ಕರ್ನಾಟಕ ನಗರ ಮೂಲಸೌಕರ್ಯ ಅಭಿವೃದ್ಧಿ
ಮತ್ತು ಹಣಕಾಸು ನಿಗಮ ನಿಯಮಿತ
ನೋಂದಾಯಿತ ಕಛೇರಿ : ನಗರಾಭಿವೃದ್ಧಿ ಭವನ
22, 17ನೇ 'ಎಫ್' ಅಡ್ಡರಸ್ತೆ, ಹಳೇ ಮದ್ರಾಸ್ ರಸ್ತೆ, ಇಂದಿರಾನಗರ
2ನೇ ಹಂತ, ಬಿ.ಎಂ.ಟಿ.ಸಿ. ಬಸ್ ಡಿಪೋ ಹತ್ತಿರ, ಬೆಂಗಳೂರು-560 038
ದೂರವಾಣಿ : 080-25196124-129 ಫ್ಯಾಕ್ಸ್ : 080-25196110

Karnataka Urban Infrastructure Development & Finance Corpn. Ltd.,
Regd. Office : Nagarabhivruddi Bhavan
22, 17th 'F' Cross, Old Madras Road, Indira Nagar
2nd Stage, Near BMTC Bus Depot, Bangalore - 560038.
Phone : 080-25196124-129 Fax : 080-25196110
E-mail : info@kuidfc.com, website: www.kuidfc.com

No.KUIDFC/FUNDS/RES/117/2016-17/1796

Date: 12.09.2016

To,

Mr.Ananda S,
Head of the Department,
Dept. of Bio Technology,
Sapthagiri College of Engineering,
#57/1, Chikkasandra, Hesaraghatta Mn Rd,
Bangalore-57.

Sir,

Sub : Development of Bio-resins and its use in processing of waste plastics and waste aluminium as composite laminates.

****

With regard to the above subject, the request of the research students (Akshay Kumar.R, Sagar.S, Chetan.S, Shivaraj.V) is accepted by KUIDFC and accordingly we have released a grant of Rs.50,000/- on 31.08.16, as first installment towards the said project research work.

A monthly brief status report may please be submitted to this office for our reference. On utilizing the released amount, a utilization certificate shall be furnished along with necessary bills, vouchers etc. These bills & vouchers shall be duly certified by the HOD.

Thanking you,

Yours faithfully,

General Manager
(Urban Affairs)

Prof Soumya to file

19/9/16

Principal
Sapthagiri College of Engineering
14/5, Chikkasandra, Hesaraghatta Main Road
Bengaluru - 560 057

Principal
Sapthagiri College of Engineering
Chikkasandra, Hesaraghatta Road,
Bangalore-560 057

18

From,

07/09/2016

Akshay Kumar.R
Student
Department of Biotechnology
Sapthagiri College of Engineering
Bengaluru-57

To,
C.Karthikeyan
Project Management Expert
KUIDFC
Bengaluru-27

Respected Sir,

Sub: Biotechnology research centre.

With respect to the above subject, Dr.Ananda.S is the head of the department of the biotechnology research centre in our college. His personal bank account is considered as departmental account and all the funds are therefore credited officially to the heads account. Kindly release the fund to his account at the earliest. We would be grateful for this act of kindness.

Thanking You,

Yours Faithfully,
07/09/2016
AKSHAY KUMAR.R

Principal
Sapthagiri College of Engineering
Chikkasandra, Hesaraghatta Road,
Bangalore-560 057

From,

3/08/2016

Vinutha Moses
Assistant Professor
Department of Biotechnology
Sapthagiri College of Engineering
Bengaluru-57

Through,

Dr. Ananda.S
Professor & Head
Department of Biotechnology
Sapthagiri College of Engineering
Bengaluru-57

To,

C.Karthikeyan
Project Management Expert
KUIDFC
Bengaluru-27

Respected Sir,

Sub:Requisition to sanction 50,000/-a part of approved grant

With respect to the above subject, as we have started our research studies with extensive literature surveyand the experimental work on processing of waste plastics and development of bio resins from organic waste. We require, fund for the analytical studies and procurement of chemicals. We request your kind self to consider and sanction the first half grant of an amount of 50,000/-. For this act of kindness we would ever be grateful.

Thanking You,

Yours Faithfully

Vinutha Moses

Research Students:

1. Akshay Kumar.R
2. Sagar.S
3. Chetan. S
4. Shivaraj. V

Principal
Sapthagiri College of Engineering
Chikkasandra, Hesaraghatta Road,
Bangalore-560 057

Research Head
Dr. Ananda.S

Head of the Department
Dept. of Bio-Technology
Sapthagiri College of Engineering
No. 57/1, Chikkasandra,
Hesaraghatta Main Road,
Bangalore -57

SAPTHAGIRI COLLEGE OF ENGINEERING
Dept of Bio-Tech
BANAGLORE -57

DC CUM CREDIT / CASH BILL

Mob : 9741816651

PUNITHA ENTERPRISES

No. 26, 10th Cross, Patel Channappa Indl. Estate,
Andrahalli Road, Near Padmavati Weight Bridge,
Peenya 2nd Stage, Bangalore - 560 091.

No. 979 Date: 31/10/11

To Cash.

Order / DC No..... Date.....

Sl. No.	Particulars	Qty.	Rate	Amount Rs.	Ps.
1	HD Red	20 Kg	100/-	2000	/-
2	LD M/c	20 Kg	95/-	1900	/-
3	Nylon 6 Black.	20 Kg	150	3000	/-
4	ABS 10 Kit	1 Kg	65	65	/-
5	Pvc 10 Kit	1 Kg	120	120	/-
6	P.P Black	1 Kg	100	100	/-
7	P.S Black	1 Kg	100	100	/-
			Total	7285	/-

For PUNITHA ENTERPRISES

Receiver's Signature

Welcomes You

DEVIKA GASOLENE PARK
MALLASANDRA
HESARGHATTA MAIN ROAD

Tel. No.: 9740952287

Receipt No.: J1945
Local ID : 00138530
FIP No. : 03
Nozzle No. : 03
Product : Petrol
Density : 748.4Kg/Cu.mtr

Preset Type: Amount
Rate : 071.29
Volume : 00007.01
Amount : 00500.00

Vehicle No.: Not Entrd
Mobile No : Not Entrd

Date : 24/10/16 Time: 15:09

CST NO :
LST NO :
VAT NO :

. & YOU! Please Visit Again..

SAMBASHIVA S.S
HPCL DEALER
TIN.NO.29981186171
80FEETROAD,KTTIGEPALAY.
BANGALORE.560091
Bill No. :155583
Transac.ID :
Vehicle No.:NotEntered
Date :30/10/16
Time :13:04:50
FP. ID :4
Nozzle No. :2
Fuel Type :MS
Density :----kg/m3
Preset val.:Rs.200
Rate :Rs.71.29
Sale :Rs.200.00
Volume :2.81Lts.
WEL COME

Welcomes You

DEVIKA GASOLENE PARK
MALLASANDRA
HESARGHATTA MAIN ROAD

Tel. No.: 9740952287

Receipt No.: J3633
Local ID : 00015666
FIP No. : 02
Nozzle No. : 02
Product : Xtra Prem
Density : 749.6Kg/Cu.mtr

Preset Type: Amount
Rate : 074.18
Volume : 00001.35
Amount : 00100.00

Vehicle No.: Not Entrd
Mobile No : Not Entrd

Date : 31/10/16 Time: 16:31

CST NO :
LST NO :
VAT No :

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Chikkasandra, Hesaraghatta Road
Bangalore-560 057

Sri Padmavathi Weighers

No. 420, 5th Main, Sri Patel Channappa
Industrial Estate, Heganahalli, Peenya 2nd Stage,
BANGALORE – 560 078
Ph : 69572028

80 TONS CAPACITY ELECTRONIC WEIGH BRIDGE

SL. NO.	:	
DATE	:	3484
TIME	:	28/10/2016
RATE	:	10:21:49
VEHICLE NO.	:	20=00
PARTY	:	KA02C 8111
MATERIAL	:	
2ND WT.	:	LOAD
1ST WT.	:	
NETT WT.	:	825 kg

Certified by the Dept. of Legal Metrology
Government of Karnataka

ALL 24 HOURS SERVICE

Thank You Have a nice Day Visit Again

RETURNABLE DELIVERY NOTE

Sl. NO. : 247

DATE : 28/10/16

U. P. R. Ref.

57F (2) No. :

Date :

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Sapthagiri College of Engineering
Chikkasandra, Hesaraghatta Road
Bangalore-560 057

UOM	QUANTITY	REASON FOR
Kgs		for Grinding.

Umesh Auto.
Transporter

Receiver's Signature with Seal

For PROGRESSIVE INDUSTRIES

Please return the duplicate in token of having receiving the above goods

TIN : 29110066348

Our K.S.T No. 01002089
C.S.T. No. 01052081 } Dt. 04-01-1991

PROGRESSIVE INDUSTRIES

B-106, 3rd Stage, Peenya, Ind-Estate, Bangalore - 560 058.
Ph : Off. 28362591, Tele fax : 28363708, email :pgi_eth@vsnl.net

RETURNABLE DELIVERY NOTE

Sl. NO. : 247

DATE : 28/10/16

Principal
Sapthagiri College of Engineering
Chikkasandra, Hesaraghatta Road,
Bangalore-560 057

ty Code
s. Ponitha Enterprises
Bangalore.

P. O. No.

U. P. R. Ref.

From No. :

Date :

57F (2) No. :

Date :

PART No.	SN	DESCRIPTION	UOM	QUANTITY	REASON FOR
	1.	PP material (Housing)	Kgs		for Grinding.

Remarks :

Umesh Auto.
Transporter

Receiver's Signature with Seal

For PROGRESSIVE INDUSTRIES

Please return the duplicate in token of having receiving the above goods

TIN : 29110066348

Our K.S.T No. 01002089
C.S.T. No. 01052081 } Dt. 04-01-1991

जमापर्ची / PAY-IN-SLIP नकद / अंतरण / CASH/TRANSFER

भारतीय स्टेट बैंक STATE BANK OF INDIA

.....Hesarghalla..... शाखा / Branch

दिनांक / Date 29/11/16

खाते का प्रकार : बचत बैंक/चालू खाता/आवर्ती जमा/कैश क्रेडिट/सावधि ऋण/माँग ऋण

TYPE OF ACCOUNT : SB / CA / RD / CC / TL / DL

खाता संख्या Account No.

3	0	2	6	5	6	0	7	0	5	5	

के बैंक खाते में जमा करने हेतु I/ For the credit of the bank account of

.....Dhar Saceniya C.....

रुपए (शब्दों में)Amount in words. Rupees.....

.....thirteen thousand only.....

रोकड/चैकों का विवरण DETAILS OF CASH/CHEQUE	राशि / AMOUNT ₹	
	13,000	00
	/	
योग रुपये TOTAL	13 000	00

CODE113199005 / Sapthagiri

एसड्ब्ल्यूओ SWO

रोकड़ अधिकारी/पासकर्ता अधिकारी/ Cash Officer / Passing Officer

Principal
Sapthagiri College of Engineering
Chikkasandra, Hesaraghatta Road
Bangalore-560 057

जमापर्ची / PAY-IN-SLIP नकद / अंतरण / CASH/TRANSFE

भारतीय स्टेट बैंक STATE BANK OF INDIA

Hesaraghatta ..... शाखा / Branch

दिनांक / Date .....

खाते का प्रकार : बचत बैंक/चालू खाता/आवर्ती जमा/कैश क्रेडिट/सावधि ऋण/माँग ऋण

TYPE OF ACCOUNT : SB / CA / RD / CC / TL / DL

खाता संख्या Account No.

३	०	२	६	३	६	०	७	०	३	३	

के बैंक खाते में जमा करने हेतु / For the credit of the bank account of

SBI

रुपए (शब्दों में) Amount in words. Rupees ..... Twenty Thousand Only

रोकड/चैकों का विवरण DETAILS OF CASH/CHEQUE	राशि / AMOUNT ₹	
	10000	00
योग रुपये TOTAL	20,000	00

CODE113199005 / Sapthagiri

एसडब्ल्यूओ SWO

रोकड़ अधिकारी / पासकर्ता अधिकारी
Cash Officer / Passing Officer

Principal
Sapthagiri College of Engineering
Chikkasandra, Hesaraghatta
Bangalore-560 057

Scanned with CamScanner

FORMATS FOR SUBMISSION OF PROJECTS

1. Research Title: "**Development of Bioresin and its Application in Processing of Waste Plastics and Waste Aluminium as Composite Laminates**
2. Broad Subject: Polymer Science

3. Duration in months. 24

4. Total cost. 1.02 Lakhs

5. FE Component. Nil

6. Principal Inv. Vinutha Moses

7. Designation. Assistant Professor

8. Department .Biotechnology

9. Institute Name. Sapthagiri College of Engineering

10. Address. #14/5, Chikkasandra, Hesaraghatta Main Road
Bangalore – 560057.

11. Telephone Fax Gram e-mail:

Tel: 080-28372800, 080-28372801,080-28372802
Fax: 080-28372797
EmailID: vinuthamoseschetan@sapthagiri.edu.in
Mosesvinutha777@yahoo.com

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1. Project summary

Accumulation of huge quantities of plastic wastes in landfills has become one of the major environmental problems, which has lead to search for a proper Solid Waste Management System. There are also currently huge quantities of long-life PVC materials used mostly in the construction sector, which will constitute this waste in the coming decades. Moreover, the ongoing growth in the production of PVC will also raise the quantity of the waste. Therefore, the amount of this waste will be huge in the near future. Water stored in plastic bottles are also a threat to human health. To minimize the threat of plastics in environment and health the present research studies focuses on developing a bioresin from kitchen organic and agro waste that would environmental friendly compared to synthetic resins, these resins are used as additives for different grades of processed recycled plastics and aluminium cans as composite laminates an alternate to wood requirement.

2. Key words: Plastics, Bioresins, laminates, Composites, Environment, Moisture absorption, Aluminium, Waste, Process.

3. Technical details: Handling and disposal of PVC waste has led to major environmental concern. The recycling of post-consumer PVC poses particular technical and financial problems. It has the lowest recycling rate among all plastics waste materials [10-13]. Incineration of PVC is not a sustainable option for the disposal because less energy can be generated and also contributes to the emission of undesirable gases such as hydrogen chloride and dioxin compounds [14, 15]. Therefore, finding alternative outlets to absorb the huge quantity of PVC waste is required in which safe disposal can be implemented. PVC materials are classified into plasticizer and rigid PVC. The plasticizer PVC contains additive materials up to 60% of its weight while rigid PVC contains few percentages. This enhances the physical and the mechanical properties of the rigid PVC. The rigid PVC has been used effectively in the different applications and has generated huge quantities of waste. This application may save energy and reduce the demand on primary mineral resources.

The reuse of plastic wastes is considered the best environmental alternative method for the disposal. The large quantities of concrete composite materials required in civil engineering applications are potentially the major areas for the reuse of the plastic waste. Many research works have been reported about utilization of plastic waste for replacement of fine and coarse aggregate in concrete mixture without sorting [16-19]. Utilization of recycled polyethylene terephthalate, polycarbonate and melamine in the concrete composite have been investigated separately [20-24]. Kou and his coworkers have studied the use of PVC waste for partial replacement of river sand as fine aggregate [25].

Marzouk et al [26] reported that the plastic bottles shredded into small (PET) particles may be used successfully as sand-substitution aggregates in cementitious concrete composites which appear to offer an attractive low-cost material with consistent properties. Ismail and Al-Hashmi [27] demonstrated that using waste iron filings as partial replacement of fine aggregate in concrete mixes offers higher strength values than that for the plain mixes. The results of the study carried out by Kou et al. [28] revealed that the workability, compressive strength, and tensile splitting strength of lightweight aggregate concretes that are prepared with recycled plastic waste were reduced. Very limited studies explored the combined effects of mixed waste materials on the mechanical behavior of concrete mixes. In view of the fact that iron and plastic wastes are widespread types of non-biodegradable solid wastes derived as discarded materials from several industrial processes[29], the knowledge of their combined influence on the strength properties of concrete is worth to be considered[30].

4. Introduction

4.1. Origin of the proposal

Solid waste is essentially waste produced in our homes, businesses and industrial sources. Globally waste production is growing in volume and in toxicity [1]. Most of the solid wastes are biodegradable like food waste, green waste, wood, paper, plastic containers, bottles and cans[2].The used cars ,electronic goods and some of the household plastics are not biodegradable, which means they do not get broken down through inorganic or organic processes. Thus, when they accumulate they pose a health threat to people, decaying wastes attract household pests and result in urban areas becoming unhealthy , dirty and unsightly places to reside in. It causes damage to terrestrial organisms, while also reducing the uses of the land for other, more useful purposes[3].More and more of our everyday products contain toxic chemicals, such as mercury or PBDEs (flame retardant chemicals) and these toxic products are combined with a plethora of other chemicals, which eventually impact public health and the environment. There are numerous solid waste facilities in India and abroad including landfills, incinerators and a growing number of transfer stations, solution to plastic waste is still a challenge to be met. Many of the older facilities run by municipalities have been closed down because of environmental concerns, paving the way for the waste industry, to market their "state-of-the-art" management and facilities [4].Plastic waste is a threat that is of great concern to the researches to refuse and reuse. The man-made systems emphasize the economic value of materials and energy where production and consumption are the dominant economic activities. Such systems tend to be highly destructive for the environment as they equire massive consumption of natural capital and energy, return the end product (waste) to the environment in a form that damages [5]. The resources and space are finite and are ultimately not sustainable. The presence of waste is an indication of overconsumption and that materials are not being used efficiently. This is carelessly reducing the Earths capacity to supply new raw materials in the future. The capacity of the natural environment to absorb and process these materials is also under stress. Valuable resources in the form of matter and energy are lost during waste disposal, placing a greater burden on the ecosystems. The main problem is the sheer volume of waste being produced [6].

5. Definition of the problem:

- Plastic reduction, reuse and recycling are the preferred options for managing waste.
- They reduce or prevent green house gas emissions.
- Reduce the demand for waste landfill space
  Recycling is predominant, production and decomposition are well balanced and nutrient cycles continuously support the next cycles of production
- Strategy clearly related to ensuring stability and sustainability in natural systems

.6. Objective

1. To determine the melting point of different grades of plastic and aluminium granules by Differential Scanning Colorimetry.
2. To study changes in physical and chemical properties of materials by thermal gravimetric analysis (TGA).
3. To carry out composition analysis.
4. To measure the thickness of the laminates using Vernier Callipers
5. To calculate Global Weight Fraction and evaluate Local Weight Fraction by Burnout test
6. To study the morphology of the Composites by SEM Analysis

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7. To determine the mechanical properties of the composites by Tensile strength, Bending and Impact Strength. Analysis

8. Moisture Absorption Studies for Plastics under normal and saline conditions.

9. Characterization Studies of the bio synthesized resin from latex- DSC, TGA and FTIR

7. Review of status of Research and Development in the subject

7.1. International status:

More and more of our everyday products contain toxic chemicals, such as mercury or PBDEs (flame retardant chemicals) and these toxic products are combined with a plethora of other chemicals, which eventually impact public health and the environment. There are numerous solid waste facilities in India and abroad including landfills, incinerators and a growing number of transfer stations, solution to plastic waste is still a challenge to be met. Many of the older facilities run by municipalities have been closed down because of environmental concerns, paving the way for the waste industry, to narket their "state-of-the-art" management and facilities [4].Plastic waste is a threat that is of great concern to the researches to refuse and reuse. The man-made systems emphasize the economic value of materials and energy where production and consumption are the dominant economic activities.No target as such is achieved in this area.

7.2. National status:

There is a lot of work going on with no satisfactory results more work is concentrated on biocomposites than composites.

Novelty Importance of the proposed project in the context of current status:

It can be used as an alternative to woods with more efficiency and durability.The novelty of this work it can also be used to make marine and aircraft bodies and so the moisture absorption testing is one at normal and saline conditions.

The following questions will be answered in this study:

1. Can the processing of plastics provide efficient reusable composites, without much operating cost on large scale?
2. Can the utilization of maximum plastics and cans be a solution to waste disposal crisis?
3. Can recycled plastic composites and recycled aluminum composites show excellent material properties?
4. Can Plastic reduction, reuse and recycling be the preferred options for managing waste.
5. Do they reduce or prevent greenhouse gas emissions.
6. Do they Reduce the demand for waste landfill space
7. Is the Strategy clearly related to ensuring stability and sustainability in natural systems

8. Work plan:

Sl. No.	Milestone	Target Time	Work Elements	Responsible Organisation
1	**Collection of different grades of waste plastics and aluminium cans and development of bioresin**	1st to 4th month	Collection from domestic source, canteen and Cafeteria. Collection of kitchen organic and agro waste and develop bioresin.	SCE, Bangalore
2	**Segregation and Pretreatment and Mechanical Process of the Separated Plastic Codes and Aluminium Cans**	5th to 12th Month	the plastics of its kind and aluminium granules are treated and mechanically processed into dried granules	SCE, Bangalore /M.S.R.I.T, Bangalore/ Peenya Industry
3	**Characterization Analysis**	13th to 16th month	Bioresins –Sem ,TGA Differential Scanning Colorimeter (DSC)-To determine the melting point. Thermo gravimetric analysis or thermal gravimetric analysis (TGA) – To study changes in physical and chemical properties of materials, such as second-order phase transitions, including vaporization, sublimation, absorption, adsorption, desorption, chemisorptions, desolvation (especially dehydration), decomposition, and solid-gas reactions (e.g., oxidation or reduction). Composition Analysis or FTIR-To determine the carbon, hydrogen ash content and others.	SCE, Bangalore /M.S.R.I.T, Bangalore/Analytical Labs
4	**Injection moldings.**	17th to 19th month	The characterized plastic granules of each grade will be melted at the determined temperature and made into a lamina of 2x2 m and 2mm thickness	SCE, Bangalore /M.S.R.I.T, Bangalore
5	**Preparation of Laminates**	20th to 22nd month	The laminates of each of its kind will be made by Resin Layup process using bio resin additive synthesized in the lab from latex .The excess of resin will be removed by vacuum bag moulding.	SCE, Bangalore /M.S.R.I.T, Bangalore

			. Moisture Absorption Studies for Plastics- post cured and unpost cured samples (cut into25x25mm) in normal and saline conditions.	
6	**Characterization Analysis**	23rd to 24th month	Thickness of the Laminate Global Weight Fraction Morphology of the Composites –SEM Analysis Mechanical properties of the composites by Tensile , Bending Analysis and Impact Strength.	SCE, Bangalore /M.S.R.I.T, Bangalore

9. Methodology

1. **Collection of the Waste**

25 kg of waste plastics and aluminum cans will be collected from domestic dry waste, industries, cafeterias and canteens that include Polyethylene Terephthalate (PET), Low Density Poly Ethylene (LDPE), Poly Vinyl Chloride (PVC), High Density Poly Ethylene (HDPE), Polypropylene (PP) and Polystyrene (PS) and also waste cola cans

2.**Segregation and Pretreatment and Mechanical Process of the Separated Plastic Codes and Aluminium Cans** Once the plastics of its kind and aluminium granules are treated and mechanically processed the dried granules are sent for analysis.

3.Characterization Analysis

1. Differential Scanning Colorimeter (DSC)-To determine the melting point.
2. Thermo gravimetric analysis or thermal gravimetric analysis (TGA) – To study changes in physical and chemical properties of materials, such as second-order phase transitions,
   including vaporization, sublimation, absorption, adsorption, desorption, chemisorptions, desolvation (especially dehydration), decomposition, and solid-gas reactions (e.g., oxidation or reduction).
3. Composition Analysis or FTIR-To determine the carbon, hydrogen ash content and others.

The characterized plastic granules of each grade will be melted at the determined temperature and made into a lamina of 2x2 m and 2mm thickness by injection moldings.

5. Preparation of Laminates

The laminates of each of its kind will be made by Resin Layup process using bio resin additive synthesized in the lab from latex .The excess of resin will be removed by vacuum bag moulding

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10. Time Plan

Activities/ Milestones	1-4	5-12	13-19	20-22	23-24
Collection of plastics, organic and agro waste and development of bioresins					
Segregation and Pretreatment and Mechanical Process					
Characterization Analysis					
Injection moldings					
Preparation of Laminates					
Characterization Analysis					

11. The development "Outcomes" and "Outputs' of the project:

The proposed work aims at an alternative for managing plastic and metal waste. The outcomes expected will provide a solution to recycle plastic metal waste effectively. Following results are expected from the work- Composite laminates will be prepared using the waste plastic and cans with bio resins.The properties analyzed will be compared to that of virgin plastics and aluminium

12. BUDGET ESTIMATES: SUMMARY

Sl. No.	Item	To be filled by PI
		Amount (Rs.)
1	Contingency	1000/-
2	Chemicals, Glass wares, Plastic wares, Biological Specimen	1000/-
Total		2000/-

Sl. No.	Name of the Equipment	Unit price	Total Unit/ Quantity	Estimated Cost
1	Injection moldings vacuum bag moulding	500	60	30000
2	Colorimeter analysis	1000/-	20	20000
3	Differential Scanning	1000/-	20	20000

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4	Thermo gravimetric analysis	1500/-	10	15000
5	Composition Analysis or FTIR	1500/-	10	15000
	100000+2000	102000/-		

1. EQUIPMENT SPECIFICATIONS

Sl. No.	Name of Equipment & Accessories	Quantity	Details of Technical Specification as indicated/proposed in the e-procurement document
1	Injection moldings vacuum bag moulding	1 1	2x2 m size 6 composites of 2mm thick [6 grades] 6 layers of same grade reinforced
2	Plastic crusher and grinder	1	model: VTM-12" / VTM-16" / VTM-18" / VTM-20" / VTM-2 Power Required: 5 HP 3.75 KW / 7.5 HP 5.6 KW / 10 HP 7.5 KW / 15 HP 11.25 KW / 25 HP KW Length of Blades: 12" / 16" / 18" / 20" / 25" No. of Blade: 5 / 5 / 5 / 5 / 5 Throat Size: 12"X 12" / 16" X16" / 18" X 18" / 20" X 20" / 25" X 2 Grinding capacity: 60 to 90 kqs/hr / 90 to 120 kqs/hr / 90 to 140 kqs/hr / 140to 180 kqs/hr / 275 t kqs/h

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3	Differential Scanning Colorimeter analysis	1	LINSEIS High Temperature DSC HDSC PT1600 • Temperature range RT up to 1400 °C • Heating and cooling rates 0,1 up to 50 °C/min • Temperature accuracy +/-0,5 °C • Resolution 0,3 µW • Atmospheres inert • Vacuum 10-2 Pa • Crucibles Al2 O3 0,12 ml, Platinum 0,12 ml
4	Thermo gravimetric analysis	1	Make/Model :Perkin Elmer, Diamond TG/ Flexible axial and radial view instrument, with high concentration :Ambient – 1200°C :165 to >1000nm TG Measurement Range :200 mg TG Sensitivity :0.2 mg DTA measurement Range :±1000mV DTA Sensitivity :0.06mV
5	Composition Analysis or FTIR	1	Make/Model :Perkin Elmer, Diamond TG/ Flexible axial and radial view instrument, with high concentration :Ambient – 1200°C :165 to >1000nm TG Measurement Range :200 mg TG Sensitivity :0.2 mg DTA measurement Range :±1000mV DTA Sensitivity :0.06mV
6	Computers -laptop	1	Fugitsu SATA; 5400 rpm; 1 TB; 2.5-inch; S.M.A.R.T. SATA; 5400 rpm; 500 GB; 2.5-inch; S.M.A.R.T. SSHD; 5400 rpm; 500 GB / 8 GB SSD Cache; 2.5-inch; S.M.A.R.T. SSD SATA III; 128 GB; 2.5-inch SSD SATA III; 256 GB; 2.5-inch SSD SATA III FDE; 256 GB; 2.5-inch SSD SATA

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14. Infrastructural Facilities:

Sr. No.	Infrastructural Facility	Yes/No/ Not required Full or sharing basis
1.	Workshop Facility	Yes
2.	Water & Electricity	Yes
3.	Laboratory Space/ Furniture	Yes
4.	Power Generator	Yes
5.	AC Room or AC	Yes
6.	Telecommunication including e-mail & fax	Yes
7.	Transportation	Yes
8.	Administrative/ Secretarial support	Yes
9.	Information facilities like Internet/ Library	Yes
10.	Computational facilities	Yes
11.	Animal/ Glass House	Yes
12.	Any other special faciity being provided	Yes

15. Equipment available with the Institute/ Group/ Department/ Other Institutes for the project:

Equipment available with	Generic Name of Equipment	Model, Make & year of purchase	Remarks including accessories available and current usage of equipment
PI's Department	UV-Visible spectrophotometer	ELICO BL 198,	Yes
	PCR	Astec	Yes
	Gel Documentation	Vilber Lourmat,	Yes
	Cold centrifuge	Remi	Yes
	Electrophoresis	Genei	Yes
	Fermentor	Scigenics Bioferm LS1	Yes

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	Hot air oven,	Indigenous	Yes
	Reverse osmosis unit,	Borosil	Yes
	Incubator,	Indigenous	Yes
	Autoclave	Indigenous	Yes
	Colorimeter- ELICO CL 157,	Indigenous	Yes
	Batch orbital shaker	Scigenics Biotech,	Yes
	pH meter	ELICO LI 127	Yes
	Deep freezer, refrigeration system and	Blue star	Yes

Signature of the Applicant

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List of Programme Advisory Committees

Chemical Sciences (3 PACs)

i) Inorganic Chemistry
ii) Organic Chemistry
iii) Physical Chemistry

Earth & Atmospheric Sciences (2 PACs)

i) Atmospheric Science
ii) Earth Science
iii) Himalayan Glaciology

Engineering Sciences (4 PACs)

i) Chemical Engineering
ii) Electrical, Electronics and Computer Engineering
iii) Materials, Mining and Mineral Engineering
iv) Mechanical & Manufacturing Engineering & Robotics
v) Civil & Environmental Engineering

Life Sciences (4 PACs)

i) Animal Sciences
ii) Biophysics, Biochemistry and Molecular Biology
iii) Health Sciences
iv) Plant Sciences

Mathematical Science (1 PAC)

Physical Sciences (3 PACs)

i) Condensed Matter Physics and Materials Science
ii) Lasers, Optics, Atomic and Molecular Physics
iii) Plasma, High Energy, Nuclear Physics, Astronomy & Astrophysics and Nonlinear dynamics

SRI SRINIVASA EDUCATIONAL & CHARITABLE TRUST (R)

SAPTHAGIRI COLLEGE OF ENGINEERING

(Affiliated to Visveswaraya Technological University, Belgaum & Approved by AICTE - New Delhi)

AUDITED UTILISATION CERTIFICATE

1. Title of the Project/ Scheme: **Development of Bioresin and its use in processing of waste plastics and waste aluminum as composite laminates**

2. Name of the Institution: **Sapthagiri college of Engineering**

3. Name of the Principal Investigator: **Dr Ananda S**

4. Funded Agency: Karnataka Urban infrastructure Development and Finance Corpation Ltd.,

5. Amount received during the financial year i. Amount : **50,000**

(Please give letter/order no and date) ii. Letter/Order No:

KUIDFC/Funds/RES/117/2016-17/1796

iii. Date: 12-09-2016

6. Total amount that was available for expenditure: **Rs. 50,000**

(Excluding commitments) during the financial year

7. Balance amount available if any: **Nil**

8. Unspent balance refunded, if any (please give details of cheque no etc.): **Nil**

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UTILISATION CERTIFICATE FOR PROJECT

Order no/Letter Date	Amount
Letter Dated:KUIDFC/Funds/RES/117/2016-17/1796	
Total amount utilized	**50,000**

Certified that **Rs 50,000** of grants-in-aid under (project) was released by Karnataka Urban infrastructure Development and Finance Corpation Ltd.,in favor of **Dr Ananda S, Head and Prof Department of Biotechnology** Vide letter/ order No KUIDFC/Funds/RES/117/2016-17/1796 as stated above during the year 2016-2017. The above grant was sanctioned towards **project.** The sum of Rs 50,000 has been utilized for the purpose of which it was sanctioned and there is no remaining amount left at the end of the year. Expenditure incurred for the purpose for which the grant was sanctioned is verified with the vouchers produced before me.

Certified that I have satisfied myself that the grants in aid was sanctioned have been fulfilled and that I have exercised the following checks to see that the money was actually utilized for the purpose for which it was sanctioned.

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Statement of Expenditure

Bill No	Particulars	Amount (Rs)
	Sample characterization	
1	PP Material Housing	15867
2	PP Materials	7285
3	**Characterization Studies**	**5000**
4	**Glass wares**	**5000**
5	**Sox let Appartus**	**7000**
6	**Stationary**	3000
7	**Travel**	5000
8	**Preparation of project report (5)**	2000
	Grand total (B)	**30152**

Signature:
Designation:
Date:
Place:

Principal
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CERTIFICATE

Certified that I have verified the disturbance of Rs 50,000, Fifty thousand towards project as mentioned above. We have exercised the verification of vouchers and supporting documents to see that the money was actually utilized for the purpose for which it was sanctioned.

Signature of Principal Investigator

SAPTHAGIRI COLLEGE OF ENGINEERING
Dept of Bio-Tech
BANGALORE-57

Signature of the Principal

Sapthagiri College of Engineering
14/5, Chikkasandra, Hesaraghatta Main Road
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MAS & CO.
VERIFIED
BANGALORE
CHARTERED ACCOUNTANTS

Place: Bangaluru

Signature of Chartered Accountant
(Seal)
(FRN and M.NO)

Principal
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