




3.3.2. Number of research papers per teachers in the Journals notified on UGC webs

Sr. No.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISBN/ISSN number
1	Execution of Julolidine based derivative as bifunctional chemo sensor for Zn ²⁺ and Cu ²⁺ ions: Applications in bio-imaging and molecular logic gate Spectrochemical Acta Part A:	Dr.K. Radhakrishnan	Chemistry	Molecular and Bimolecular Spectroscopy	2019	ISSN: 1137-5019
3	Phyto chemical studies and biological activity of alangium salvifollum, 5(5), 1037-1042 (2018)	Dr.K. Radhakrishnan	Chemistry	European journal of biomedical and pharmaceutical sciences	2018	ISSN 2349-8870
4	Synthesis of anthryl sulfides from anthrylmethylethers via acid catalysed ether sulfide exchange reaction, Synthetic letters 14(2005)2179 2017	Dr.K. Radhakrishnan	Chemistry	chem.sinica.edu.tw	2017	DOI: 10.1055/S-2005-872268
5	synthesis of silver nanoparticals using flavonoid : Apigenin and its antibacterial effect. 4(1),(2017)	Dr.K. Radhakrishnan	Chemistry	European journal of biomedical and pharmaceutical sciences	2017	ISSN 2394-3211
6	Power Optimization and Temperature Control in solar Powered Automated Dryer Using Fuzzy Controller	S.Malaisamy and Dr.A.Srinivasan	Instrumentation	International Journal of ChemTech Research	2016	ISSN:24559555
7	Synthesis and antimicrobial activity of 2-benzylidene-1, 3- indandiones:	Dr.K. Radhakrishnan	Chemistry	International Journal of ChemTech Research	2016	ISSN 0974-4290
14	Scanning electron microscopy analysis of effect of pedalum murex(l) seeds on the morphology of calcium oxalate crystals. Kidney Research Journal, 8, 1-6(2018)	Dr Krishnan Radhakrishnan	Chemistry	Kidney Research Journal	2018	ISSN 2044-4648

16	Antioxidant activity of Noval Complexes of Schiff Base Derived from (2-Hydroxy 1,2 - Diphenylethylidene Amino Phenol)	V Balamurugan, L Muruganadam, K Radhakrishnan	Chemistry	Research Journal of Life Sciences, Bioinformatics, Pharmaceutical and Chemical Sciences	2018	DOI: 10.26479/2018.0405.36
17	A Comparison of chemical composition, Antioxidant and Antimicrobial studies of Abutilon indicum leaves and seeds	K Radhakrishnan	Chemistry	Research Journal of phytochemistry	2017	ISSN 2044-4648
18	Foreign Direct Investment Trends in India	Mrs.Navazia Banu, Mrs. Vanitha	Economics	International Journal of Law and Social Sciences	2016	ISSN 2394-4277
19	Women entrepreneurs in the era of Globalisation	E Vanitha and Dinesh Kannan R	Economics	Research Magma	2017	ISSN No.2456-7078
20	Women entrepreneurs in the era of Globalisation	E Vanitha and Dinesh Kannan R	Economics	Research Magma	2018	ISSN No.2456-7079


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 Outline

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Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy

Volume 219, 5 August 2019, Pages 33-43

Execution of julolidine based derivative as bifunctional chemosensor for Zn²⁺ and Cu²⁺ ions: Applications in bio-imaging and molecular logic gate

Jeya Shree Ganesan ^a, Sivaraman Gandhi ^a, K. Radhakrishnan ^b, Ashokkumar Balasubramaniam ^c, Murugesan Sepperumal ^a, Siva Ayyanar ^a  

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Highlights

- New julolidine based Schiff base derivative (JT) was designed and synthesized and JT served as a selective emission *on-off* response towards Zn²⁺ and Cu²⁺ ions.
- The sensor shows excellent sensitivity for Zn²⁺ and Cu²⁺ ions with an LOD at 3.5 × 10⁻⁸ M and 1.46 × 10⁻⁶ M, respectively.
- The 1:1 binding model of the sensor JT with Zn²⁺/Cu²⁺ was established and reversibility of the chemosensor JT was proved by experiments with EDTA.
- JT was successfully established to track intracellular Zn²⁺ ions in HeLa cells.

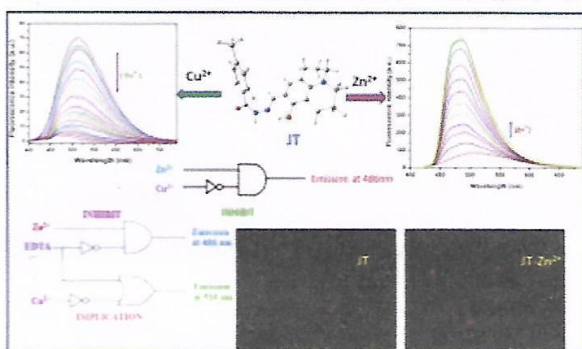
Abstract

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... biologically relevant metal ions in aqueous media. Upon addition of Zn²⁺ ions, JT exhibited a significant blue shift in emission followed by turn-on enhancement while with Cu²⁺, the fluorescence intensity of JT was completely vanished. The 1:1 binding affinity between JT and Zn²⁺/Cu²⁺ was proposed by Job's plot analysis. The detection limit for Zn²⁺ and Cu²⁺ ions reached at 3.5 × 10⁻⁸ M and 1.46 × 10⁻⁶ M, respectively. The sensing mechanism of JT with Zn²⁺/Cu²⁺ was supported by DFT calculations. Based on photophysical studies and its reversibility environment with EDTA, molecular logic gates were fabricated. Furthermore, JT was successfully established to detect intracellular Zn²⁺ ions in live cells by turn-on response.

Graphical abstract

A bifunctional chemosensor JT was synthesized to distinguish Zn²⁺ and Cu²⁺ ions based on emission *on-off* response.



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Keywords

Julolidine; Zn²⁺ and Cu²⁺ sensor; Molecular logic gate; Live cell imaging

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PHYTOCHEMICAL STUDIES AND BIOLOGICAL ACTIVITY OF ALANGIUM
SALVIFOLIUM

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ABSTRACT

In the present study the antibacterial activity of *A. salvifolium* leaves extract was carried out against various pathogenic microbes such as gram negative and gram positive bacteria of *E. coli*, *K. Pneumoniae*, and *S. aureus* by using disc diffusion method. The extract of *Alangium salvifolium* shows highest antibacterial activity was observed against *Staphylococcus aureus* followed by *E. coli*, and lowest inhibition show against *Klebsiella pneumoniae*. Further the invitro antidiabetic effect of *Alangium salvifolium* by the α -amylase inhibitory activity also analyzed. The results indicated the IC_{50} value of *A. salvifolium* was 168.07 μ g/ml for on α -amylase enzyme, compared with the standard drug Acarbose exhibited 50% inhibition on α -amylase enzyme at 56.84 μ g/ml. The *A. salvifolium* revealed dose dependent inhibitory property for α -amylase enzyme.

KEYWORDS: *Alangium salvifolium*, invitro antidiabetic, antibacterial.

INTRODUCTION

Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions. Globally, about 60% of the healthcare products available in markets are known to be derived from plant origin. In India, medicinal plants are widely used by the people as: folk remedies, pharmaceutical preparations and also in different indigenous systems of medicine like Siddha, Unani and Ayurveda for the treatment of various diseases.^[1] About 80% of the world population relies on plants and their products for primary health care. Awareness of plant based medications and therapeutics are continuously increasing worldwide and hence there are high acceptance and demand.^[2] *Alangium salvifolium* Wang. belongs to the family *Alangiaceae* and is commonly known as sage leaved *Alangium*. It is a well-known traditionally used medicinal plant in India and it is also one of the most versatile medicinal plant having a wide spectrum of biological activities like antidiabetic, antiulcer, analgesic, anti-inflammatory, antimicrobial, antioxidant, anti-arthritis, diuretic, antifertility, anthelmintic, antiepileptic and antifungal.^[3] *A. salvifolium* is a tall thorny tree and the genus contains 17 species of small trees, shrubs and lianas. *Alangium* name has been derived from the Malayalam word *Alangi*. Almost all the parts (root, bark, leaves, seeds and fruits) are known to have important therapeutic uses and are extensively used for different purposes in the indigenous herbal medicines. The synonyms of *A. salvifolium* are *A.*

decapetalum Lam., *A. lamarckii* Thw., *A. latifolium* Miq. ex C.B. Clarke, *A. mohillae* Tul., *A. salvifolium* subsp. *Decapetalum* (Lam.) Wangerin, *A. sundanum* var. *Miqueliana* Kurz., *A. tomentosum* Lam., *Grewiasalvifolia* L.f., *Karangolummohillae* (Tul.) Kuntze and *Karangolum salvifolium* (L.f.) Kuntze.^[4] The plant selected for study was based on its availability and its various therapeutic activities in various ailments mentioned in Ayurveda. In the present work, we have reported for the first time the results of the combined investigations on in-vitro antibacterial and antidiabetic activities of the extracts of *Alangium salvifolium*.

MATERIALS AND METHODS

GC-MS: The ethanolic extract was subjected to GC-MS analysis on the instrument GC and MS JEOL GC mate equipped with secondary electron multiplier. JEOL GCMATE II GC-MS with Data system is a high resolution, double focusing instrument. Maximum resolution: 6000 Maximum calibrated mass: 1500 Daltons. Source options: Electron impact (EI); Chemical ionization (CI) (Agilent Technologies 6890N Network GC system for gas chromatography). The column (HP5) was fused silica 50 m x 0.25 mm I.D. Analysis conditions were 20 min. at 100°C, 3 min at 235°C for column temperature, 240°C for injector temperature, helium was the carrier gas and split ratio was 5:4. The sample (1 μ l) was evaporated in a split less injector at 300°C. Run time was 22 min. Interpretation on mass spectrum of GC-MS was done using the database of National Institute Standard and Technology (NIST)

LETTER

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Synthesis of Anthryl Sulfides from Anthryl Methyl Ethers via Acid-Catalyzed Ether-Sulfide Exchange Reaction

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Abstract

Under acidic condition, anthryl methyl ethers behave as anthryl cation synthons and undergo *ipso*-substitution to produce anthryl sulfides. These compounds are hard to access with currently available methodology and they have great potentials as organic electronic materials.

Key words

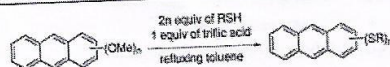
arene - nucleophilic aromatic substitution - heterocycles - macrocycles - sulfur

Anthracene is the simplest member of the prominent acene type molecules. These linearly fused aromatic hydrocarbons have been the focus of much research recently due to their unusual optical and electronic properties. Ever since theoretical calculations hinted that polyacenes should have near-zero band gaps, [1] the intriguing prediction has inspired numerous studies of their application in material science. These explorations have recently culminated in the pentacene based field effect transistor. [2] Even as smallest member of the acene family, anthracene and its derivatives have also been utilized in a varieties of optical electronic devices including light emitting diode [3] and field effect transistor. [4]

In spite of the incentives presented from both theoretical and practical sides, the synthesis of acenes and its derivatives remained a difficult problem. The synthesis of anthracene derivatives from scratch can take up to 4-8 steps [5] and some reactions involved have compatibility problems with common functional groups. Selective derivatization is arguably even more challenging since the central rings are much more reactive towards the majority of reagents. The lack of synthetic accessibility hampered the effort to understand and fine-tune the physical and material properties of acenes. Among all the acene derivatives with common functional groups, acene sulfide is one of the least accessible. Since sulfide substitution is frequently used in many other conjugated systems to improve their redox properties and stability for material applications, [6] developing an efficient strategy to build acene sulfides appears crucial for their wider applications.

Besides direct alkylation thiolates, the most common way to prepare aromatic sulfides is the coupling reaction between aromatic halides and free thiols. Despite of some recent progresses in this field, [7] this method is not easily applicable to acene substrates due to the limited availability of halogen substituted acenes. We recently discovered an ether-ether exchange reaction on anthracene core. [8] Along this line, we extended this reaction to ether-sulfide exchange. In this communication, we wish to demonstrate the efficiency and versatility of this exchange protocol in preparing anthryl sulfides.

The reaction condition closely resembles the ether-ether exchange reaction (Equation [1]). Non-oxidative triflic acid is chosen to prevent oxidative degradation of the sulfide products, and boiling condition facilitates the removal of methanol.



Equation 1 General conditions for anthryl ether-sulfide exchange

Examples of simple exchange reactions are listed in Table [1]. The reaction proceeds smoothly with primary, secondary, and even aromatic thiols, which is a marked disparity from the ether-ether exchange reaction [8] (we later found that even 2-methoxy naphthalene underwent the same exchange with octanethiol to produce 2-naphthyl octyl sulfide [9]). However exchange reactions conducted with *t*-BuSH, allyl mercaptan, and benzyl mercaptan produced complex unidentifiable products (entry 3, 4) survived the reaction. Up to four sulfide groups can be installed

SYNTHESIS OF SILVER NANOPARTICLES USING FLAVONOID: APIGENIN AND ITS
ANTIBACTERIAL EFFECTK. Radhakrishnan¹, T. Rettinaraja^{1*}, A. Mohan¹, S. Syed Jainulabideen²¹Department of Chemistry, Saraswathi Narayanan College, Perungudi, Madurai-625022, Tamil Nadu, India.²Department of Chemistry, Raja Duraisingam Government Arts College, Sivagangai-630561. Tamil Nadu, India.

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ABSTRACT

Apigenin, a dietary plant derived flavonoid was isolated from the leaves of *Smilax perfoliata*. The separation was carried out by different chromatographic techniques and their structures were elucidated by IR spectra, MS, ¹HNMR, and ¹³CNMR spectroscopic methods. Further, the isolated flavonoid – apigenin was used for the synthesis of silver nanoparticles (AgNPs). Aqueous solution of pure flavonoid mixed with 1mM AgNO₃ solution were exposed to bright sunlight to prepare the nanoparticles. Characterization of the synthesized nanoparticles by UV-Visible spectrophotometer, X-ray diffraction and scanning electron microscopy revealed that the synthesized silver nanoparticles were 10–80 nm in size and polydispersed in nature. Bactericidal effect against common pathogens of the synthesized silver nanoparticles was investigated. It is concluded that AgNPs synthesized using Apigenin as reducing agent showed higher stability and better antibacterial activity.

KEYWORDS: Apigenin, Flavonoids, Silver Nanoparticle, Bio-synthesis, *Smilax perfoliata*.

INTRODUCTION

Smilax (Family -*Smilacaceae*) is a large genus of climbing shrub distributed in tropical and temperate regions of the world. *Smilax perfoliata* Lour is found in various parts of India and has tuberous rhizomes. It is a robust more or less strongly armed climber. Stem is used as tooth brush to strengthen the gums. Tender shoot is taken in curries and is useful as blood purifier.^[1] Roots and stems are used as anticancer, anti-dysenteric and in urinary complaints.^[2] The leaves and fruits of *Smilax perfoliata* are traditionally used for treatment of various ailments such as rheumatism, lumbago, nourishing the functions of spleen, stomach, muscle and bone.^[3]

The nanoparticles (Nps) of noble metals are nontoxic to human cells and have high thermal stability.^[4] In addition to non-toxicity, their unique characteristics include optical, electrical,^[5] and magnetic properties.^[6] These have made AgNPs to own applications ranging from catalysts and sensing to optics, antibacterial agents, antioxidant agents and data storage.^[7,8] In particular, silver nanoparticles (AgNPs) exhibit fabulous antimicrobial potential and can be used in medicine for dental materials, burn treatment, water treatment and coating stainless steel materials.^[9,6] For the synthesis of AgNPs, chemical, physical and biological methods have been used and among those, the chemical method is extensively employed owing to its high yield and quick throughput.^[10,11] Yet, the chemical synthesis of NPs frequently necessitates the utilization of toxic reagents

such as reducing and stabilizing substances. Hence, biological synthesis of AgNPs has been suggested as an ecofriendly and less toxic approach.^[12] The present study is an attempt to test the antibacterial efficacy of AgNPs synthesized by using a flavanoid –apigenin, which is isolated from the leaf extract of *Smilax perfoliata*, which have been using in traditional medicine without any validation.

MATERIALS AND METHODS

Plant Material

Fresh leaves of *Smilax perfoliata* were collected from Siluvippatti village, Sivagangai District, Tamil Nadu during June 2016 and were dried under shade for several days.

Isolation of Total Flavonoids by Soxhlet Extraction Method

Before extraction, *S. perfoliata* was crushed into powder. The powdered sample was degreased by soxhlet extractor with petroleum ether until the colour of elute becomes colourless. The same powder sample was accurately weighed and placed in soxhlet extractor by adding 80 mL of ethanol: water (70:30) solvent, followed by the extraction for up to 5 h, and then extract solution was concentrated. The extract was centrifuged for 30 min; supernatant was taken for further use



Power Optimization and Temperature control in Solar Powered Automated Dryer Using Fuzzy Controller

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Abstract : Drying is an exceptional way to defend food and solar food dryers are appropriate food preservation technology for sustainable development. The main objective of this paper is to design a solar powered Automatic drier which has solar as well as electric heater for efficient and quality drying in an economical way. This work is split up into two stages, initially an efficient drier has to be designed and modelling and conventional PI controller and Fuzzy controller has to be designed for maintaining temperature in the heating chambers for drying process and the efficient usage of solar energy and solar powered electrical energy for heating process has to be studied in detail.

Keywords: PI controller, Fuzzy logic, solar dryer, heating process.

I. Introduction

In many parts of the world there is a growing awareness that renewable energy have an important role to play in extending technology to the farmer in developing countries to increase their productivity and be more economical when compared with any other energy resource. Drying of fresh fruits is one of the most energy-intensive processes in the food industry and a promising method of reducing post-harvest losses. Improving energy sufficiency by only 1% could result as 10% increase in profits. Now a day's, optimization of solar system is used to reduce total cost of the system, increase life cycle savings and improve thermal efficiency of the process. It is very demanding for optimal utilization of solar resources to meet the energy demands.

Several designs are available particularly cabinet type solar drier suitable for drying fruits and vegetables and indirect natural convection solar drier for paddy drying [1] and Many different drying methods exist in the food industry. Some of these include: Vacuum drying, solar drying, contact and air drying, cocoa bean drying and copra drying. Recent cardamom fruit drying process has lot of disadvantages like high cost; require large space and manual heating etc.

Some review article prepared PID controller not provide sufficient control action for solar powered Automated dryer [2-7]

In this research work, we have compared two existing solar driers like cardamom drier and copra drier. And these comparison portraits the efficiency, time, consumption, quality of the drier and an alternate source is also being included in tit to make it as constant continuous process.

The objective of the research is to develop the efficiency and economical solar drier for getting good quality and occupy less amount of space. Now a day's new design and development of Automatic solar Powered drier is essential and our work is proposed to drying the cardamom fruit without destroying its color and flavor by using a basic PID controller and compare its performance with advanced intelligent controllers like Fuzzy logic is developed control action for a non linear process based PID controllers and Fuzzy tuned PID controllers.

Performance Analysis, Modeling and Power Optimization in Solar Powered Automated Drier

Malaisamy S¹, Sahanayagam A²

Abstract — Drying is an excellent way to preserve food and solar food dryers are appropriate food preservation technology for sustainable development. The main objective of this paper is to design a solar powered Automatic drier which has solar as well as electric heater for efficient and quality drying in an economical way. This work is split up into two stages, initially an efficient drier has to be designed and modelled and an basic PI controller and an intelligent control system has to be designed for maintaining temperature in the heating chambers for drying process and the efficient usage of solar energy and solar powered electrical energy for heating process has to be studied in detail.

Keywords— PI controller, Intelligent control system, solar drier, heating process, heater.

I. INTRODUCTION

In many parts of the world there is a growing awareness that renewable energy have an important role to play in extending technology to the farmer in developing countries to increase their productivity and be more economical when compared with any other energy resource. Drying of fresh fruits is one of the most energy-intensive processes in the food industry and a promising method of reducing post-harvest losses. Improving energy sufficiency by only 1% could result as 10% increase in profits. Now a day's, optimization of solar system is used to reduce total cost of the system, increase life cycle savings and improve thermal efficiency of the process. It is very demanding for optimal utilization of solar resources to meet the energy demands. Several designs are available particularly cabinet type solar drier suitable for drying fruits and vegetables and indirect natural convection solar drier for paddy drying [3] and many different drying methods exist in the food industry. Some of these include: Vacuum drying, solar drying, contact and air drying, cocoa bean drying and copra drying. Recent cardamom fruit drying process has lot of disadvantages like high cost; require large space and manual heating etc.

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The objective of the research is to develop the efficiency and economical solar drier for getting good quality and occupy less amount of space. Now a day's new design and development of Automatic solar Powered drier is essential and our work is proposed to drying the cardamom fruit without destroying its color and flavor by using a basic PI controller and compare its performance with advanced intelligent controllers like Fuzzy based PID controllers and Fuzzy tuned PID controllers.

I. IDEOLOGY

"The sun rays that reaches the Earth's surface delivers 10,000 times more energy than what humans consume every day." The idea proposed is that if just 0.1 percent of area of Earth's surface is cover with [very efficient] Large-area solar cells, then this can replace all the existing method of power production and can power a large energy which is clean and renewable.

II. DRYING OF FRUITS

Drying is removing a large portion of the water contained in a product in order to considerably reduce the reactions which lead to deterioration of the products. The removal of moisture arrests the growth and reproduction of micro-organisms that would cause decay and minimizes many of the moisture-mediated deterioration reactions. This can be done by simultaneous heat and mass transfer and is a classical method of food preservation that provides longer shelf life, reduced weight and volume. There are three phases in the drying process.

The first phase is short and it is the phase during which the drying velocity increases and corresponds to the rise in temperature of the product until it reaches and settles in equilibrium state. This is the time when the product receives as much heat as possible from the hot air which is used to vaporize the water molecule from the product. The second phase works as the constant drying velocity period. It corresponds to the evaporation of the free water on the surface of the product, which are permanently remains as the moisture coming from inside of the product settles over the surface. The third phase is

Diagram to show the alternative power source

VI. PI CONTROLLER

The basic Controller which is going to be used in the process is PI controller. It is to control the temperature in the boiler and then the controlled temperature is given to the dryer for the process of drying the fruits. The P and I terms are added together to produce a control signal that is applied to the system being controlled. Integral action enables PI controller to eliminate offset also avoids a major weakness of a P-only controller. Thus, the PI controllers provide a balance of complexity and capability that makes them by far the most widely used algorithms in process control applications.

VII. ADVANTAGE OF THIS APPROACH

1. To replace the conventional method of drying fruits; which cost more and time consuming.
2. Using a cheap supplementary supply of solar heat, so reducing conventional fuels demand can result in significant cost savings.
3. No corrosion problems.
4. The system will not malfunction if there are small leaks.
5. Air is nontoxic.
6. It requires less technical equipment.
7. Sustainable reduction in wastage.
8. Hygienic method of drying.
9. The quality, color, flavor of fruit is good.
10. Requires less man power.
11. No pollution.
12. The area required is less.

VIII. EFFICIENCY

1. A small change in boiler efficiency (even 1%) can represent a significant economic impact.
2. The cost of the process includes watertreatment, boiler, personnel services, equipment maintenance, typically these cost combine to be much lesser than the fuel cost.
3. The proposed drier will ensure uniform drying, in much lesser time, through maintenance of the chamber temperature within the desired limit. In this process, the heated air is not let out and it is recycled. Thus it results in high efficiency of operation.
4. The space required drying for the Chamber and the total time of drying will also be highly reduced with increased capacity for drying.

IX. CONCLUSION

This paper predicts and had proposed a cheap way of designing and constructing an efficient drier through which the solar energy can be tapped and stored in batteries and the plant can be run without a shut down even during cloudy days and even at dark nights. By using this technology we can increase the output power of solar energy and can use in much more applications. Also, results showed that the control system could improve energy efficiency during the drying process.

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VII. PI CONTROLLER

The PI controller which is going to be used in the controlled temperature is given to the dryer during the process of drying the fruits. The P and I terms are added together to produce a control signal that is applied to the system being controlled. Integral action enables PI controller to eliminate offset also avoids a major weakness of a P-only controller. Thus, the PI controllers provide a balance of complexity and capability that makes them by far the most widely used algorithms in process control applications.

VII. ADVANTAGE OF THIS APPROACH

1. To replace the conventional method of drying fruits; which cost more and time consuming.
2. Using a cheap supplementary supply of solar heat, so reducing conventional fuels demand can result in significant cost savings.
3. No corrosion problems.
4. The system will not malfunction if there are small leaks.
5. Air is nontoxic.
6. It requires less technical equipment.
7. Sustainable reduction in wastage.
8. Hygienic method of drying.
9. The quality, color, flavor of fruit is good.
10. Requires less man power.
11. No pollution.
12. The area required is less.

VIII. EFFICIENCY

1. A small change in boiler efficiency (even 1%) can represent a significant economic impact.
2. The cost of the process includes watertreatment, boiler, personnel services, equipment maintenance, typically these cost combine to be much lesser than the fuel cost.
3. The proposed drier will ensure uniform drying, in much lesser time, through maintenance of the chamber temperature within the desired limit. In this process, the heated air is not let out and it is recycled. Thus it results in high efficiency of operation.
4. The space required drying for the Chamber and the total time of drying will also be highly reduced with increased capacity for drying.

IX. CONCLUSION

This paper predicts and had proposed a cheap way of designing and constructing an efficient drier through which the solar energy can be tapped and stored in batteries and the plant can be run without a shut down even during cloudy days and even at dark nights. By using this technology we can increase the output power of solar energy and can use in much more applications. Also, results showed that the control system could improve energy efficiency during the drying process.

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Synthesis and Antibacterial Activity of 5-benzylidenebarbituric acids : A structure - reactivity Study.

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Abstract : A very simple and highly efficient synthesis was established for the reaction of barbituric acid and substituted benzaldehydes to provide novel substituted 5-benzylidenebarbituric acids. Synthesized substituted 5-benzylidenebarbituric acids were characterized by ¹H and ¹³C NMR spectral analysis. The antibacterial activities and structure reactivity correlation of the compounds have been studied.

Keywords : Substituted 5-benzylidenebarbituric acids; antibacterial, correlation studies.

Introduction

The barbituric acid derivatives are clinically useful. By substituting two protons in C-5 position during barbiturate synthesis, acidity of the whole molecule can be reduced and an unsaturated group can be added for the later incorporation of parahydrogen into the molecule [1]. Benzylidene barbituric acids as potential organic oxidizers [2] are applied for preparing pyrimidine derivatives [3]. The benzylidenebarbituric acids are the important building blocks in synthesizing pyrazolo[3,4-d]pyrimidines and pyrido[2,3-d]pyrimidines [4,5]. They also have a broad range of biological activities. Some barbituric acid derivatives have been widely used as sedative, hypnotic, anticonvulsant, antispasmodic, as well as local anesthetic agents [6]. Benzylidenebarbituric acids are useful as potential organic oxidizers, for the preparation of oxadeazaflavines [7] and for the unsymmetrical synthesis of disulfides [8]. Some of them have been recently studied as nonlinear optical materials [9]. Several 5-benzylidenebarbituric acids were prepared in the absence of solvent by the influence of infrared irradiation. These molecules were obtained by means of a Knoevenagel condensation between barbituric acid and various benzaldehydes [10]. Recently we have reported the substituent effects on zone of inhibition against the growth of microorganisms in various substituted 2-benzylidene-1,3-indandiones [11]. In continuation of our research interest in the structure - reactivity study, we have synthesized substituted 5-benzylidenebarbituric acids and studied the antibacterial activity to find out the substituent effect on 5-benzylidenebarbituric acid.

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Kidney Research Journal

Volume 8 (1): 1-6, 2018

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Research Article

Scanning Electron Microscopy Analysis of Effect of Pedalium murex (L.) Seeds on the Morphology of Calcium Oxalate Crystals

Krishnan Radhakrishnan (<http://ascidatabase.com/author.php?author=Krishnan&last=Radhakrishnan>),
Pandi Pandi Gowri (<http://ascidatabase.com/author.php?author=Pandi%20Pandi&last=Gowri>) and
Shanmugavadelu Chandra Mohan (<http://ascidatabase.com/author.php?author=Shanmugavadelu%20Chandra&last=Mohan>)

Abstract

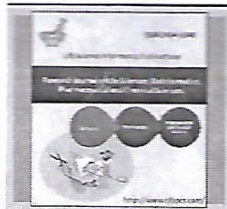
Background and Objective: Calcium oxalate crystals are found in majority of kidney stones as calcium oxalate monohydrate (COM) as one of the primary types of kidney stones. The present investigation aimed to better understand the role of Pedalium murex Linn. seeds on the inhibition of calcium oxalate (CaOx) crystals by Scanning Electron Microscopic (SEM) analysis. **Materials and Methods:** Under in vitro condition, the effect of Pedalium murex Linn. extract on the morphology of CaOx crystals was studied by scanning electron microscopy. **Results:** Extract inhibited the crystallization of CaOx , less and smaller particles were observed in the presence of extract. Scanning Electron Microscopic (SEM) images revealed aggregation of crystals without plant extract. With plant extract, the scanning electron micrographs showed discernible crystal unit boundaries. **Conclusion:** Pedalium murex Linn. extract was observed to have decreased crystal size and prevented the aggregation of calcium oxalate crystals.

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**Original Research Article**

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ANTIOXIDANT ACTIVITY OF NOVAL COMPLEXES OF SCHIFF BASE DERIVED FROM (E)-2-((2-HYDROXY-1,2-DIPHENYLETHYLIDENE)AMINO)PHENOLV. Balamurugan^{1*}, L. Muruganadam¹, K. Radhakrishnan²

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ABSTRACT: In this study a new metal complexes of Co(II), Ni(II), Cu (II) and Zn(II) with (E)-2-((2-hydroxy-1,2-diphenylethylidene)amino)phenol has been synthesized and characterized by elemental analysis, FT-IR, ¹H-NMR, ¹³C-NMR and molar conductance. The antioxidant activity of these complexes are being studied and compared with the standard ascorbic acid. Antioxidant study is carried out against the 2,2-diphenyl-1-picrylhydrazyl radical (DPPH), which shows the metal complexes found to be a good antioxidant, as comparable to ascorbic acid.

KEYWORDS: Schiff base, novel metal complex, antioxidant, DPPH, NMR.

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1. INTRODUCTION

Reactive oxygen species (ROSs) play an important role in degenerative condition such as aging cancer, cardiovascular diseases, cataracts, neuron degenerative disorders, liver diseases and inflammations [1]. These free radicals occur in the body during an imbalance between ROSs (Reactive oxygen species) and anti oxidants. Hence, the dietary intake of antioxidant is necessary and important to balance the anti oxidant states that would reduce pathological conditions to that induced free radicals [2]. A metal complex plays an essential role in agriculture, pharmaceutical and industrial chemistry. The biological study of these complexes highlights the potential of metal (II) complex with bioactive ligand as anti-oxidant activity. The synthetic metal complexes are act as antioxidants, which strengthen the endogenous antioxidant defenses from ROS ravage and restore the optimal balance by neutralizing the reactive species. They are gaining immense importance by

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Research Article

A Comparison of Chemical Composition, Antioxidant and Antimicrobial Studies of *Abutilon indicum* Leaves and Seeds

K. Radhakrishnan (<http://ascidatabase.com/author.php?author=K.&last=Radhakrishnan>), A. Mohan (<http://ascidatabase.com/author.php?author=A.&last=Mohan>), Shanmugavadivelu Chandra Mohan (<http://ascidatabase.com/author.php?author=Shanmugavadivelu&last=Chandra%20Mohan>) and S. Velavan (<http://ascidatabase.com/author.php?author=S.&last=Velavan>)

Abstract

Objective: The objective of this study was to evaluate in vitro antioxidant, antimicrobial activity and characterize the chemical constituents of leaves and seeds of *Abutilon indicum* by using gas chromatography-mass spectrometry (GC-MS). In addition total phenolics and flavanoids were also estimated. **Materials and Methods:** The GC-MS analysis of plant and seed extracts was performed using a GC-Brucker 436 system and interpretation on mass spectrum GC-MS was conducted using the database of National Institute Standard and Technology (NIST). Antioxidant activity was determined in the 1,1-diphenyl-2-picrylhydrazyl (DPPH) method. The total flavonoids assay was conducted by aluminium chloride colorimetric method and total phenolics content was determined according to the Folin-Ciocalteu method. Antibacterial activity and minimum inhibitory concentrations were calculated by the agar diffusion method. **Results:** Twenty five chemical compounds are identified from the plant extract and 29 compounds identified from seed extract by GC-MS analysis. The leaf and seed extracts showed significant DPPH scavenging activity (IC_{50} values are 48.94 ± 3.54 and $49.89 \pm 3.29 \mu\text{g mL}^{-1}$) compared with the values obtained for ascorbic acid standard (IC_{50} value 39.22 ± 5.50). The leaf and seed extracts prevented the growth of both Gram-positive and Gram-negative bacteria. The antimicrobial and antioxidant activities of the extracts were positively associated with the total phenolic and flavonoid contents of the extract. **Conclusion:** The presence of various bioactive compounds justifies the use of *Abutilon indicum* for various ailments by traditional practitioners.

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FOREIGN DIRECT INVESTMENT TRENDS IN INDIA

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Abstract

The saga of FDI trends in India, over the past two decades, signifies the sustained gentrification of foreign investment confidence. Though subject to erratic downfall, it did not impede the enthusiasm of external investors in India. Foreign Direct Investment (FDI) in India is the major monetary source for economic development in India. Foreign companies invest in India to take benefits of cheaper wages and changing business environment of India. Economic liberalisation started in India in wake of the 1991 economic crisis and since then FDI has steadily increased in India. According to the Financial Times, in 2015 India overtook China and the US as the top destination for the Foreign Direct Investment. In first half of the 2015, India attracted investment of \$31 billion compared to \$28 billion and \$27 billion of China and the US respectively. The database shows that FDI has been growing sizably in the fertile soil of the Indian economy, which was reconditioned by the eventful economic restructuring initiatives. This paper analyses the growth trends of inward FDI in India from 1990-91 to 2009-10 on a multi-dimensional perspectives. Along with the

annual trend, decadal and five year growth trend has also been analyzed to understand the periodical phenomena. The paper reviews the main policy framework on FDI, suggests further policy guidelines for the future as well to enable the country to be an enduring liberal and seemingly attractive investor-friendly investment climate.

Keywords: FDI, UNCTAD, Centre for Monitoring of Indian Economy.

INTRODUCTION

Disillusioned by the setbacks to heavily state-protected economies in general, and the disintegration of the USSR in particular, gave a room for India to have an objective re-look to the stifling regulative regime and the feeble knots of bureaucracy. Coincidentally, the fascinating waves of LPG (liberalization, privatization and globalization) started enticing the national economies across the world. India was not hesitant to follow suit. Despite the conditionality for enabling financial accommodation for an economy, which was near the brink of collapse, India was also lured into the euphoria of openness. As a result, the business atmosphere in India was transferred from license permit raj to laissez-faire, which

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is superseded by single window clearance system for many privileged ventures. The Nehruvian vision of isolationism and bureaucratic control (Cappelli et. al., 2010) helped the country barely to achieve almost consistently a meager Hindu rate of growth, as it was referred in the economic literature, which was not at all sufficient enough even to cover up the constantly rising population. International credibility of the country was abjectly low. It was evidenced from the low level of foreign exchange reserve, which was not enough to meet two weeks export bill in 1991. In this backdrop, India initiated its economic restructuring with a clear road map. After three years of bottleneck, the macro economic reform programme started showing promising signals. The approach towards foreign investments, backed by considerable strides in enabling business friendliness, has been progressively favourable. Throughout the restructuring process the business and economic policy regimes were enviably growth-oriented and stabilizing. It has been corroborated from the high annual GDP growth rate and the perceptible capability of the country to withstand the East Asian crisis in the late 1990s and the recent financial turmoil that shook the world economies, shattering the business confidence across the world. Inward FDI has a major role to play in shaping the structure of host economies. India is a perennial beneficiary of this bounty. The government initiated a dramatic liberalization of its regulative regime governing inward FDI in 1991 in tandem with the implementation of the new economy policy. The reforms initiated included the abolition of the mandatory industrial licensing system, the opening up of areas in which foreign participation was previously excluded

and the establishment of the Foreign Investment Promotion Board. The recent UNCTAD (2009) survey finding puts India as the most preferred destination for foreign investors, second only to china.

ROUTES

Foreign technology induction can be encouraged through FDI and through foreign technology collaboration agreements. The sectors which have resources but do not have the required technology acquire foreign technology collaboration through RBI or Government approvals. The total number of approvals recorded for the period of 2000 to 2010 by the RBI, SIA and FIPB is 8080. The RBI has approved 4580 proposal whereas SIA and FIPB have approved 3500. Technical collaborations have put a positive effect on the domestic firms. It helped in establishing technology transfers. An Indian company may receive Foreign Direct Investment under the two routes as given under:

1. **Automatic Route:** FDI in sectors /activities to the extent permitted under the automatic route does not require any prior approval either of the Government or the Reserve Bank of India.

2. **Government Route:** FDI in activities not covered under the automatic route requires prior approval of the Government which are considered by the Foreign Investment Promotion Board (FIPB), Department of Economic Affairs, Ministry of Finance. FDI is not permitted in the following industrial sectors:

- Arms and ammunition.
- Atomic Energy.
- Railway Transport.

- Coal and lignite.
- Mining of iron, manganese, chrome, gypsum, sulphur, gold, diamonds, copper, zinc.
- Lottery Business
- Gambling and Betting
- Business of Chit Fund
- Agricultural (excluding Floriculture, Horticulture, Development of seeds, Animal Husbandry, Pisciculture and cultivation of vegetables, mushrooms, etc. under controlled conditions and services related to agro and allied sectors) and Plantations activities (other than Tea Plantations).
- Housing and Real Estate business.
- Trading in Transferable Development Rights (TDRs).
- Manufacture of cigars, cheroots, cigarillos and cigarettes, of tobacco or of tobacco substitutes.

PURPOSE OF THE STUDY

The overall objective of the study is to examine the chronological trends in India's FDI inflows from 1990-91 to 2009-10 on a multi-dimensional perspective.

RESEARCH METHODOLOGY

The present study followed an analytical approach to chronological quantitative data. The database on FDI published by the Directorate of Industrial Policy and Promotion (DIPP), India and the Centre for Monitoring of Indian Economy (CIME) for the period between 1990 – '91 and 2009 – '10 was obtained for trend analysis. The DIPP database was procured from the official web page and that of CIME was from its monthly publications. The

growth trend was analysed in four levels for the period under consideration. The annual growth trend was estimated as a first step of analysis. These annual trends were averaged on a five year, ten year and eventually on an overall level to unfold and decipher the multi-dimensional trends and implications. As a prelude to trend analysis, the policy implications were reviewed to understand the institutional framework of FDI policy.

GLOBAL TRENDS IN FDI

Global FDI inflow was estimated as \$ 193 billion during the year 1990 (UNCTAD, 1991). The share of developed and developing countries was \$163 billion and \$30 billion respectively. During 1999, the FDI inflow of the world increased to \$865 billion. Out of it the share of developing countries was \$208 billion, showing an apparent increase in the stake of growing economies in the global inward FDI flows. The current global financial crisis has had a dampening effect on FDI (UNCTAD, 2009). World Investment Report (UNCTAD, 2009) discloses that the global trends in FDI inflows show a declining trend continuously during 2008 and the first quarter of 2009, immediately after an unprecedentedly record peak during 2007. The widespread significance of inward FDI is widely recognized as the off-shoot of rapid technological change, intensified competition and economic liberalization (UNCTAD, 2000). As global FDI flows are expected to jump from \$1.2 trillion this year to \$1.6 to \$2.0 trillion in 2012, changing ecosystem of foreign investment in India could pay rich dividends as it is observed by World Investment Report 2009 (UNCTAD, 2009).

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POLICY IMPLICATIONS

The economic crisis during 1990-91 triggered more comprehensive and sustainable reforms in India. These policies have provided ample opportunities to build strong foundations for planned economic development (Reddy, 2009). Dismantling barriers for ensuring free flow of capital was an essential component of the New Economy Policy initiatives 1991, which enabled removing the restriction on inward FDI in the country. As a start up initiative permission was granted to foreign investment aimed at encouraging foreign trading companies to assist Indian exporters in export activities, by approving FDI equity participation up to 51% in high priority industries (GoI, 1992). The foreign investment was further liberalized in 1993 by removing the conditionality of dividend balancing for non-consumer goods. Decisive policy decisions appeared during 1996 - 1997. The FDI limit was raised up to 74 per cent, under the automatic route by RBI in nine categories of industries in infrastructure sector. In 1997 the first ever guidelines for FDI for expeditious approval of foreign investment, in areas not covered under automatic approval, was announced. In 1999, in terms of procedures, automatic approval for foreign equity participation up to 100 per cent is permitted for electricity generation, transmission and distribution for foreign equity investment not exceeding Rs.1500 crore (excluding atomic reactor power plants). In 2000-2001 the time frame for consideration of FDI proposals was reduced from 6 weeks to 30 days for communicating Government decisions. In August 2001 the Planning Commission appointed a Steering Committee on FDI with a mandate of streamlining foreign

investment. In a major breakthrough FDI up to 100 per cent is allowed under automatic approval for most sectors/activities, where the prior approval is not required. Foreign investment limit in the private sector banking was raised to 74 per cent under automatic approval. As a result of the comprehensive review of the FDI policy, wide-ranging policy changes were notified in 2006, extending automatic routes, increasing equity caps, removing restrictions, simplifying procedures and extending the horizon of FDI to vistas like single brand product retailing and agriculture (GoI, 2008a). In a major policy initiative, during 2008, the sectors, in which FDI was prohibited, were specified. These areas are retail trading (except single brand product retailing), atomic energy, lottery business, gambling and betting, business of chit fund, nidhi companies, trading in transferable development rights and activities/ sectors not opened to private sector investment (GOI, 2009). The latest policy document on FDI was released on 31st March 2010, whereby this document now consolidated all existing regulations related to FDI contained in FEMA, the comprehensive policy document came into effect from April 1, 2010 and would be replaced every 6 months after incorporating the changes which have been effected during the period. This step will improve the transparency and boost confidence level of global investors' community. The present policy reveals that 100 per cent FDI is permitted under automatic route in most of the sectors while there are sectoral caps, in the case of banking (74%), Insurance (26%), Telecom (49%), Aviation (74%) and single brand retail (15%) etc. Certain sectors like atomic energy, lottery, gambling and betting, multi

brand retail etc., are not yet permitted (GoI, 2009). Government's recent proposal to allow up to 49% FDI limit in defense and entry in multiple brands in retail have a serious discussion on different forums and revealing different versions of the stakeholders leads to examining multiple dimension of recent policy initiations. The Indian polity is also planning to initiate the full convertibility of rupee on a phased manner (current account convertibility was announced in 1994). The institutional mechanism established for FDI growth in India has five major components. Firstly, the establishment of Foreign Investment Promotion Board (FIPB) for reviewing and recommending the FDI proposals, which do not come under the automatic route. approval holders in obtaining various approvals and resolving their operational difficulties. Secondly, the constitution of Foreign Investment Promotion Council (FIPC) to undertake vigorous investment promotion and marketing activities. Thirdly, Financial Investment Implementation Authority (FIIA) was constituted for assisting the FDI. Fourthly, The Foreign Exchange Management Act (FEMA) has been introduced as Enforcement Directorate, replacing the much punitive Foreign Exchange Regulation Act (FERA), with a broad aim of consolidating and amending the law relating to foreign exchange with objective of facilitating external trade and payments and for promoting the orderly development and maintenance of foreign exchange market in India. Lastly, constitution of Investment Commission (IC) for facilitating meetings and visits industrial groups and houses in India and large companies abroad in sectors where there was dire need for investment.

TRENDS IN FDI INFLOW

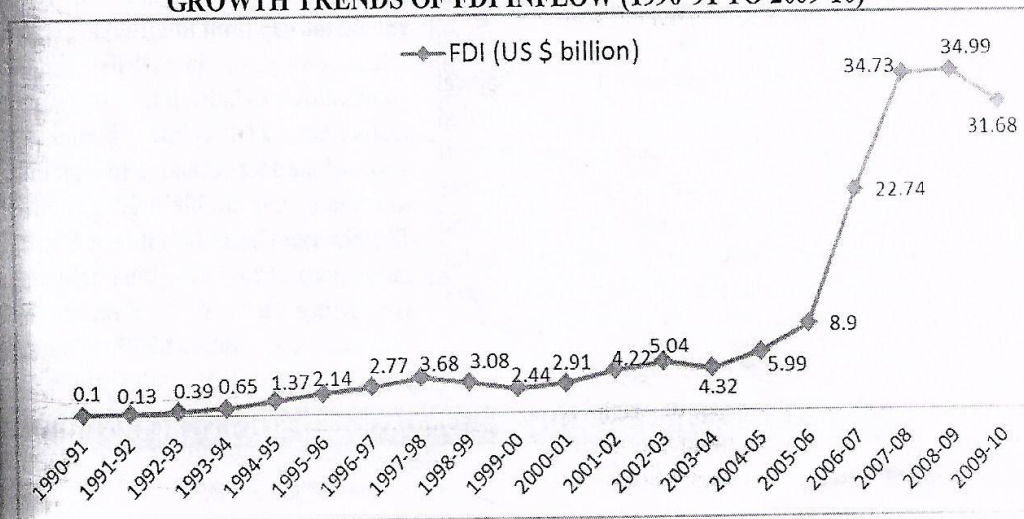
The pattern of FDI inflow to India, over the last twenty years, shows a rising trend, with 36.1 per cent growth rate on an average, with erratic oscillations. It is a clear indication of the international business confidence on India. A generally accorded prediction is that India would be the next super power (GOI, 2008b). Both policy and structural changes are being taken place in India that are conducive for building business confidence and, thereby, furthering international business partnership creating all-season investment enabling climate. The saga of FDI inflow to India is worth analyzing. A cursory analysis of the chronological data during immediately preceding two decades discloses that FDI is growing at a rate of 36.1 percent on a twenty year over all average (refer table 1). Splitting the twenty year span into two decades, the FDI growth rate shows an almost consistent level to the overall percent, being 36.78 per cent during the first decade and 35.62 per cent during the second decade. The economic confidence of world economies was shattered by periodical business and economic turbulence. However, the business confidence of global investors on India continued to be positive, though subject to erratic disturbances, as evidenced by the statistics. Over the years three financial years (1992-93, 1994-94 and 200607) were remarkable with FDI growth rates crossing 100 percent over the immediate preceding years. Within two years of economic restructuring policy of India the FDI inflow recorded all time highest growth (202.31 per cent) during 1992-93. It can be inferred from the date that foreign investors were waiting at the door steps of India, as they rushed in when the economy started opening up.

TABLE -1
INDIA'S FDI GROWTH TREND (1990 - 91 to 2009-10)

Year	FDI (US \$ billion)	Growth Rate (%)	Five Year Average (%)	Ten Year Average (%)	Overall Average (%)
1990-91	0.10	0	88.25	36.78	36.1
1991-92	0.13	30			
1992-93	0.39	202.31			
1993-94	0.65	66.41			
1994-95	1.37	110.59			
1995-96	2.14	55.82	16.19		
1996-97	2.77	29.38			
1997-98	3.68	32.92			
1998-99	3.08	-16.27			
1999-00	2.44	-20.87			
2000-01	2.91	19.23	21.61	35.62	
2001-02	4.22	45.19			
2002-03	5.04	19.28			
2003-04	4.32	-14.18			
2004-05	5.99	38.52			
2005-06	8.90	48.67	49.63		
2006-07	22.74	155.47			
2007-08	34.73	52.72			
2008-09	34.99	0.76			
2009-10	31.68	-9.46			

Source: Center for Monitoring of Indian Economy (CMIE), July 2010, P.7

FIGURE - 1
GROWTH TRENDS OF FDI INFLOW (1990-91 TO 2009-10)



flow to India, shows a rising growth rate on an annual basis. It is a clear trend that international business generally accorded to India would be the next step. Both policy and implementation taken place in India have been a boon for building the economy. Thereby, furthering the growth of the country. Partnership creating a conducive business climate. The growth of India is worth a detailed analysis of the growth rate immediately following the disclosure that FDI inflow has increased by 5.1 percent on an annual basis (refer table 1). The growth rate shows an upward trend to the overall growth rate during the first half of the year during the period of economic confidence. The growth rate is shattered by the economic turbulence. The confidence of global investors is expected to be positive, despite the economic disturbances, as the growth rate is expected to rise. Over the years, the growth rate has been remarkable with FDI inflow increasing by 100 percent over the last decade. Within two years, the growth rate of India has become the highest in the world. The growth rate in 1992-93. It can be seen that foreign investment has taken the door steps of the Indian economy and has become a significant part of the economic growth.

12/10)

The inward FDI accumulated an ever time higher amount of \$34.99 billion during 2008-09, followed by a down fall in the next year. This accomplishment is quite incredible when it is known that FDI inflow during 1990-91 was a paltry amount of \$0.10 billion. To understand the periodical trends in FDI inflow, the twenty year time frame was divided into four quarters, each comprising of five years and finding five year average for each quarter. The highest rate of growth recorded during the first quarter (88.25 per cent). This quarter was notable due to a few of other factors also. Firstly, the highest annual growth rate recorded during this quarter (202.31 per cent in 1992-93). Secondly, not a single year registered negative growth. Thirdly, FDI growth rate crossed 100 percent limit in two alternate years. Lastly, the single quarter that registered constant rising trend.

A close examination of the second quarter (1995-96 to 1999-00) unveils the following trends. Firstly, the positive growth trend continued (though subject to oscillation) during the initial three years. Secondly, the last two years of this quarter registered setbacks, the highest negative accumulated growth in the overall scenario. Contradictory to the global trend (refer UNCTAD, 2000), inward FDI to India experienced a continuous decline during this period. These setbacks were due to the unfavourable FDI policy by the new political party at power (however they overhauled their policy later). Those who are aware of the East-Asian currency crisis towards the close of last century can easily understand that the reason for this reverse gear was the repercussion of the collapse of Asian Tigers. Lastly, the five year trend is showing a perfect inverted 'U' hypothesis (refer figure

4b) and recorded the lowest quarterly average (16.19 per cent) in the reference period. The third quarter was relatively better than the previous quarter, being the quarterly average 21.61 per cent. This quarter experienced a cyclical trend in FDI flow. The last quarter witnessed an optimistic growth patterns as the rate of growth (49.63 per cent) got back to higher plateau after low growth rates during previous two consecutive quarters. An appreciable growth in FDI inflow (155.47 per cent) was witnessed in during 2006-07 (immediately preceding the global financial turmoil). It has been followed by a continuous down fall and eventually set back in 2009-10. The FDI inflow touched its ever recorded highest level (\$34.99 billion) in the Indian economic history in 2008-09, when the world economies were engulfed by global financial landslide and the global inward FDI encountered a negative growth trend (UNCTAD, 2009).

THE ROAD AHEAD

Efforts are on to reinforce the competitiveness of India as a first choice investment destination. The road ahead for India is not seemed to be smooth, when the world economies are contesting to woo foreign investors. We need shore up transparency and rationalize the rules and extend the cap limit to different sectors and allow new sectors in FDI list leads to tap good inflows to India, but no one can ignore that a liberal FDI regime is bound to act as a springboard for attracting foreign investors to India's near double digit growth story. The Foreign Direct Investment Confidence index prepared by the global management consulting firm A. T. Kearney (2010) estimates that India is the third among the top 25 inward FDI optimistic countries

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across the world. The report also observes that the investors have shown a strong vote of confidence for the strength of BRIC (Brazil, Russia, India and China) countries. Very recently the country has mooted the idea of CEO forums, as a second string of FDI friendly policy. The CEO forums can spearhead Track II diplomacy of the economic kind where in the high-level corporate interaction between two countries can create an enabling environment that could be capitalized wherever seemingly intractable bilateral hurdles crop up (Joshi, 2010). India and China will retain their supremacy in this regard. Some policy prescriptions are put forward to cement the position of India as a global investment enabler. Such steps may include raising the cap limit, further liberalization of FDI in defense production, furtherance of automatic approval, liberalize the brownfield investment, overhaul of retail sector and more transparent governance and civil administration.

CONCLUDING REMARKS

It has, ipso-facto, been proved that India is sustainable investment destination and the same has been reinforced by the sustained rise in the inward FDI flow to the country over the last twenty year span of time, signifying the growing degree of India's transnationality (a measure of the relative economic importance of foreign affiliates in total economic activity; refer UNCTAD, 2005) and it will continue to surge in future also. The rapid strides in inward FDI can be cited as an important indicator of gains from structural economic reforms, underpinning the openness of the economy, reflecting the attractiveness of India as an investment destination. FDI is playing a decisive role in

the infrastructure development in the country. It is widely known that the skepticism on the motive of foreign capital and heavy obsession on the principle of 'self-reliance' were the major impediments for the unimpressive growth FDI during the early stage of reform regimes. It is during the 1993-94 there seemed to be a realization of the importance of FDI. This enlightenment led to the progressive removal of barriers of foreign capital inflow through greater procedural simplifications and threshold limit. Now India provides a liberal, seemingly attractive and investor-friendly investment climate. The database on FDI we have discussed aforesaid is a solid evidence of recognizing its potential as an accommodative host for FDI. The major motivation of foreign investors to enter the Indian market is low-cost level of the skilled labour force and this decreasing cost advantages will be even more significant in the future. However, we are not overlooking the labour militancy and unrest, which is veritably a nightmare and strange industrial relation to foreign investors. The future of India's growth and output is seen to be connected to FDI and it was deemed necessary for promoting higher growth of output, exports and employment through enabling policy framework.

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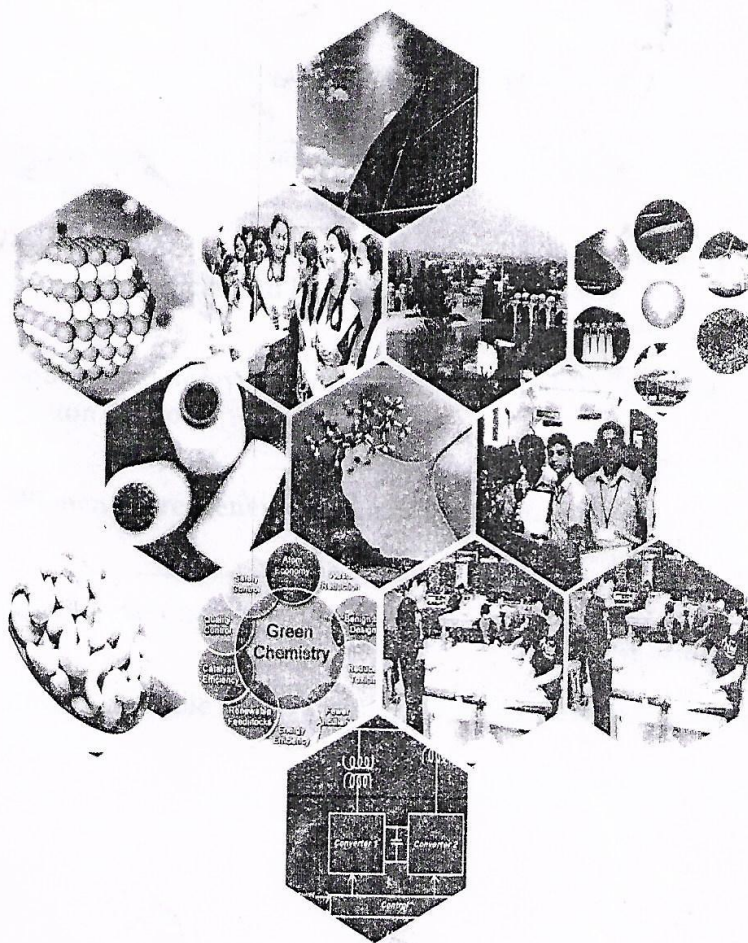


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WOMEN ENTREPRENEURS IN THE ERA OF GLOBALISATION

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ABSTRACT

Entrepreneurship is necessary to initiate the process of economic development of both developed and developing countries as it is the backbone of economy of any country. It is observed that there has been an increasing trend in number of women-owned enterprises as the result of drastic change in the present world. Women are participating in large number in the present world of business. Entrepreneurship of Women development is an essential part of human resource. Entrepreneurship is considered as one of the most important factors contributing to the economic development of the society. Entrepreneurs have been considered instrumental in initiating and sustaining socio-economic development. In India, concept of women entrepreneurship is of recent origin. Women have become aware about their rights and situations and entered indifferent fields of business. They have established their own successful business empires. They are contributing towards the growth of economy and improvement of their socio-economic conditions. Development Compared to other countries the development of women entrepreneurship is very low in India, especially in the rural areas. However, women of middle class are not too eager to alter their role in fear of social backlash. Since Globalisation is opening up the Indian economy suddenly at a very high speed without the requires economic and social policies to provide the much required safety net, women who have been involved with production in the traditional ways, have to cope with numerous problems and yet try to avail of the opportunities which an open economy promises. The changing scenario will diversify the information needs of women at different levels.

KEYWORDS

Women Entrepreneurs, Women Entrepreneurship, Globalisation.

INTRODUCTION

Indian women have travelled with the time of centuries and have proved to the world that the hand that rocks cradle can rule the world. To Pundit Nehru "The greatest revolution in country is the one

that effect the status and living conditions of its women" To him, when women move forward the family moves, the village moves and the nation moves. These women have been regarded as the nuclei of a nation and the builders and moulder of its destiny. Globalisation can be a major force for prosperity only if it is backed by adequate national policies and conducive social and economic environment. In India, a large group of working women are unorganised sectors. Socially the majority of Indian women are still tradition band are in a disadvantageous position. Since globalisation is opening up the Indian economy suddenly at a very high speed without the requires economic and social policies to provide the much required safety net, women who have been involved with production in the traditional ways, have to cope with numerous problems and yet try to avail of the opportunities which an open economy promises. The changing scenario will diversify the information needs of women at different levels.

NEED FOR WOMEN ENTREPRENEURSHIP

Women entrepreneur is entitled to necessary backup support to specialized and experienced persons. The need for providing proper environment for entrepreneurship is of vital importance. Desirable qualities may be developed by training. To change the social and economic structure of our country and to uplift the disadvantaged section of the society like women, greater emphasis is needed on entrepreneurial development. Human resources, both men and women, of working age constitute the main strength of economic development of an action. Woman form an important segment of the labour force and the economic role played by them cannot be isolated from the framework of development. The role and degree of integration of women in economic development is always an indicator of women's economic independence and social status. Soundarapandian quotes the words of Pandit Jawaharlal Nehru – "When women move forward, family moves and the village's moves and the nation moves." Employment gives economic independence to women. Economic independence paves the way for social status. Moreover, women have become an integral part of the industrialized society. A women must supplement the income of the family through whatever skill she possess or has acquired. The present inflationary pressures warrant women to join the male members of the family for securing substantial livelihood. According to Rani Entrepreneurship seems to be ideal for women seeking participation in the country's economic development because of certain factors. Emergence in the country's economic development because of certain factors. Emergence of entrepreneurship is considered to be closely linked to social, cultural, religious and psychological variables.

GLOBALISATION AND ENTREPRENEURSHIP

The concept of entrepreneurship has gained world wide popularity in recent years. Women are becoming entrepreneur at a faster rate as compared to men. It is estimated that women entrepreneurs presently comprise 10 per cent of the total number of entrepreneurs in India, and this figure is found to be increasing every year. If the prevailing trend continues, it is likely that in another five years, women will comprise 20 per cent of the entrepreneurial force. But women face major challenges as a result of change in the world economy arising from rapid globalisation, fast-paces technological progress and a growing in formalisation of work. As result, as the I L O notes, women's labour market status has greatly altered. Although women representation in the labour force is increasing all over the world – to at least one – third in all regions except Northern Africa and Western Asia their participation rates are still lower than men's and they are disproportionately represented in non – standard and lower – paid form of work, such as temporary and casual employment, part- time jobs, home – based work, self – employment and work in micro enterprises. Achieving Women's

Empowerment is not a question of giving or providing some provisions, but it is a question of all women being able to use those provisions without hesitation. They should also be able to use such provisions for empowerment without being compromised by their economic status through social and cultural limitations imposed on them and by ever present threat of violence. The welfare, equity, efficiency and anti-poverty approach might be connected to women's empowerment. Women's empowerment develops self-confidence, self esteem, sense of urgency and a sense of dignity in them.

Women's empowerment includes two components like attitudinal empowerment and material advancement. This helps to improve women's need strategies and these involve a complex interplay and a shifting empowerment of women in the economic area. Women's active participation in economic activities leads to their economic development. Participation of women in entrepreneurship will provide a change to utilise their free time, rather than being employed outside their homes in some other job. In a meeting conducted by a consortium of women entrepreneurs in India concluded that the women's after that it is for women's development and now it is for Women's empowerment.

STUDIES ON WOMEN ENTREPRENEURSHIP

Rani (1986) examined the characteristics of women entrepreneur and the factors that motivate them to start a business, About 30 respondents were randomly contacted during their the training in entrepreneurial skill in Hyderabad in October 1985. The study revealed that the majority of the were in the age group, 21-30 years, are were prompted by the desire "to do something independently". Among the other factors that motivated the trainees to start new enterprises were:- (a) the desire to keep busy, (b) to supplement family income, (c) to gain business and technical knowledge and earn money. A project by Mrs. Gloria Daya Samuel (1991) examines the managerial efficiency of women entrepreneurs in food processing units of Madhurai district of Tamil Nadu. The study covers 56 women entrepreneurs and 10 male entrepreneurs in an Urban area. The study tested the managerial performance of women and men entrepreneurs and reveal that there is no significance difference in the managerial performance in terms of profit of male and female entrepreneurs. A study of women entrepreneurs and enterprises at Chennai by the centre for Entrepreneurs Development, Chennai (1992) reveals that a new old characteristics in their social status are their family in decision making, sharing family responsibility, personality traits in communicating with others, lack of proper training and lack of market orientation. A regional workshop on the development of women entrepreneurship, held at the Indian Institute of Management, Ahmedabad in 1992, strongly recommended the developing of micro enterprises among Indian women, since the merit of such enterprises is that the women themselves could run the business, within their capacity. In order to judge the effectiveness of the training of entrepreneurs, 50 trainees at the centre for Entrepreneurs Development Madurai were intervened to find out the success rate in areas where training has helped in self improvement. The studies showed that the problems faced by entrepreneurs are finance, marketing, labour and lack of information. Surekha rao and Suneetha (2002) conducted OC research study in the Tirupathy region. The sampling size s 30 women with two years experience in entrepreneurship. The majority of 47 percent respondents participate in their enterprise for 6 hours to 8 hours per day and their main motive to start an enter prise is to utilise leisure time, but 54 per cent of the respondents said that their motives are to get employment, to support family income, use of skills and dissatisfaction in present job. 53 percent of their major ambitions and to get a good income and to prove a good entrepreneurs.

NEED FOR WOMEN ENTREPRENEURSHIP IN THE GLOBALISATION ERA

In the developed countries like United States of America and Canada women own 30 per cent of all businesses. In the US women launching small business units, at almost twice the rate of men and employ one worker out of every ten, thus generating jobs for more people than all the fortune 500 companies combined. The transformation of the social fabric of Indian Society in terms of increased illiteracy among women and varied aspirations for better status have witnessed a growing volume of un-employment. This problem necessitates a change in the life style of men and women in the country. Self employment is recognised as panacea, which generates a category of entrepreneurs, who own economic enterprises in general and particularly for women would be the appropriate approach to fight poverty at the grass roots level and generate income at the house hold level. The era of globalisation the quest for economic independence and better social status and some times the sheer need for the family's survival, force women into self employment and entrepreneurship. Women are becoming entrepreneur at a faster rate as compared to men. It is estimated that women entrepreneurs presently comprise 10 per cent of the total number of entrepreneurs in India, and this figure is found to be increasing every year. In the prevailing trend continues. It is likely that in another five years, women will comprise 20 per cent of the entrepreneurial force. But women face major challenges as a result of changes in the world economy arising from rapid globalisation, fast – paced technological progress and a growing in formalisation of work. The New Industrial Policy (NIP) also has stressed the importance of entrepreneurship among women. The NIP concedes that merely making larger resource allocation for women within the prevailing pattern and structure of development would not yield the desired results. This policy would help to develop personality of the women entrepreneurs and social conditions in the era of globalisation.

APPLICABILITY OF GLOBALISATION

In understanding the impact of Information and Communication Technology (ICT) on poorer countries, it is important to understand globalisation, since ICT has become one of the major driving forces in bringing national markets to the international domain. Countries are thus affected by globalisation either through inclusion or exclusion; this polarity in economic well being increases as the world economy becomes reliant on information technologies. Globalisation is not a new phenomena, but the distinguishing feature of the current form of globalisation is that both developing and developed countries, have become increasingly connected through trade in digitized information. Combinations of computer and communication technologies culminating in networking technologies have enhanced the speed reduced the cost of communication to such an extent that the question of distance has become less relevant in commercial and business transactions. The position of women, even in the developing world, has been far from uniform or developing world, has been far from uniform or unilinear in this emerging global scenario. In some developing countries, such as India, Women have become major recipients of this globally distributed work. The market for e-business and e-commerce is, at least potentially, global Hence the internet, if and when available to have access to global knowledge that includes prices, markets and tools. It has strengthened their ability to more effectively compete even in the domestic market. When they have been included in the digital economy, women have benefited (albeit to a lesser degree than men) by having access to:-

1. Global markets
2. Globally distributed work;
3. Global Knowledge

Nevertheless, in spite of the new opportunities that ICT has offered to women, one can only be cautiously optimistic. The success of women has so far been limited to a handful (mostly Asian)

countries. The beneficiaries are generally from urban areas, whereas the majority of women, even in the high profile Asian countries, live in rural areas where connectivity is rare or non-existent. Women are generally engaged in meeting local and family needs and are overwhelmingly not linked to a global digital economy that is essentially geared to trade anchored in market transaction.

POSITION OF WOMEN ENTREPRENEURS

Women's small and medium-scale enterprises (SME) constitute a seedbed for entrepreneurship development and are an important source for the emerging private sector in developing countries. They naturally play an important role for private sector-led growth. Taking into account that women constitute one in three of the global labour force in manufacturing, the importance of women entrepreneurship development becomes even more obvious for promoting and sustaining industrial development. UNIDO recognizes that the participation of women in industrial production is a means of empowering women economically which results in better education, better health, and child care. Women's economic empowerment leads in many instances to more social recognition and less discrimination. However, women's entrepreneurial endeavours are not without constraints and problems. Some are due to stereo-type discrimination, others are related to their limited training, limited access to economic opportunities, information and technology, particularly in the developing countries. In order to be competitive in national and international markets, women should not be constrained by these limitations. Increased participation of women entrepreneurs in national and global economics can be promoted through the creation of an enabling environment with policy measures addressing impediments to women business, training and improved access to new technologies.

PROBLEMS OF WOMEN ENTREPRENEURS

In the era of globalisation women entrepreneurs often face difficulties in gaining market access as their products do not enjoy comparative advantages. They are unable to meet either quality requirements or environmental regulations imposed by the markets due to their inadequate skills. Low level technologies and production techniques. Lack of modern marketing techniques or information further hampers them to export their products. Moreover, particularly in the case of Africa, women entrepreneurs face increasingly competitive threats from large Asian developing countries. Thus it becomes imperative that they become capable of participating in the global value chain of industrial production. This requires not only knowledge and skills but also information access and absorptive capacity of new technologies. Collective efficiency in terms of networking and clustering of enterprises is another aspect that contributes to this process particularly as it relates to the (SME) sector where women entrepreneurs are most involved. Apart from the above Indian women entrepreneurs exclusively face the following problems:-

- + Patriarchy and social pressures.
- + Caste based discrimination and social restrictions.
- + Poverty.
- + Insufficient advancement facilities.
- + Powerlessness.

SUGGESTIONS

The following suggestions are given to overcome the problems of women entrepreneurs.

- + It is worth considering that all women enterprises should come under one roof just like all companies

come under the companies act, to have some preferential treatment for specific period.

+ It is necessary to build up an effective research and data base in the field of women entrepreneurs. Building up such a research and data base can help in locating gaps and the emerging needs in the area of women entrepreneurship and in planning appropriate policies and programmes for women entrepreneurs in the future.

+ Whenever possible training programmes should be framed to support and promote group entrepreneurship. The great advantage of group entrepreneurship is that it can be carried out with the poorest of the poor. Coping mechanisms and stress management topics could be given priorities in the entrepreneurial programmes in order to meet the challenges from competitors.

+ When several agencies are involved in the promotion of women entrepreneurs there should be proper Co-ordination in terms of objectives, fiscal targets and social outcomes

+ Financial assistance for export.

+ It is need to proper training on marketing research and market strategy.

+ Associations of women's enterprises must be formed to voice their demands and such associations can represent their problems to the state. Also these associations can bring our case studies of successful women entrepreneur to motivate the new and existing enterprises.

Conclusion

Thus women entrepreneurs can play a crucial role in the industrial as well as Human Resource Development and strengthen the nation's economic development in midst of highly competitive global business situations. For this among other factors, women entrepreneurs should be developed and challenged properly.

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