

3.2.1 Institution has created an ecosystem for innovations, Indian Knowledge System (IKS), including awareness about IPR, establishment of IPR cell, Incubation centre and other initiatives for the creation and transfer of knowledge/technology and the outcomes of the same are evident

Avishkar Activity

Name of the college: Nutan Art's Commerce & Science College Rajapur, Sangamner.

Name of ARC: Prof. Sunil S Shewale.

Contact No. of ARC: 9764689274/8421329298.

LIST OF PARTICIPANTS IN AVISHKAR-2017-18 (ZONAL LEVEL RESEARCH COMPETITION)

Sr. No.	Title of the Project	Name of participants	Category (Humanities, languages, fine art/ commerce management law/ pure science/ agriculture and animal husbandry/ engg. & technology/ medicine and pharmacy)	Level (UG/ PG/ Post PG/ Teacher)	Special requirement e.g. Electric supply / Net connectivity /extra furniture etc.
1.	α - Amylase inhibitory activity of polyphenols fractionated from <i>Abutilon indicum</i> leaves.	1. Naikwadi Ghanshyam Bhaskar. 2. Gunjal Swapnil Malhari.	Pure Science	UG	Table.

Prof. Sunil S. Shewale

Assistant Professor (Physics) & A.R.C,

Nutan Arts, Commerce & Science College,

Rajapur, Tal. Sangamner,

Dist. Ahmednagar.



Qadlag

Principal

**Nutan Arts College, Rajapur
Tal. Sangamner Dist, A. Nagar**



SAVITRIBAI PHULE PUNE UNIVERSITY

University Research Cell

AVISHKAR - 2017

UNIVERSITY LEVEL RESEARCH PROJECT COMPETITION


Certificate of Participation


This is to certify that Mr./Miss. Naikwadi Ghanshyam
of Nutan college

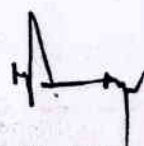
College/Department has participated in Avishkar 2017 University, Level
Research Competition at UG / PG / Post PG [M.Phil. / Ph.D.] / Teacher Level,

Under pure science Category held at

Savitribai Phule Pune University on 2nd January, 2018.


Dr. S. P. Bathe
Deputy Registrar


Dr. R. G. Jaybhaye
Co-Ordinator


Dr. N. S. Umrani
Pro Vice-Chancellor



SAVITRIBAI PHULE PUNE UNIVERSITY

(Formerly University of Pune)

University Research Cell

AVISHKAR 2017

ZONAL LEVEL RESEARCH COMPETITION

Certificate of Participation

This is to certify that Shri./Smt. Naikwadi Ghanshyam Bhaskeer
of Nutan Senior College, Rajapur has
participated at the "Avishkar - 2017" Zonal Level Research Competition at UG / PG /
Post PG/ Teacher level in the Pure Science category, held at
Rahuri College, Rahuri on 10 Dec. 2017


Coordinator


Principal


Dr. S. P. Bathe
Deputy Registrar

Nutan Arts College, Rajapur
Tal. Sangli District, A. Nagar

Principal




Avishkar 2017-18

Project title: “ α -Amylase inhibitory activity of polyphenols fractionated from *Abutilon indicum* leaves”

Abstract:

Diabetes is a chronic disease, which occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. This leads to an increased concentration of glucose in the blood (hyperglycemia). Approximately 171 million individuals worldwide had diabetes in the year 2000 and it is estimated that this will increase to 366 million by 2030. Based on current trends, epidemiologists predict that almost half of all diabetic individuals will be in the Asia/Oceania region. The term diabetes mellitus describes a metabolic disorder of multiple etiologies that is characterized by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both. The causes of type diabetes are either a predominant insulin resistance with a relative insulin deficiency or a predominant insulin secretory defect with or without insulin resistance. In recent years, plants and their constituents have received much attention in the treatment of diabetes for various reasons and many researchers have focused on hypoglycemic agents from medicinal plants. Many natural products especially plants have been investigated with respect to glucose production suppression from carbohydrates in the gut or glucose absorption from the intestine. Based on the existing studies, we have selected *Abutilon indicum* (Malvaceae) from Western Ghats of Maharashtra, India, to evaluate their preliminary anti-diabetic activity. Since they are used in the medicine for the treatment of diabetes.

Stabilization of blood glucose is an important for diabetic patients, because it prevents hyperglycemia and the complications associated with diabetes. The best therapeutic approach to decrease postprandial hyperglycemia is to retard absorption of glucose through inhibition of carbohydrate hydrolyzing enzymes in the digestive organs. The enzymes are responsible for the breakdown of oligo- and disaccharides to monosaccharides. α -Amylase is one the enzymes that catalyses the breakdown of starch to maltose and finally to glucose, which is the only sugar that can be utilized by the body. The inhibition of these enzymes leads to a decrease in blood glucose level, since monosaccharides are a form of carbohydrates, which are absorbed through the small intestine. There are several reports of established or screened and developed enzyme inhibitors and its effects on blood glucose levels after food uptake. Hence, they have long been thought to improve glucose tolerance in diabetic patients. Preliminary analysis of *Abutilon indicum* shows presence of polyphenolic compounds which may be act as an inhibitor to amylase enzyme.


Project Guide
Varge S. N.

Student




Principal
Nutan Arts College, Rajapur
Tal. Sangamner Dist, A. Nagar

**“ α -Amylase inhibitory activity
of polyphenols fractionated
from *Abutilon indicum* leaves”**

Mr. Naikwadi Ghanshyam

Mr. Gunjal Swapnil

DEPARTMENT OF BOTANY

Nutan Arts, Commerce & Science college Rajapur.

2017-18

Ballesh
Principal

Nutan Arts, Commerce, Rajapur
Tal. Sangli District, S. Nagar



Origin of study

- Diabetes => the increase in blood glucose level.
- Stabilization of Blood glucose.
- Acarbose & Metformin.
- α -Amylase => Carbohydrate hydrolyzing enzyme
- Medicinal plants used for treatment of diabetes.
- Plant phytochemicals as enzyme inhibitor.

“One of the most beneficial therapies for type II diabetes is said to be the control of postprandial hyperglycemia.”



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Photoplate



Adulthion indicum



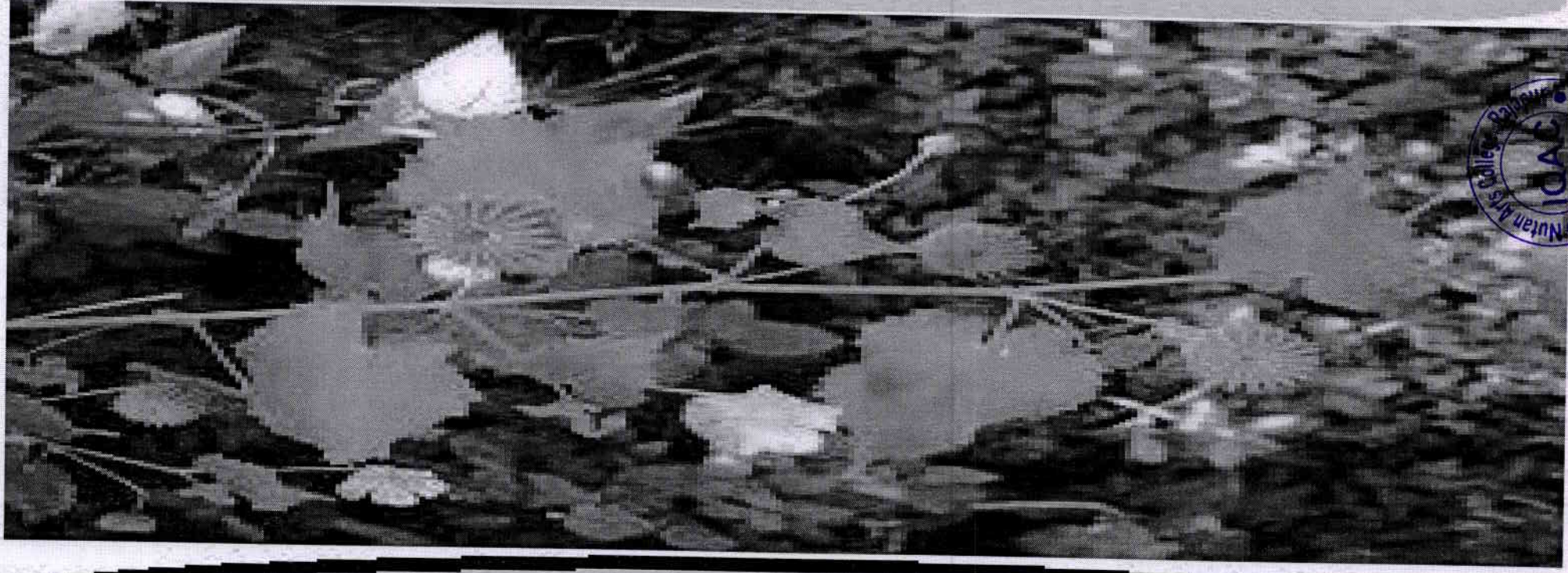
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ADDITIONAL



Photoplate



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Tal. Sangli District, A. Nagar

Aims and Objectives

- To collect and identify the plant species from western ghats region of India.
- To extract the leaves of plant species in aqueous methanol.
- To fractionate the crude extract using polar and non-polar solvent.
- To undergo all the fractions to α -amylase inhibitory assay done by DNS method.
- To identify the active constituents of potential fractions by GC-MS.




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Experimental

- Collection and identification (Pradhan & Singh) of plant species.
- Fractionation of Polyphenolics.
- Preliminary phytochemical Screening using standard protocols (Harborne, 1984).
- In-vitro salivary α -amylase inhibitory assay using DNS method (Jayaraman, 1991).
- GC-MS analysis of fractions of *Abutilon indicum*.




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Results

Table 1. Preliminary Phytochemical screening.

Test name	Clematis gauriana
Alkaloid	+++
Tannin	-
Saponin	+++
Anthraquinon	+
Anthocyanine	-
Flavonoid	+++
Reducing sugar	+++
Cardenoloids	+++
Phobatannin	-
Phytosterol	+++
Diterpens	++
Phenol	+++

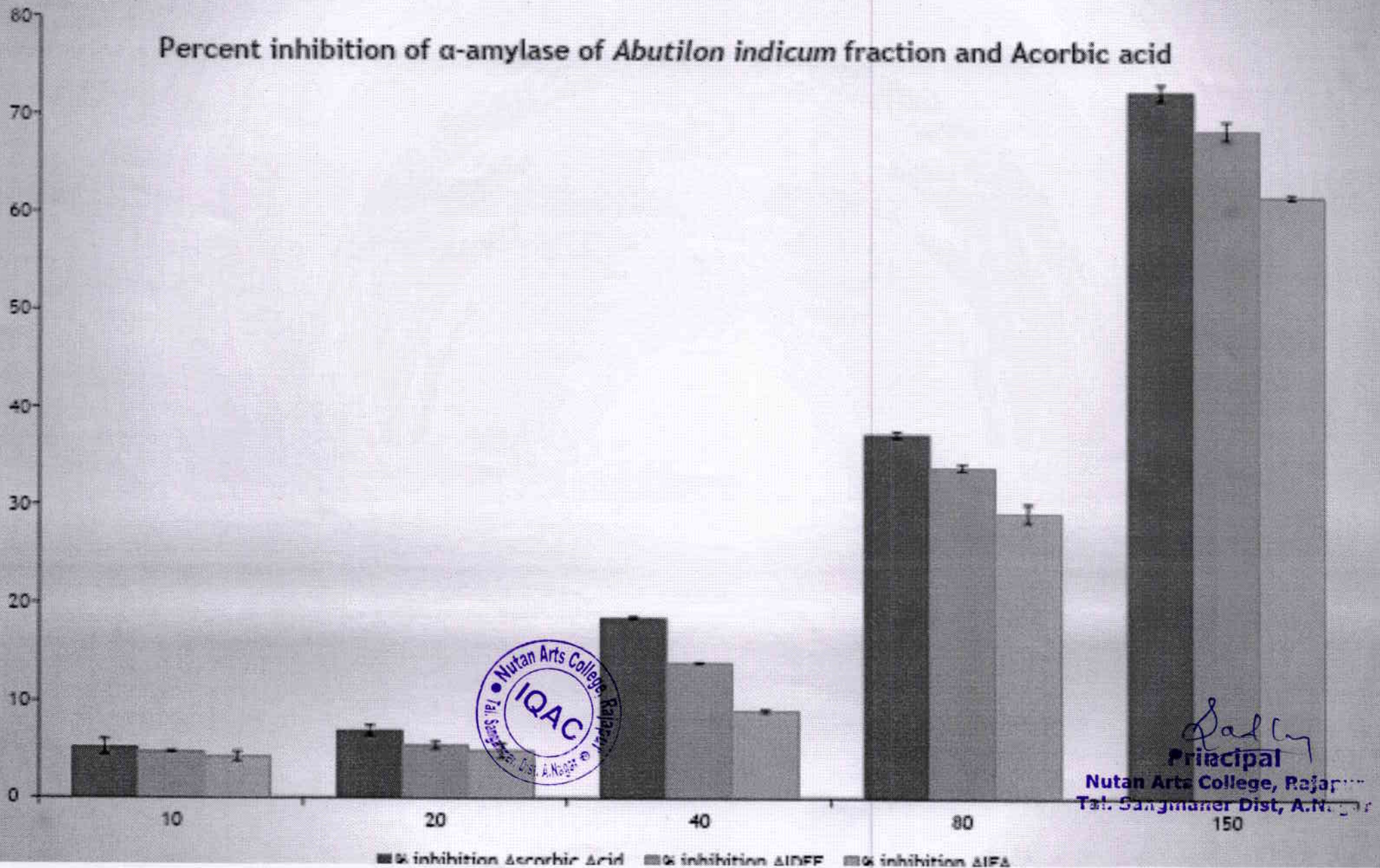


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Percent inhibition of α -amylase of *Abutilon indicum*.

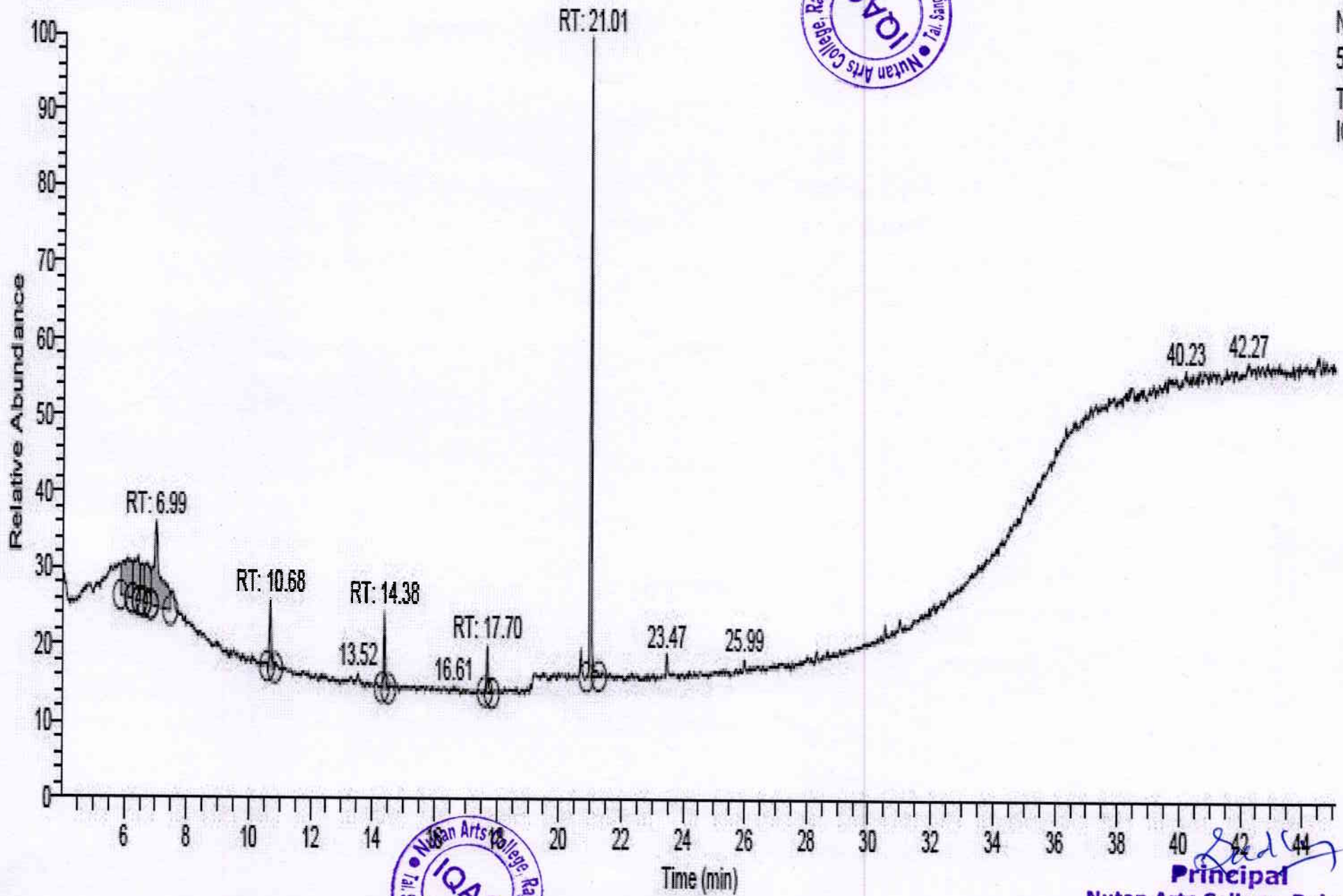
Percent inhibition of α -amylase of *Abutilon indicum* fraction and Acorbic acid



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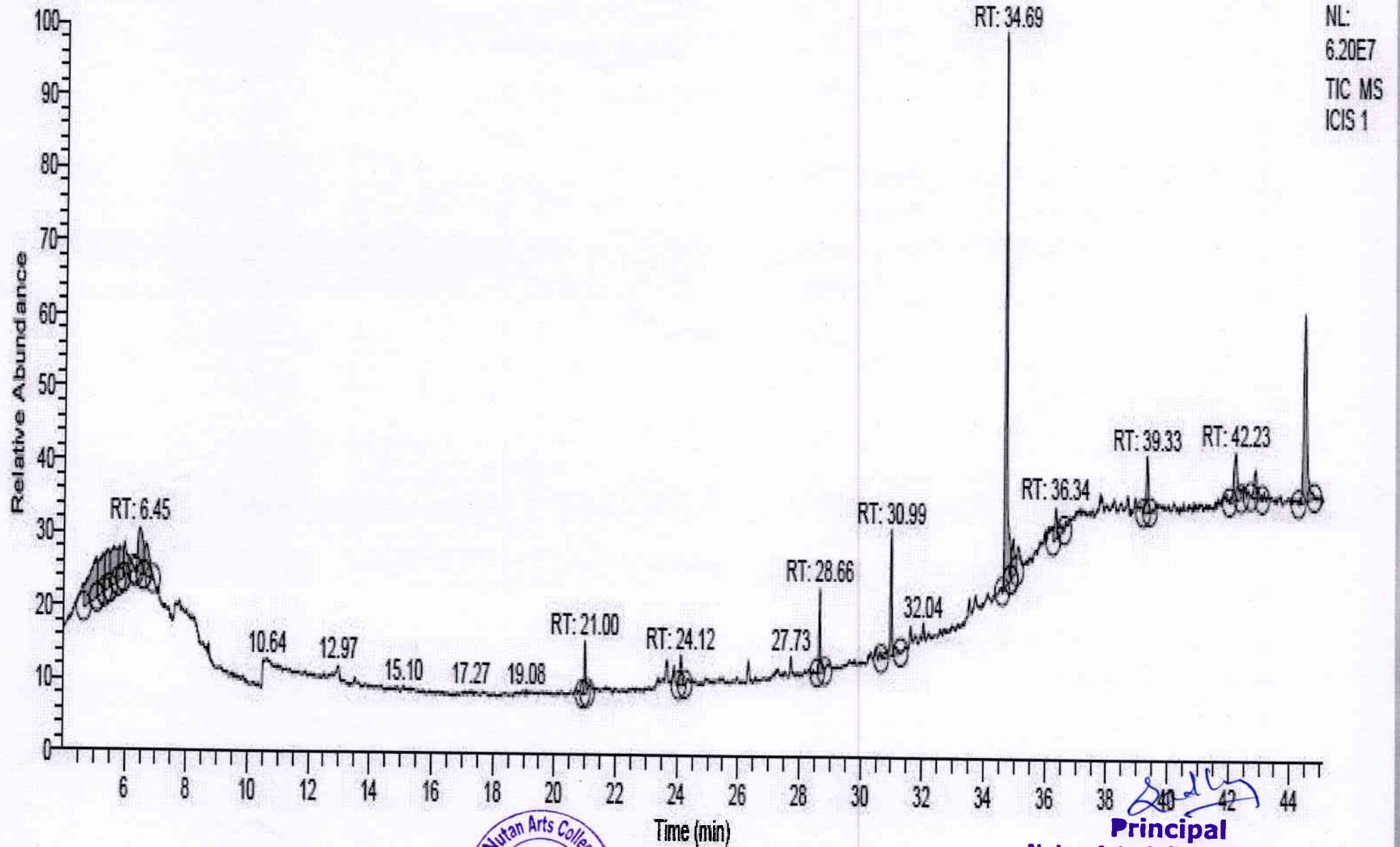
NL:
5.03E7
TIC MS
ICIS 4



[Signature]
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Spectra showing GC-MS Peak of Ethyl acetate fraction of *Abutilon indicum* leaves.

RT: 4.00 - 45.09 SM: 7G



NL:
6.20E7
TIC MS
ICIS 1



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Spectra showing GC-MS Peak of Diethyl ether fraction of *Abutilon indicum* leaves.

Conclusion

- The increasing interest on traditional ethno medicine may lead to discovery of novel therapeutic agents. Medicinal plants are finding their way into pharmaceuticals, nutraceuticals, cosmetics and food supplements. The World Health Organization estimated that 80% of the population of developing countries still relies on traditional medicines, mostly plant drugs, for their primary health care needs.
- In the present study analysis of salivary amylase inhibitory activity showed that the polyphenolics isolated from leaves of *Abutilon indicum* can be the potent source of inhibitor towards the key carbohydrate digesting enzyme.




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Significance of study

- ❖ The present study gives an alternative source to pharmaceutical industries.
- ❖ The data present in the study gives preliminary theme for researchers working in the field of plant sciences.
- ❖ It is natural source of inhibitor without side effects.




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Tal. Sangamner Dist. Akhner

Future prospective

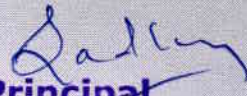
- ❖ To test the bioactivity and pharmacology for future drug developments for different diseases.
- ❖ To test the toxicity of extracted fractions.
- ❖ To isolate and identify the natural products.
- ❖ To test various biological activities of pure compounds.
- ❖ To analyze the plant at molecular level for synthesis of novel protein.




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Thank you




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Tal. Sangmaner Dist, A. Nagar

सावित्रीबाई फुले पुणे विद्यापीठ
(पूर्वीचे पुणे विद्यापीठ)

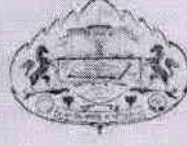
दूरध्वनी क्र.

०२०-२५६०१३५३,

२५६०१२६३

ई-मेल

iqac@unipune.ac.in



गणेशखिंड, पुणे ४११००७
अंतर्गत गुणवत्ता सिध्दता कक्ष

संदर्भ क्र.: आयक्यूएसी / ९२०

दिनांक: २७.१२.२०१९

प्रति,

मा. प्राचार्य / संचालक,

संलग्नित महाविद्यालये / मान्यताप्राप्त परिसंस्था,

सावित्रीबाई फुले पुणे विद्यापीठ,

पुणे ४११००७.

विषय :- 'आविष्कार' संशोधन संकल्पनांचे पोस्टर सादरीकरणाबाबत.

महोदय / महोदया,

'आविष्कार' या राज्यस्तरीय संशोधन स्पर्धेसाठी विद्यापीठाच्या संकेतस्थळावर 'आविष्कार' पोर्टल विकसित करण्यात आलेले असून या पोर्टलवर स्टेज-१ अंतर्गत विद्यार्थ्यांकडून संशोधन विषयक संकल्पना ऑनलाईन पध्दतीने मागविण्यात आलेल्या होत्या.

विषय तज्ज्ञांकडून सदर संशोधन विषयक संकल्पनांचे मूल्यमापन करण्यात आलेले असून पात्र संशोधन विषयक संकल्पनांचा समावेश स्टेज-२ मध्ये करण्यात आलेला आहे. ज्या विद्यार्थ्यांच्या संशोधन संकल्पना स्टेज-२ साठी पात्र ठरविण्यात आलेल्या आहेत, अशा विद्यार्थ्यांना 'आविष्कार पोर्टल' वर स्टेज-१ चा निकाल व विषयतज्ज्ञांकडून नमूद करण्यात आलेले शेर (Remarks) त्यांच्या लॉग-ईन मध्ये पाहण्यास उपलब्ध करून देण्यात आलेले आहेत.

तसेच संबंधित महाविद्यालयांनाही त्यांच्या महाविद्यालयातील पात्र विद्यार्थ्यांचे निकाल खालील लिंकवर उपलब्ध करून देण्यात आलेले आहेत.

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वरील लिंकवर गेल्यानंतर महाविद्यालयांनी त्यांचा PUN Code/BCUD Code व पासवर्ड वापरून login करावे.

स्टेज-२ साठी पात्र ठरविण्यात आलेल्या संशोधन संकल्पनांबाबत विषयतज्ज्ञ प्रत्यक्ष मार्गदर्शन करणार आहेत. 'आविष्कार' संशोधन स्पर्धेमध्ये विद्यार्थ्यांना त्यांच्या संशोधन संकल्पनांचे पोस्टर तयार करणे व त्याबद्दले सादरीकरण (Presentation) करणे आवश्यक असते. या पोस्टरमध्ये संशोधन संकल्पनेची मांडणी व त्या संबंधीचा मजकूर यास अत्यंत महत्व असते. ही बाब लक्षात घेता, विद्यार्थ्यांनी त्यांच्या संशोधन संकल्पनेबाबतचे पोस्टर तयार करणे आवश्यक आहे. यासाठी ज्या विद्यार्थ्यांच्या संशोधन संकल्पना स्टेज-१ मध्ये पात्र झाल्या आहेत, अशा विद्यार्थ्यांनी विषयतज्ज्ञांनी नमूद केलेले शेर विचारात घेऊन ए-३ साईज पेपरवर पोस्टरचा मसुदा तयार करून सोबत घेऊन यावयाचा आहे.

मा. प्राचार्य / संचालक / शैक्षणिक संशोधन समन्वयक यांना कळविण्यात येते की, आविष्कार स्पर्धेची स्टेज - २ (विभागीय स्पर्धा व तज्ज्ञांचे मार्गदर्शन) माहे जानेवारी, २०२० च्या पहिल्या/दुसऱ्या आठवड्यात आयोजित करण्यात येणार आहे. आपल्या महाविद्यालय / परिसंस्थेतील स्टेज-२ साठी पात्र ठरविण्यात आलेल्या विद्यार्थ्यांकडून त्यांच्या संशोधन संकल्पनांचे पोस्टर तयार करून सोबत जोडलेल्या वेळापत्रकाप्रमाणे संबंधित विद्यार्थ्यांना संबंधित ठिकाणी उपस्थित राहण्याबाबत कळविण्यात यावे ही विनंती.

कळ्याचे,

आपला,




(गुणाणी राठोडे)

उपकुलसचिव,

अंतर्गत गुणवत्ता सिध्दता कक्ष

(अतिरिक्त कार्यभार)

सोबत- जिल्हानिहाय 'आविष्कार' संशोधन संकल्पनांचे पोस्टर सादरीकरणाबाबत वेळापत्रक.


Principal
Nutan Arts College, Rajapur
Tal. Sangamner Dist, A. Nagar

सावित्रीबाई फुले पुणे विद्यापीठ
(पूर्वीचे पुणे विद्यापीठ)

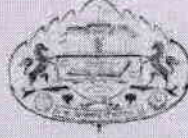
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०२०-२५६०१३५३,

२५६०१२६३

ई-मेल

iqac@unipune.ac.in



गणेशखिंड, पुणे ४११००७
अंतर्गत गुणवत्ता सिध्दता कक्ष

जिल्हानिहाय 'आविष्कार' संशोधन संकल्पनांचे पोस्टर सादरीकरण व मार्गदर्शनाबाबतचे वेळापत्रक

अ. क्र.	महाविद्यालयाचे नाव	जिल्हा	दिनांक	विद्याशाखा
१	डॉ. विठ्ठलराव विखे पाटील आभियांत्रिकी महाविद्यालय, विळद घाट, अहमदनगर	अहमदनगर	०३/०१/२०२०	सर्व विद्याशाखा
२	एच.पी.टी. कला आणि आर. वाय.के. विज्ञान महाविद्यालय, नाशिक	नाशिक	०४/०१/२०२०	आभियांत्रिकी व तंत्रज्ञान विद्याशाखेव्यतिरिक्त इतर सर्व विद्याशाखा
३	लोकनेते गोपीनाथजी मुंडे इन्स्टिट्यूट ऑफ इंजिनिअरींग एज्युकेशन अँड रिसर्च, कॅनडा कॉर्नर, नाशिक	नाशिक	०४/०१/२०२०	आभियांत्रिकी व तंत्रज्ञान विद्याशाखा
४	ए.आय.एस.एस.एम.एस. आभियांत्रिकी महाविद्यालय, पुणे	पुणे ग्रामीण	११/०१/२०२०	आभियांत्रिकी व तंत्रज्ञान विद्याशाखा
५	डॉ. डी. वाय. पाटील कला, वाणिज्य आणि विज्ञान महाविद्यालय, आकुर्डी, पुणे	पुणे शहर व पुणे ग्रामीण	१२/०१/२०२०	आभियांत्रिकी व तंत्रज्ञान विद्या शाखेव्यतिरिक्त इतर सर्व विद्याशाखा
६	पिंपरी-चिंचवड आभियांत्रिकी महाविद्यालय, रावेत	पुणे शहर	१२/०१/२०२०	आभियांत्रिकी व तंत्रज्ञान विद्याशाखा



Rady
(मुंजाजी रासवे)

उपकुलसचिव,
अंतर्गत गुणवत्ता सिध्दता कक्ष
(अतिरिक्त कार्यभार)

Rady
Principal

Nutan Arts College, Rajapur
Tal. Sangamner, Dist. A. Nagar

Phytochemical analysis of some medicinal plants

INTRODUCTION

Medicinal plants besides therapeutic agents are also a big source of information for a wide variety of chemical constituents which could be developed as drugs with precise selectivity. These are the reservoirs of potentially useful chemical compounds which could serve as newer leads and clues for modern drug design. The most important of these bioactive constituents of plants are alkaloids, tannins, flavonoids and phenolic compounds. Correlation between the phytoconstituents and the bioactivity of plant is desirable to know for the synthesis of compounds with specific activities to treat various health ailments and chronic diseases as well. Owing to the significance in the above context, such preliminary phytochemical screening of plants is the need of the hour in order to discover and develop novel therapeutic agents with improved efficacy. Numerous research groups have also reported such studies throughout the world. Thus, the present study deals with the screening based on phytochemical tests of six medicinal plants viz., *Ficus religiosa* (umber), *Citrus limonia* (limbu), *Aegal marmalos* (Bel), *Zizipus jujube* (Bor), *Clematis gauriana* (Ranjai) and *Annona reticulate* (Ramphal) for identifying their chemical constituents. All these plants possess different bioactivities which were later correlated with the presence of some specific phytoconstituents.

MATERIALS AND METHODS

Plant materials

Fresh leaves of *Ficus religiosa* (umber), *Citrus limonia* (limbu), *Aegal marmalos* (Bel), *Zizipus jujube* (Bor), *Clematis gauriana* (Ranjai) and *Annona reticulate* (Ramphal) were collected locally from Sangamner area and got identified in Department of Botany, Sangamner college, Sangamner. Voucher specimens have been submitted to the Department of Botany, Sangamner college.

Preparation of extracts

The collected leaves were washed well, shade dried and powdered. They were then extracted with hot distilled water using soxhlet apparatus till the colorless solvent was obtained. Extracts obtained were filtered, concentrated and allowed to dry till constant weight was obtained.

Phytochemical tests:



Dolly
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Nutan Arts College, Rajapur
Tal. Sangamner Dist, A. Nagar

Screening of the above six selected medicinal plants for various phytochemical constituents (Tannins, Flavonoids, Terpenoids, Saponins, Carbohydrates, Glycosides, Coumarins, Alkaloids, Proteins, Emodins, Anthraquinones, Anthocyanins and Leucoanthocyanins).

RESULTS:

Phytochemicals	<i>Ficus religiosa</i> (Umber)	<i>Citrus limonia</i> (limbu)	<i>Aegal marmalos</i> (Bel)	<i>Zizipus jujube</i> (Bor)	<i>Clematis gauriana</i> (Ranjai)	<i>Annona reticulate</i> (Ramphal)
Tannins	+	+	+	+	-	+
Flavonoids	+	+	+	+	+	+
Terpenoids	+	+	+	+	+	+
Saponins	+	+	+	+	+	+
Carbohydrates	+	+	+	+	+	+
Glycosides	+	+	+	+	+	+
Coumarins	+	-	-	-	-	+
Alkaloids	+	-	-	-	+	+
Proteins	+	+	+	+	+	+
Emodins	-	-	-	-	-	-
Anthraquinones	-	-	-	+	+	-
Anthocyanins	-	+	-	+	-	+
Leucoanthocyanins	-	-	-	-	-	-

The data shown in Table shows screening of aqueous extracts of different parts of six medicinal plants viz., *Ficus religiosa* (umber), *Citrus limonia* (limbu), *Aegal marmalos* (Bel), *Zizipus jujube* (Bor), *Clematis gauriana* (Ranjai) and *Annona reticulate* (Ramphal) based on phytochemical tests. These tests reveal the presence of various bioactive secondary metabolites which might be responsible for their medicinal attributes. The observations and inferences made in the phytochemical tests are presented as follows:

Tannins: A green precipitate was observed shows the presence of tannins.

Flavonoids: A yellow coloration was indicate the presence of flavonoids.

Terpenoids: A deep red color shows the presence of terpenoid.

Saponins: Persistent frothing indicate the presence of saponins.



Sadhu
Principal
Nutan Arts College, Rajapur
Tal. Sangamner Dist, A. Nagar

Steroids: A reddish brown ring at the interface indicate the presence of steroids

Phlobatannins: Presence of a red precipitate is as an evidence for the presence of phlobatannins.

Carbohydrates: Red violet ring appeared at the junction confirmed by the presence of carbohydrates.

Glycosides: A color change from violet to blue to green confirming the presence of glycosides.

Coumarins: Formation of yellow color as an indication of coumarin

Alkaloids: A yellow precipitate was observed in three extracts confirming thereby the presence of alkaloids.

Proteins: Precipitate formation which turns yellow on boiling was only observed in the extract shows the presence of proteins.

Emodins: presence of red color indicated the presence of emodins.

Anthraquinones: Presence of a pink, violet or red coloration in ammonical layer indicated the presence of free anthraquinones.

Anthocyanins: The presence of pink-red to blue-violet coloration indicated the presence of anthocyanins.

Leucoanthocyanins: Presence of red color in organic layer indicated the presence of leucoanthocyanins.

CONCLUSION

Screening of six selected medicinal plants clearly reveals that the maximum classes of phytoconstituents are present selected plant extracts. Hence, the above plant extract could be explored for its highest therapeutic efficacy by pharmaceutical companies in order to develop safe drugs for various ailments. These plants have been used in the treatment of different ailments, the medicinal roles of these plants could be related to such identified bioactive compounds.

Significance of study:

These secondary metabolites contribute significantly towards the biological activities of medicinal plants such as hypoglycemic, antidiabetic, antioxidant, antimicrobial, antiinflammatory, anticarcinogenic, antimalarial, anticholinergic, antileprosy activities etc. Flavonoids are also present in all six selected medicinal plants as a potent water-soluble antioxidant and free radical scavenger, which prevent oxidative cell damage and also have strong




Principal
Nutan Arts College, Rajapur
Tal. Sangamner Dist, A.Nagar

anticancer activity. It also helps in managing diabetes induced oxidative stress. Terpenoids have been found to be useful in the prevention and therapy of several diseases, including cancer. Terpenoids are also known to possess antimicrobial, antifungal, antiparasitic, antiviral, anti-allergenic, antispasmodic, antihyperglycemic, antiinflammatory and immunomodulatory properties. Numerous studies have confirmed that saponins possess the unique property of precipitating and coagulating red blood cells and steroids are responsible for cholesterol-reducing properties. Phlobatannins have been reported to possess astringent properties. Plants containing carbohydrates, glycosides and coumarins are known to exert a beneficial action on immune system by increasing body strength and hence are valuable as dietary supplements. Coumarins can be suggested to be beneficial for hyperproliferative skin diseases on the basis of their antimicrobial and anti-inflammatory effects. Alkaloids represent a class which affects the central nervous system, reduces appetite and behaves as diuretic. The body needs protein to repair and maintain itself. Thus, from the present investigation medicinal properties of the selected six plants can be identified based on the phytoconstituents present in them.

Future Prospectives:

The quantitative analyses of these phytochemicals will be an interesting area for further study. Efforts should be geared up to exploit the biomedical applications of these screened plants due to the presence of certain class of phytochemicals for their full utilization.




Principal
Nutan Arts College, Rajapur
Tal. Sangamner Dist, A.Nagar