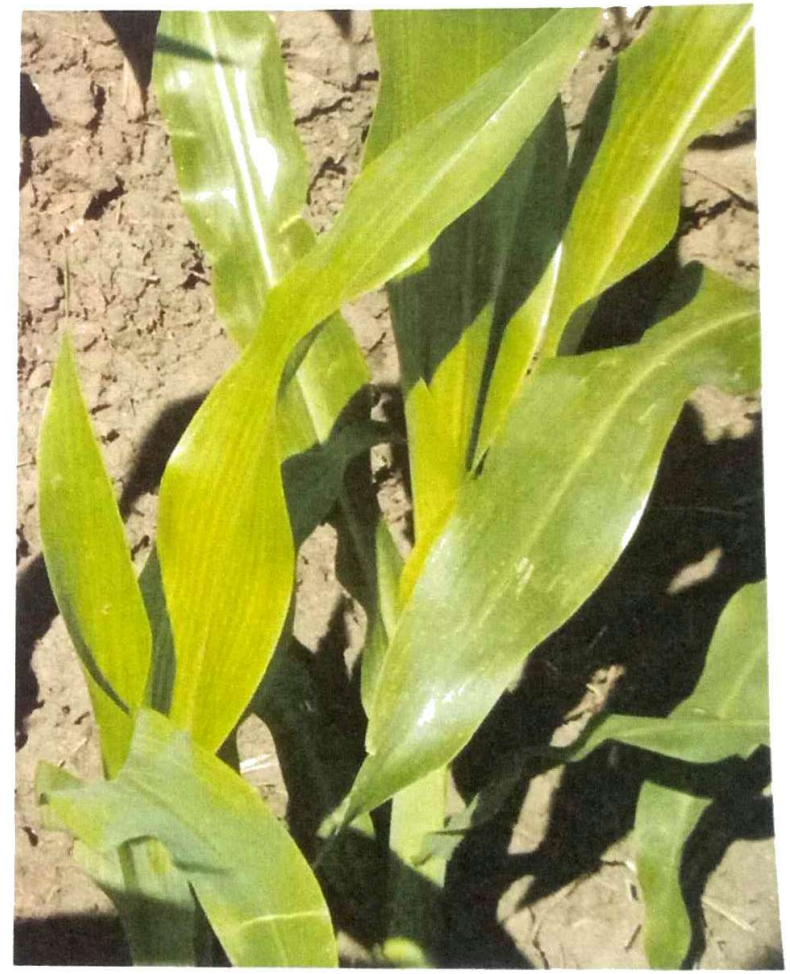
The growing tips of roots and leaves will turn brown and die. The edges of the leaves will look ragged as the edges of emerging leaves stick together. Fruit quality will be affected with the occurrence of blossom-end rot on fruits.ExcessPlants may exhibit typical Mg deficiency symptoms, and when in high excess, K deficiency may also occur.

Magnesium (Mg)Deficiency
Older leaves will be yellow in color with interveinal chlorosis (yellowing between the veins) symptoms. Plant growth will be slow and some plants may be easily infested by disease.ExcessResults in a cation imbalance showing signs of either a Ca or K
deficiency.Sulfur (S)Deficiency
A general overall light green color of the entire plant with the older leaves being light green to yellow in color as the deficiency intensifies.ExcessA premature senescence of leaves may
occur.Boron (B)Deficiency
Abnormal development of the growing points (meristematic tissue) with the apical growing points eventually becoming stunted and dying. Rowers and fruits will abort. For some grain and fruit crops, yield and quality is significantly reduced.ExcessLeaf tips and margins will turn brown and die.

Chlorine (Cl)Deficiency Younger leaves will be chlorotic and plants *will easily wilt. For wheat, a plant disease will infest the plant when Cl is deficient.*ExcessPremature yellowing of the lower leaves with *burning of the leaf margins and tips. Leaf abscission will occur and plants will easily wilt.*

Molybdenum (Mo) deficiency (no picture) is rarely, if ever, found in corn. It has not been identified in Iowa. If it occurs, however, older leaves become necrotic at the tip, along the margins, and between the veins. This condition is favored by very low soil pH and strongly weathered soils, conditions not normally found in the Midwest.

Sulfur (S) deficiency shows on small corn plants as a general yellowing of the foliage, similar to nitrogen deficiency. Yellowing of the younger upper leaves is more pronounced with sulfur deficiency than with nitrogen deficiency because sulfur is not easily translocated in the plant.



Nutrient deficiency in soybean

Potassium (K) deficiency yellows soybean leaves, beginning at the margins and moving inward over the leaf. Deficiency symptoms occur on older lower leaves first. All but the newest emerged leaves may show potassium deficiency symptoms in severe cases.

Nutrient deficiency in winter wheat

Nitrogen (N) deficiency appears as a general pale yellowish-green plant with slow growth and reduced tiller development. If the deficiency persists, plants remain pale green, have reduced growth, and the stand appears thin.

NUTRIENT DIFFICIENCE IN MAIZE

light manganese undersupply produces hardly any visible symptoms. Severely affected plants show pale foliage with flaccid growth form. The leaves become chlorotic with white interveinal streak leasions.

The most common symptoms of zinc deficiency in maize include the development of whitish or yellowish stripes parallel to the midrib on the young leaves and stunting appearances with shortened internodes. Necrotic spots and reddish color may develop on leaves at the advanced stage of zinc deficiency

SMT. RADHABAI SARDA ARTS, COMMERCE AND SCIENCE COLLEGE, ANJANGAON SURJI

FIELD PROJECT

WINTER- 2023

B.Sc.- III (Sem- V)

TOPIC – SURVEY ON USE OF PESTICIDES BY THE FARMERS AND ITS IMPACT ON BIODIVERSITY IN ANJANGAON REGION.

GUIDED BY- DR. MANGESH DAGWAL

SUBMITTED BY-

SR. NO.	NAME OF STUDENT	SIGNATURE
1	OM PRAMOD KHODE	
2	SWARAJ RUPRAO WANKHADE	
3	PRANAV SHARAD KHANDARE	
4	SANKET SURENDRA BHELE	
5	TEJAS DILIP BHOPLE	
6	PRATIK SHRIDHAR KALE	
7	ROHIT RAMDAS JADHAV	
8	PRATHAMESH SURENDRA NIMKAR	
9	SANCHIT VINODRAO KUKADE	
10	OM PRASHANTRAO UKHALKAR	
11	NATIQUE KAMRAM ZAMEERUDDIN	
12	NITESH RAMESHWAR BHAKARE	

30/10/2023

Introduction-

Pesticides are a major factor affecting biological diversity, along with habitat loss and climate change. They can have toxic effects in the short term in directly exposed organisms, or long-term effects by causing changes in habitat and the food chain. In an ecosystem, interdependent populations of various species deliver 'services' such as the supply of food and soil resources, or the retention and cycling of nutrients, water and energy. Although it seems that the average species loss can affect the functioning of a wide variety of organisms and ecosystems, the magnitude of effect depends on which particular species is becoming extinct. The use of pesticides (particularly herbicides) and synthetic fertilizers has increased dramatically over the past 60 years.

In industrialized countries, farming practices have fundamentally changed. In the UK and many other places, mixed agriculture has been lost and farms have become increasingly specialized. Arable farming (field crops) and pastoral grassland are now largely separated as traditional crop rotation has been abandoned. Field sizes have risen and field margins have shrunk. Harvesting has become more efficient and hedgerows have been lost. There has been a marked population decline of many species living on farmland. Heavy pesticide input has been a key feature of agricultural intensification. This is closely linked to changes in farming practices and habitat destruction or loss.

Impact of pesticides on wildlife population and species diversity-

Many pesticides are toxic to beneficial insects, birds, mammals, amphibians, or fish. Wildlife poisoning depends a pesticide's toxicity and other properties (eg water-soluble pesticides may pollute surface waters), the quantity applied, frequency, timing and method of spraying (eg fine spray is prone to drift), weather, vegetation structure, and soil type. Insecticides, rodenticides, fungicides (for seed treatment) and the more toxic herbicides threaten exposed wildlife. Over the past 40 years, the use of highly toxic carbamate and organophosphate has strongly increased. With habitat change, pesticide poisoning can cause major population decline which may threaten rare species.

Pesticides accumulating in the food chain, particularly those which cause endocrine disruption, pose a long-term risk to mammals, birds, amphibians, and fish. Broad-spectrum insecticides and herbicides reduce food sources for birds and mammals. This can produce a substantial decline in rare species populations. By changing vegetation structure, herbicides can render habitats unsuitable for certain species. This threatens insects, farmland birds, and mammals.

Bird Species decline due to pesticides-

In India the number of farmland birds is now just half that of 1980, even among formerly abundant species. While average populations of all common and forest birds declined by about 10%. Populations of farmland birds have fallen by 48%. Forest birds have declined less than have specialist birds living on farmland. A recent survey found that in India one in three bird species is endangered, threatened, or of conservation concern. Forty percent of grassland and arid-land birds are affected by population decline. Populations of raptors and other birds recovered after DDT and other toxic pesticides were banned. Populations of grassland species declined more than species living in shrubland.

Herbicides and pesticides affect birds indirectly by reducing food abundance. Lower availability of key invertebrates and seed food for farmland birds in India was likely due to insecticides and herbicides, intensification and specialization of farmland, loss of field margins, and ploughing. Insecticides generally had a negative effect on yellowhammer when spraying occurred during the breeding season. Spraying at this time may cause more damage than repeated use throughout the year. More frequent spraying of insecticides, herbicides, or fungicides was linked to a considerably smaller abundance of food invertebrates. This resulted in lower breeding success of corn buntings and may have contributed to their decline. Herbicides were a major cause of the decline of sparrows populations by removing weeds which are important insect hosts.

Broad-spectrum herbicides threaten rare and endangered bird species by reducing the abundance of weeds (eaten by birds) and insects hosted by weeds. Insecticides reduce the number of insects which are important food sources for birds.

Risk to mammals of hazardous pesticides

Pesticides and other chemicals have caused population declines in wild mammals. Mostly bats and rodents (and 38% of species) were affected. Certain pesticides can gradually accumulate in the food chain. This is of concern to vertebrates, particularly species in higher orders and top predators such as mammals or raptors. Anticoagulant rodenticides are highly toxic and some can bioaccumulate. Non-target predatory mammals (eg dogs and foxes) and raptors frequently suffer 'secondary poisoning' by eating rats or mice which are poisoned by rodenticides. However, it is not well known how frequently rodenticides cause secondary mammal poisoning, and what the impact on their populations might be. Anticoagulant rodenticides often indirectly poison predatory mammals and raptors. Herbicides can cause changes in vegetation and habitat which threaten mammals, while insecticides may reduce the availability of important food insects.

Impact of pesticides on butterfly, bees and other insects-

Broad-spectrum insecticides (eg carbamates, organophosphates and pyrethroids) can cause population declines of beneficial insects such as bees, spiders, or beetles. Many of these species play an important role in the food web or as natural enemies of pest insects. Numbers of bugs, spiders and beetles were considerably higher in untreated fields. On organic farms, numbers and species richness of butterflies was greater than on conventional farms. The number of carabid beetles and spiders was usually higher on organic farms. Conventional management practice appeared to affect natural enemies far more than other insects or target pests. Moths were considerably more abundant on organic farms and species richness was higher. In arable fields, insecticide use was an important factor influencing communities of epigenic spiders. On sites with an increased pesticide input, communities of bugs, wild bees, and spiders were more uniform, indicating less exchange between communities in areas with intensive agriculture. Bees perform essential pollination. Honey bees are under pressure from parasitic mites, viral diseases, habitat loss and pesticides. Intensified agricultural practices, habitat loss, and agrochemicals are considered to be among the chief environmental threats to honey and wild bees. Agricultural policy must reduce these pressures to ensure adequate pollinator populations

Impact of pesticides on soil fertility-

A fertile soil provides the nutrients needed to promote growth of plants, is a habitat of an active and diverse community of organisms, and exhibits a structure which is characteristic of the location, and which enables a continuous decomposition of organic residues. In South Africa, the feeding activity of soil organisms was higher in soil from organic vineyards than from conventionally treated sites. The number of earthworms was 1.3-3.2 times higher in organic compared to conventional plots, and the length of plant roots colonized by mycorrhizae was 40% higher in organic than in conventional systems. Triclopyr, a herbicide, caused a major reduction in the growth of mycorrhizae at levated soil levels. The sulfonylurea herbicides metsulfuron and (to a lesser extent) chlorsulfuron caused a reduction in the growth of Pseudomonas soil bacteria. In laboratory tests, a combination of two sulfonylurea herbicides, bensulfuron-methyl (B) and metsulfuron-methyl, caused a considerable reduction in soil microbial biomass over the first 15 days. In bacterial communities in soil, bromoxynile (a nitrile herbicide) caused major changes in species composition and diversity. Bromoxynile inhibited the growth of bacteria capable of degrading chemicals in soil. Also captan (a fungicide) and the herbicide glyphosate caused a shift among species in bacterial communities in soil. Certain organophosphate insecticides (eg dimethoate) can decrease the activity and biomass of soil microorganisms, while others (such as fosthiazate) may actually result in an increase in microbial biomass (Eisenhauer et al 2009). How pesticides affect long-term soil fertility is not well understood as this depends on many factors. Pesticides affect earthworms, symbiotic mycorrhizae, and other organisms in soil. Composition and activity of bacterial communities can be changed by pesticides.

Farmers awareness on pesticides poisoning-

It was reported that 75.43% of the farmers knew the ill effects of pesticides completely and 24.57% were not aware. During the use of pesticides farmers reported problems such as eye irritation (32.75%), headache (25.15%), dizziness (10.53%), breathing difficulty (2.34%), skin rashes (2.34%) and 7.02% claimed to have experienced all of these symptoms at least once during their exposure to pesticides. When such symptoms are seen 69.60% responded that they would consult a doctor, 23.40% ignored and 3.50% used home remedies. 76.02% of the respondents said that they experienced long term effects with the use of pesticides.

Survey Analysis-

From the survey of 24 farmers it is found that in Anjangaon surji region usually the pesticides used in farm are Acephate, Lambda-cyhalothrin, Quizalofop Ethyl, Chloropyriphos and Glyphosate.

The main crops cultivated in Anjangaon surji region are cotton, soyabean, tur, banana and orange. The amount spent on herbicides and pesticides are from 10,000 Rs. to 50,000 Rs. The use of herbicides and pesticides is mostly as per requirement. The cultivation area in survey was found to be 2-10 Acre. The expected annual income on crops is between 1 lakh to 10 lakh.

On the basis on survey table is as follows :

Sr. No.	Name of Farmer	Cultivation area(in acre)	Amount spent on pesticides(Rs.)	Annual income on crops(Rs.)
1	Vishal Umak	4	12,000	1,75,000
2	Gajanan Warankar	3	17,000	2,00,000
3	Balasaheb Solanke	4	15,000	1,75,000
4	Bhavesh Dabare	3	17,000	1,45,000
5	Mahadevrao Makode	7.5	25,000	5,00,000
6	Vinayak Manekar	11	60,000	10,00,000
7	Gajendra Gabare	4	3,500	6,50,000
8	Pramod Rase	2	4,000	1,60,000
9	Vikas Sarode	5	1,50,000	8,00,000
10	Ambadas Tade	4	20,000	1,50,000
11	Zameeroddin Shaheed	6	15,000	1,00,000
12	Nazimoddin Shaheed	7	5,000	50,000
13	Dilip Bhople	5	15,000	2,00,000
14	Sudhir Khalokar	7	20,000	2,50,000

15	Sunil Lahane	5	20,000	2,75,000
16	Sharad Kasat	5	25,000	4,00,000
17	Roshan Sherkar	4	15,000	1,75,000
18	Eknath Kharole	4	17,000	2,00,000
19	Shridhar Gavande	6	70,000	4,15,000
20	Arun Pundkar	4	20,000	1,70,000
21	Nishant Khandare	6	25,000	5,00,000
22	Kumar Barabde	4	18,000	4,00,000
23	Arun More	2	12,000	1,50,000
24	Balu Jadhav	4	20,000	2,50,000

Result-

Exposure of farmers to pesticides is immense especially in rural areas. So understanding farmer's level of knowledge, their attitudes and levels of awareness of pesticide safety is essential. This helps in providing sound educational and policy strategies for avoiding the dangers of pesticides and for reducing potential pollution to agricultural systems. Hence the present study aimed to understand the knowledge, attitude and practices of farmers of Anjangaon surji region, Maharashtra, India. Oral communication with the farmers helped us to obtain information about the use of pesticides and the safety measures they follow while handling those pesticides.

SMT RADHABAI SARDA ARTS, COMMERCE & SCIENCE COLLEGE, ANJANGAON SURJI
DEPARTMENT OF BOTANY

Project on – Survey on use of herbicides and pesticides by the farmers and its impact on biodiversity in Anjangaon region.

Sheet No. 1 **Date:** 9/10/2023

SURVEY SHEET

Name of Farmer: Vishal R. Umak

Address: Kumbhargaon

Age: 38

Land area in Acre : 4 Acre

Name of crops cultivated : Tur and Soyabean

Name of weeds grown in crop cultivated (Local Name) - कुंजीर, केना, लाल दांडी

Name of Herbicides &pesticides used : Glyphosphate, Profenofos, Flubendiamide, Emamectin Benzoate

Uselis of Herbicides Herbicides &pesticides : Monthly Quarterly As per requirement ✓

Amount spent on Herbicides &pesticides : 12,000 ₹

Cultivation area: 4 Acre

Annual income on crops (Expected) :- 1,75,000 ₹

Name & Signature of Student
Om Khode.

V. R. Umak
Signature of informants

Name of Project Guide : Dr. Mangesh Dagwal

SMT RADHABAI SARDA ARTS, COMMERCE & SCIENCE COLLEGE, ANJANGAON SURJI
DEPARTMENT OF BOTANY

Project on – Survey on use of herbicides and pesticides by the farmers and its impact on biodiversity in Anjangaon region.

Sheet No. 2 **Date:** 9/10/2023

SURVEY SHEET

Name of Farmer: Gajanan T. Warankar

Address: Kumbhargaon

Age: 59

Land area in Acre : 3 Acre

Name of crops cultivated : Cotton

Name of weeds grown in crop cultivated (Local Name) - केना, तरोटा, गाजर गवत

Name of Herbicides &pesticides used : Quizalofop Ethyl, Chloropyriphos, Acephate, Lambda-cyhalothrin

Use]s of Herbicides Herbicides &pesticides : **Monthly** **Quarterly** **As per** ✓ **requirement**

Amount spent on Herbicides &pesticides : 17,000 ₹

Cultivation area: 3 Acre

Annual income on crops (Expected) :- 2,00,000 ₹

Name & Signature of Student
Om Khode.

ग. तु. वरणकार
Signature of informants

Name of Project Guide : Dr. Mangesh Dagwal

SMT RADHABAI SARDA ARTS, COMMERCE & SCIENCE COLLEGE, ANJANGAON SURJI
DEPARTMENT OF BOTANY

Project on – Survey on use of herbicides and pesticides by the farmers and its impact on biodiversity in Anjangaon region.

Sheet No. 3

Date: 18-10-2023

SURVEY SHEET

Name of Farmer: Balgsaheb Solanke

Address: At Pathrot

Age: 48

Land area in Acre : 4 Acre

Name of crops cultivated : Cotton, Tur

Name of weeds grown in crop cultivated (Local Name) - केना, शेवरी

Name of Herbicides &pesticides used : Emamectin Benzoate, Profenofos

Use]s of Herbicides Herbicides &pesticides : Monthly Quarterly As per requirement

Amount spent on Herbicides &pesticides : 15,000 ₹

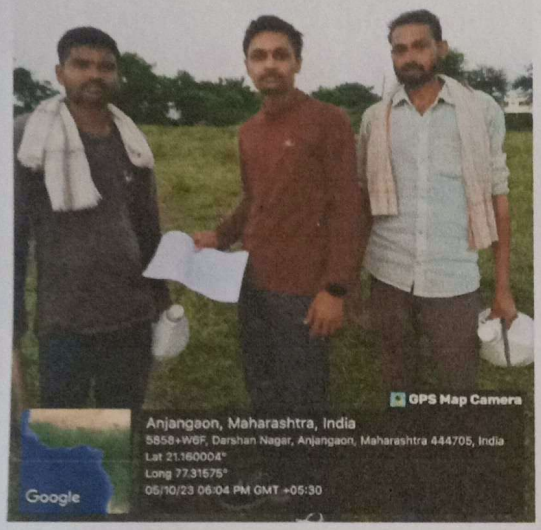
Cultivation area: 4 Acre

Annual income on crops (Expected) :- 1,75,000 ₹

Name & Signature of Student
Om- P Ukhalkar

Signature of Informants

Name of Project Guide : Dr. mangesh Dagwal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5858+W6F, Darshan Nagar, Anjangaon, Maharashtra 444705, India
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Google


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GPS Map Camera
Kumbhargaon Bk., Maharashtra, India
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Long 77.29493°
05/10/23 08:09 AM GMT +05:30
Google

Conclusion-

The findings of the study indicate that knowledge level is adequate among farmers but this did not reflect in their practice. There is a need for continuous pesticide safety education along with training to the farmers regarding use of personal protective devices, personal hygiene and sanitation practices during and after application of pesticides. In addition, promotion of alternative pest control strategies such as application of bio pesticides can be introduced. This would reduce the dependency of chemical pesticides as well as their adverse impact on human health and environment.

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3

Smt.Radhabai Sarda Art,Commerce & Science College

Anjangaon surji. Dist.Amravati

Department of Botany

Academic session 2023-2024

Class:B.sc 3rd (Sem V)

Project name :

Study on Carbon sequestration by plant in college Campus

Guided by:-Dr.Mangesh Dagawal

Submitted by:

Sr. No	Name of Students	Siganture
1.	Priya Badan	
2.	Nikita Raibole	
3.	Mohini Kedar	
4.	Shital Hire	
5.	Kanchan Ladole	
6.	Achal Dhule	
7.	Sejal Khalokar	
8.	Yashasvi More	
9.	Nikita Tayde	
10.	Prajakta Bansod	

30/10/2023

Content:

- Introduction
- Study Area
- Methodology
- Observation
- Survey Sheets&table
- Conclusion
- Reference

Introduction

Carbon dioxide is the most commonly produced greenhouse gas. Carbon sequestration is the process of capturing and storing atmospheric carbon dioxide. It is one method of reducing the amount of carbon dioxide in the atmosphere with the goal of reducing global climate change. The USGS is conducting assessments on two major types of carbon sequestration: geologic and biologic

carbon sequestration, the long-term storage of carbon in plants, soils, geologic formations, and the ocean. Carbon sequestration occurs both naturally and as a result of anthropogenic activities and typically refers to the storage of carbon that has the immediate potential to become carbon dioxide gas. In response to growing concerns about climate change resulting from increased carbon dioxide concentrations in the atmosphere, considerable interest has been drawn to the possibility of increasing the rate of carbon sequestration through changes in land use and forestry and also through geoengineering techniques such as carbon capture and storage

Study Area

:- Our college campus is fulfil of various types of trees and medicinalplantand botanical garden is also very useful forstudents tostudy and gain knoewlege of rare species of plants.there are 125 trees are present in our college campus .

We studied on that plants and collect information about trees. And also we practically do this project to collection of the lInformation about height,width, carbon percentage,green weight,dry weight,circumference,and diameter of trees.

Carbon contain are as follws:-

Azadiracta indica stored carbon is 0.004....

. Tectona grandis ..0.00125..

Saraca asoca ..0.0025Etc.

Methodology

Visit conducted in Smt. Radhabai sarda College campus to down the circumference of the tree present in the campus. 45 types of tree were observed for the survey. After that the measurement of CO2 was taken out according to the methodology

As a rough start, the key figure of carbon content is the size of the trees. Bigger trees are usually older and have during their life and should therefore contain more carbon.

The GIRTH(circumference) of a tree is a good basic measure of size or how big the tree is. GIRTH is measured at chest height 1.3m above the ground

Easy carbon content calculator method using just GIRTH

Observation

In the college campus of smt.Radhabai sarda College, the survey was taken need the carbon sequestration rates present in tree are available in the survey sheets

Conclusion

The survey of college campus we found many typesof trees Like saraca asoka(Ashok)Azadirachta indiaca(neem)dalbergia sisso(Indian rose wood), acacia nicotia (babul), Cucalyptus globulus (Nilgiri),Peltoforum-pterocarpum(Gulmohar)tectona - garndist(Sagwan).Measurment of carbon content of found in trees approximately 50% of its biomass

Refercence

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SMT RADHABAI SARDA ARTS, COMMERCE & SCIENCE COLLEGE, ANJANGAON SURJI DIST AMRAVATI

DEPARTMENT OF BOTANY

PROJECT TITLE: Study on Carbon sequestration by plants in the college campus

Name of Student: Ku. Nikita Nandu Raibole

Data sheet **Date :**

Area: college campus

SN	Name of Tree	GPS Location	Circumference				Dry weight	Stored Carbon	CO2 absorbed by tree Carbon store	
			1	2	3	Average				
1)	Tectona grandis	lat: 27.163633° long: 77713323°	39	37	35	37	0.0025	0.00125	0.0045875	
2)	Azadirachta indica	lat: 21.169792° long: 77.16 9293°	51	23	21	31.66	0.0008	0.0004	0.001468	
3)	Kalanchoe pinnata	lat: 21.155568° log: 77.81322°	40	38	38	38.66	0.0015	0.00075	0.0027525	
4)	Saraca Asoca	lat: 21.155238° long: 77.81566°	20	22	23	21.66	0.005	0.0025	0.009175	
5)	Senna siamea	lat 21.169731° long: 77.313224°	36	38	39	37.66	0.0009	0.000045	0.0016515	
6)	Bauhinia racemosa	lat: 21.179732° long: 78.313224°	10	7	6	7.66	0.01	0.005	0.01835	
7)	Annona squamosa		8	7	9	8	0.02	0.01	0.0367	
8)	phyllanthus niruri	lat: 21.169593° long: 77.30798°	13	25	29	22.33	0.015	0.0075	0.027525	
9)	Terminalia catappa	lat: 21.179538° long: 76.313325°	57	55	56	56	0.001	0.0005	0.001835	

Project Guide: Dr Mangesh Dagwal

SMT RADHABAI SARDA ARTS, COMMERCE & SCIENCE COLLEGE, ANJANGAON SURJI DIST AMRAVATI

DEPARTMENT OF BOTANY

PROJECT TITLE: Study on Carbon sequestration by plants in the college campus

Name of Student: Shital Gulabrao Hire

Data sheet **Date :** 10/23

Area: College campus

SN	Name of Tree	GPS Location	Circumference				Dry weight	Stored Carbon	CO2 absorbed by tree Carbon store	
			1	2	3	Average				
1)	Aegle marmelos	lat 21.155195° long 77.314108°	40	37	38	89.66	0.0003	0.00015	0.0005505	
2)	Cascabela thevetia	lat 21.155191° long 77.314106°	25	27	25	60.33	0.00050	0.00025	0.0009175	
3)	Justicia adhatoda	lat 21.155418° long 77.313972°	45	45	43	44.33	0.0025	0.00125	0.0045875	
4)	Terminalia catappa	lat 21.155191° long 77.314106°	58	57	56	133.6	0.0008	0.004	0.01468	
5)	Phyllanthus Niruri	lat 21.155421° long 77.313982°	13	25	29	47.66	0.010	0.005	0.01835	
6)	Calotropis gigantea	Lat 21.155189° Long 77.314119°	5	4	5	4.6	0.063	0.0315	0.115605	
7)	Bambusa vulgaris	lat 21.155421° long 77.313982°	5	4.5	3	10.5	0.058	0.029	0.10643	
8)	Thuja occidentalis	lat 21.155418° long 77.313902°	13	30	29	52.66	0.0049	0.0024	0.008808	
9)	ocimum Sanctum	lat 21.155195° long 77.314107°	2	1.5	1	3.83	0.68	0.34	1.2478	

Project Guide: Dr Mangesh Dagwal

SMT RADHABAI SARDA ARTS, COMMERCE & SCIENCE COLLEGE, ANJANGAON SURJI DIST AMRAVATI

DEPARTMENT OF BOTANY

PROJECT TITLE: Study on Carbon sequestration by plants in the college campus

Name of Student: Kanchan G. Ladole

Data sheet **Date :**

Area: college campus

SN	Name of Tree	GPS Location	Circumference				Dry weight	Stored Carbon	CO2 absorbed by tree Carbon store	
			1	2	3	Average				
1)	Eucalyptus globulus	Lat 21.155069° Long 77.314386°	49	50	53	44.33	397.91	198.95	730.1465	
2)	Eucalyptus globulus	Lat 21.155244° Long 77.313658°	43	47	52	47.66	851.94	425.97	1,563.3099	
3)	Eucalyptus globulus	lat 21.155568° long 77.31322°	56	58	56	55.00	371.63	185.81	681.9227	
4)	Palmae	Lat 21.155132° Long 77.314003°	38	38	28	34.66	136.98	68.49	251.3583	
5)	palmae	lat 21.155712° long 77.313704°	21	20	29	23.33	63.90	31.95	117.2565	
6)	Sennasiamea-1	lat 21.1696270 long 77.315946°	46	48	81	58.71	106.00	194.51	713.8517	
7)	Aeglenamentous	lat 21.155712° long 77.314220°	43	48	43	44.42	106.00	194.51	713.8517	
8)	Azdiroata Indica	lat 21.155245° long 77.314222°	42	44	46	44.33	373.55	186.77	685.4459	
9)	pongnia pinnata	lat 21.155568° long 77.31322°	22	23	30	25.00	50.4	25.21	92.5207	

Project Guide. Dr Mangesh Dagwal

Sarda Education society (Trust)

SMT Radhabai Sarda Arts,Commerce And Science CollegeAnjangao Surji -444705,Dist-Amravati (Maharashtra)

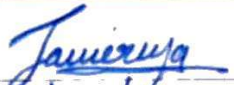
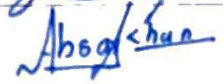
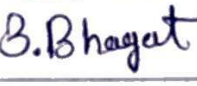
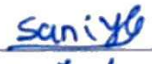
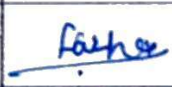
Class: BSC-lll, Sem-V

Academic session: 2023-24

Project Topic: Review On Pharmacognostic Studies of Medicinal Plants Piper Longum Cultivated in Anjangaon Region.

Guided By: DR. MANGESH DAGWAL

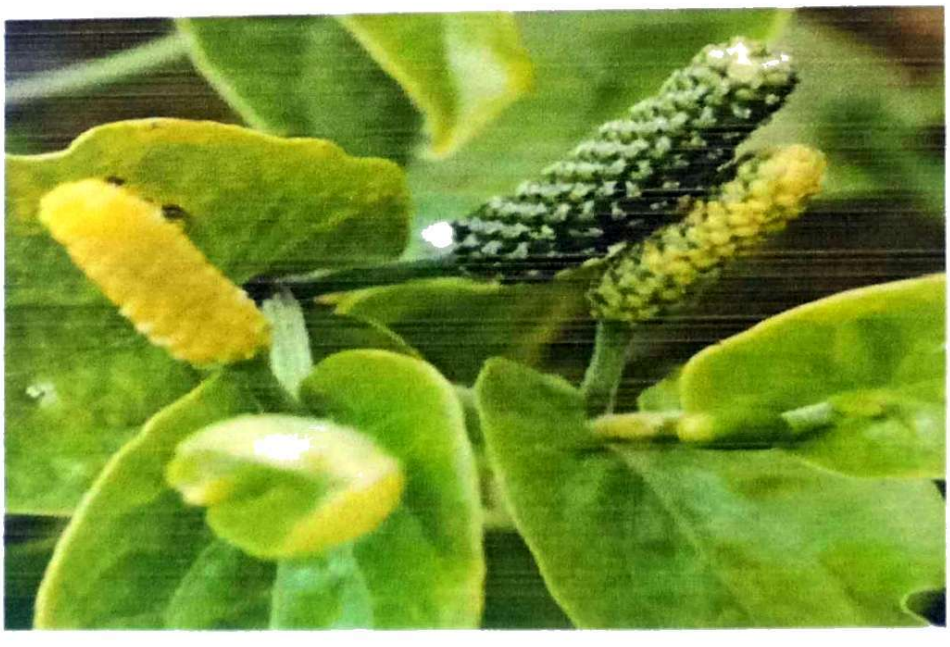
Submitted By:

Sr, No.	NAME OF STUDENT	SIGNATURE
1	Jaweriya Firdous	
2	Absar Khan	
3	Ayesha Humera	
4	Bhumika Bhagat	
5	Mehwish Anam	
6	Saniya Firdous	
7	Javeriya Tabbassum	
8	Farha Parveen	
9	Mohd Uzair	
10	Alquama Baig	
11	Sheikh Awais	
12	Sayed Noor Ahmad	

30/01/2023

INTRODUCTION:

Medicinal plants are known as the 'backbone of the traditional medicinal system. More than 3.3 billion people in developing countries rely on medicinal plants to treat various diseases. One such plant is Piper longum which is also known as Javanese, long pepper, pippalimool (the root of Piper longum Linn.), Indian or Indonesian long pepper. Pippalimoolam is known as the root of this plant. P. longum was first written by Hippocrates who define this plant as a medicine rather than a spice. The most utilized parts of this plant are mainly fruits and roots. Long pepper was considered one of the major Indian exporters for nearly 2400 years. Theophrastus categorized pepper in two divisions i.e. round one and another one which is long. This plant is mainly utilized as a spice and as a drug in Europe during the medieval period and in the 19th century. It is the source of the drugs Pippali and Pippalimulam. The fruit of P. longum has been used as a flavor since ancient times and is used as a preservative in pickles, food items, medicine and traditional drinks.!! It is an aromatic climber and is widely distributed in the tropical and subtropical regions of the world. It is mainly used for cooking purposes as a spice. Medicinally, the plant is reported as a good remedy to cure menstrual pain, gonorrhea, sleeping problems, tuberculosis, respiratory tract infections, arthritic conditions and chronic gut-related pain.



Piper Longum Plant

Piper Longum Dry Fruit.

In Ayurveda, Unani, Siddha and the Chinese medicinal system, the roots and fruits of P. longum are used to treat fever, asthma, hemorrhoid infection, bronchial stress, abdominal pain, inflammation, jaundice diarrhea and antidote to snake bite. The main active constituent present in the P. longum plant is piperine which is reported to have CNS depressant, analgesic, antipyretic, antioxidant, 51 inflammatory,161 anti-and hepatoprotective properties!?! In Ayurveda, it comes under panchakola, Shudhashana and is considered a great remedy for dipaniya (stomachic), pachaniya (digestive). From various clinical studies, it was reported that pippali shows significant effects against bronchial asthma in children.

CHEMICAL CONSTITUENTS:

The fruit of P.longum contains a large number of alkaloids in which the major is piperine. The piperine content is 3-5% (on dry weight basis) in P.longum. The other alkaloids and gvamides are methylpiperine, iperonaline, piperettine, asarimine, pellitorine, piperundecalidine, piperlongumine, piperlonguminine, refractomide, pregumidiene, brachystamide, brachystamide-A, brachystine, pipercide, piperderidine, longamide and tetrahydropiperine, tetrahydropiperlongumine, dehydropipernonaline, piperidine and tri-methoxycinnamoyl-piperidine. Some lignans like sesamin, pulvuatilol, forgesin and others have been isolated from the fruit of P.longum. The fruit of P.longum contains some esters like tridecyl-dihydro-p-coumarate, eicosanyl-(E)-p-coumarate. and Z-12-octandecenoic glycerol-monoester? The essential oil of the fruit P. longum is a complex mixture, the three major components of Myophylenendemacane (ot abou 1.50 about 17.8% and bisaboline (11%).Others include thujine, terpinoline, 19 zingiberine, dihydrocarvel! Bymene, p-methoxyacetophenone, and The fruit of P.nigrum also contains a large number of alkaloids like P. longumin which the major alkaloid is Piperine (3.15%-4.82%) and another is piperitone. Piperine is the Trans stereoisomer of 1-Piperoyl piperidine. This alkaloid is responsible for the pungency of black pepper. The other chemical constituents are betapinene, limonene. Furthermore terpinene, alpha-pinene, myrcene, delta3-carene and monoterpene derivatives (borneol, carvone, carvacrol, 1,8- cineol, linalool). Black pepper contains a volatile oil (including beta-bisabolene, camphene, beta-caryophyllene, and many other terpenes and sesquiterpenes), up to 9% alkaloids (especially piperine, largely responsible for the herb's acrid taste), about 11 % proteins, and small amounts of Minerals.' Black pepper is an excellent source of Manganese, a very good source of iron and vitamin K and a good source of dietary fiber." Through GC-MS, different components isolated from the oil of hot petroleum ether extract of P.nigrum (Fruit) are methyl benzene,& elemene, a copane, caryophyllene, a caryophyllene, B-bisabolene and 8 cadinene.The dried cubeb fruits mainly contain the alkaloids, lignans, and essential oil.

The major alkaloid is piperine and essential oil consisting monoterpenes (sabinene 50%, a-thujene, and carene)and sesquiterpenes (caryophyllene, copaene, a- and ß-cubebene, 8-cadinene, germacrene), the oxides 1,4- and 1,8- cineole and the alcohol cubebol. The root of Chavya (Piper retrofractum) contains piperine 6.55-0.18%, pippalotin (0.13-0.20%), piperceaguminin, sterol, and glycoside.

BOTANICAL DESCRIPTION OF PIPER LONGUM:

Piper longum plant is a dioecious slender, aromatic climber with perennial woody roots occurring in the hotter parts of India. Leaves are numerous wide ovate, cordate. The inflorescence is a cylindrical bearing pedunculate spike, male flowers are larger and slender as compared to female flowers, female flowers are up to 2.5 cm long and 4-5 mm wide. Fruits are long, shiny blackish green corn or spike like bodies. Male spikes are greenish- yellow in colour, fleshy, cylindrical, with minute flowers. Female spikes are erect and yellow, mature female spikes are known as long pepper and are shorter and thicker as compared to male spikes. Fruit spikes when ripe give aromatic odour and pungent taste.

PHYTOCHEMISTRY:

The fruits contain 1% volatile oil, resin, alkaloids piperine and piperlonguminine, a waxy alkaloid N-isobutyldeca-trans-2-trans-4-dienamide and a terpenoid substance. The pungency of the fruits is mainly due to the piperidine alkaloid piperine. The fruits also contain calcium, 1230; phosphorous, 190; and iron, 62.1mg/100g. Roots contain piperine, piperlongumine or piplartine and dihydrostigmasterol

MEDICINAL USES:

The fruits are used as spice and also in pickles. They have a pungent taste and cause salivation and numbness of the mouth (Neelam & Krishnaswamy, 2000). Since Long pepper is more pungent than Black pepper, it must be used with care, unless fiery food is demanded. Since terpene components are missing in its aroma, Long pepper cannot be substituted by Black pepper. Its hot and sweet taste goes well with spicy cheese specialities or wine sauces. In traditional medicines, mature spikes of female plants, thick stems, roots and leaves are extensively used in the treatment of bronchial diseases, dyspepsia, worms, amoebiasis and aphrodisiac agent.

Pippali is an important drug capable of improving intellect and memory power and also to regain health by dispelling diseases. It is reportedly acrid, hot, light, digestive, appetizer and tonic. It cures cough, dyspnoea, ascites, leprosy, diabetes, piles, colic indigestion, anaemia, thirst and dispels cardiac and spleen disorders, chronic fever and loss of appetite. It rehabilitates vitiated vata and kapha. Dried ripe fruits and roots are the officinal parts (Viswanathan, 1995). It is also used as an antidote to snake-bite and scorpion-sting (Sumy et al, 2000). It is carminative, sedative,emollient. Long pepper causes high pitta but no information about the safety of this herb is available. However, it is not advisable to take P. longum, except under the supervision of a qualified professional.The fruits and roots of Long pepper are used as snuff in coma and drowsiness, as sedative in insomnia and epilepsy, as cholagogue in obstruction of bile duct and gall-bladder,as emmenagogue, abortifacient and as anthelmintic (Neelam & Krishnaswamy, 2000). Clinical studies have revealed that Pippali is very effective in the treatment of bronchial asthma in children (Dahanukar et al, 1984; Anshuman et al, 1984). The important formulations using the drug are: Abhayaristam, Draksaristam, Chyavanaprasam,Pippalyasavam, etc. (Sivarajan & Balachandran, 1994). The drug is used in Ayurvedic treatment for abdominal tumours and distention, to improve the digestive fire, kapha disorders, flatulence, gout, laryngitis, paralysis, rheumatic pain, sciatica, worms, and for the immune system. It is used in manufacturing cold relief balm, pain balm, joint care balm and in heart and geri/stress care and cough syrup.

MEDICINAL AND PHARMACOLOGICAL USES

1. ANTI-INFLAMMATORY: Piper longum contains compounds that exhibit anti-inflammatory properties and may be used in the treatment of inflammatory conditions.

2. ANALGESIC: It may have pain-relieving properties and could be used for pain management, including in conditions like arthritis.

3. ANTIOXIDANT: Compounds in Piper longum have antioxidant properties, which can help in reducing oxidative stress in the body.

4. ANTIMICROBIAL: It has demonstrated potential as an antimicrobial agent, which means it could be used to combat certain infections.

5. DIGESTIVE HEALTH: Piper longum is traditionally used to improve digestion, and it may have pharmacological effects in this regard.

6. RESPIRATORY HEALTH: It has been used for respiratory conditions, and its pharmacological properties might be relevant for managing respiratory issues.

7. METABOLISM: Some studies suggest that it might have a role in metabolism and weight management.

8. WEIGHT MANAGEMENT: Some traditional remedies use long pepper as part of weight management strategies, as it is thought to stimulate metabolism.

9. TRADITIONAL REMEDIES: It is a common ingredient in various herbal formulations and remedies for a wide range of health.

10. ANTIBACTERIAL, ANTIMICROBIAL AND ANTI-AMOEBIC:

As per study, the ethyl acetate extract of P. longum fruit showed effective antibacterial activity.

against selected bacteria or microbes using the agar well diffusion method. In another study, the plant extracts exhibit significant antibacterial activity when tested against different bacterial pathogens such as Staphylococcus albus, Pseudomonas aeruginosa, E. coli, Bacillus megaterium and Salmonella typhi. The methanolic extract of the P. longum fruit showed significant antimicrobial activity by inhibiting the severity of cecal wall ulceration in mice caused by Entamoeba histolytica. The root and fruit extract of the plant showed significant antiamoebic activity against amoebiasis almost to the same extent.

STUDY ANALYSIS:

In anjangaon region the plant is cultivated for the medicinal purpose the study have been concluded piper Longum plant is very essential for the treatment of various diseases Pharmacognostic studies might also explore the plant's traditional and potential medicinal uses, such as its effects on digestive health, respiratory conditions, and pain relief. These various aspects of a pharmacognostic study contribute to a comprehensive understanding of Piper longum, its quality, safety, and potential medicinal or pharmacological properties. Such studies are vital for the development of herbal medicines and products derived from Piper longum.

RESULT:

Piper longum play important role to cure many diseases on the point of View of medinal uses the traditional and potential medicinal applications of Piper longum, including its effects on digestive health, respiratory conditions, and pain relief.Toxicology and Safety: Findings on the safety profile of Piper longum, indicating safe dosage levels and any potential toxicological concerns.

CONCLUSION:

As per the literature study, the P. longum plant is utilized both as a spice and medicine since ancient times. In Ayurveda medicinal system, there are about 135 ayurvedic formulations where P. longum is used as a major ingredient. In the traditional medicinal system, the plant is used to treat numerous diseases such as epilepsy, pleural effusion, spleen disorders, dementia, diarrhea, dysentery, insomnia and many more. There are some reported pharmacological activities of the P. longum plant such as antiulcer, anti-inflammatory, anticancer, neuroprotective and others. till, the plant needs more attention from researchers as the data on the pharmacological properties of this plant is not much explored. This plant claims to treat various diseases as per the literature study but there are no reported pieces of evidence available that showed its effective results. So,the plant needs more experimental and clinical studies to investigate the mechanism of action of the plant extracts in the animal body to prove the significant effects of the plant in treating various diseases.

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Sarda Education Society's (Trust)
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Smt Radhabai Sarda Arts, Commerce & Science College

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Department Of Science

B.Sc- IIIrd (Semester- Vth)

Subject :- Botany

Project Topic :- Foliar Spray

Submitted by :-

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Introduction:

Foliar sprays, a crucial component of contemporary agricultural practices, involve the application of nutrient solutions directly onto plant leaves. This method offers a targeted and efficient approach to supplementing plant nutrition. The composition of foliar sprays is meticulously designed, often including essential macronutrients such as nitrogen, phosphorus, and potassium, as well as micronutrients crucial for optimal plant growth. Unlike conventional soil-based fertilization, foliar sprays provide a direct avenue for nutrient absorption, facilitating rapid uptake and assimilation by plants.

The rationale behind foliar sprays lies in their ability to address nutrient deficiencies promptly and enhance overall crop performance. By circumventing soil-related constraints, foliar feeding becomes a strategic tool for precision agriculture. The interaction between the foliar spray and the intricate physiological processes within the plant offers a nuanced understanding of how external nutrients integrate into the plant's metabolic pathways, influencing growth, development, and yield.

Study Area of Foliar Spray:

1. Nutrient Uptake Mechanisms:

Absorption Pathways: Investigating the different pathways involved in nutrient absorption through the leaf surface, including stomatal and cuticular uptake.

Transport Dynamics: Understanding the movement of nutrients within the plant following foliar application, from initial absorption to systemic distribution.

2. Crop-Specific Responses:

Leaf Anatomy: Analyzing the anatomical features of leaves in various crops and how these features influence the efficacy of foliar nutrient uptake.

Metabolic Responses : Studying the specific biochemical and physiological responses triggered by foliar nutrient applications in different crop species.

3. Optimal Formulations :

Nutrient Ratios : Investigating the ideal ratios of macronutrients and micronutrients in foliar spray formulations for specific crops and growth stages.

Adjuvant Effects : Examining the impact of adjuvants, surfactants, and carrier solutions on the efficacy of foliar sprays.

4. Environmental Factors :

Temperature and Humidity : Assessing how environmental factors, such as temperature and humidity, influence the efficiency of foliar nutrient absorption.

Light Conditions : Studying the role of light conditions, including intensity and duration, in optimizing the response to foliar sprays.

5. Economic and Environmental Impact :

Cost-Benefit Analysis : Evaluating the economic feasibility of foliar spray applications compared to traditional soil-based methods.

Environmental Sustainability : Investigating the potential of foliar sprays to reduce nutrient runoff and minimize environmental impact.

Conclusion :

In conclusion, the in-depth exploration of foliar sprays has illuminated their multifaceted role in modern agriculture. Our comprehensive study has provided insights into the intricate mechanisms of nutrient uptake, crop-specific responses, formulation optimization, and the influence of environmental factors. The strategic application of foliar sprays emerges as a valuable tool for addressing nutrient deficiencies promptly, promoting sustainable agricultural practices, and maximizing crop yield. As we continue to unravel the complexities of plant nutrition, foliar sprays stand out as a dynamic and responsive approach to nourishing crops in an ever-changing agricultural landscape.

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