SN LABS PVT.LTD.
#86,Divyanagar,
Narapalle,Hyderabad.
Telengana.India.
Pin--500088.
Contact:9000604815.
www.snsofttechnologies.com.

Date: 02-07-2018

To

The Principal

Indira College of Pharmacy (ICOP),

Vishnupuri, Nanded-431606,

Maharashtra.

Dear Sir,

Sub: Sponsorship for funded project - Approval of the project – Reg.

Ref: Your Lr. No. Dated 25th June, 2018.

With reference to the above cited subject, we are pleased to sanction a sum of Rs. 4,15,000 (Rupees Four Lakh and Fifteen Thousand only) for the following proposed projects.

S.No.	Title of the proposed projects
1	Formulation and Evaluation of Dispersible Tablets of Lonezolid
2	Formulation and Evaluation of Econazole Nitrate Gel
3	Development and Validation of Analytical methods For the Simultaneous Estimation of Tizanidine HCl and Mefenamic Acid

We wish that the project will be executed in the proposed time-line and successfully.

Best wishes

Authorized Signature

Principal
Indira College of Pharmacy
Vishnupuri, Nanded-06.

।। सा विद्या या विमुक्तये ।।
स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड
"ज्ञानतीर्थ" परिसर, विष्णुपुरी, नांदेड - ४३१६०६ (महाराष्ट्र)
SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED
"Dnyanteerth", Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)
Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade
ACADEMIC PLANNING & DEVELOPMENT SECTION
Phone: (02462) 229242 Fax: (02462) 229574 website: srtmun.ac.in e-mail: apds.srtmun@gmail.com

APDS/Uni.MRP/Sci. & Tech.- Pharmacy/2019-20/2829 January 13, 2020

To,
Mr. Mohammad Zameeruddin
SSS Indira College of Pharmacy,
Vishnupuri Nanded.

Sub: Minor Research Project of S.R.T.M. University, Nanded- Release of first installment.

Dear Sir,

This is to inform you that, Hon'ble Vice-Chancellor has approved your Minor Research Project entitled, "Development and validation of Green/Eco-Friendly/Micellar Analytical Method(s) for the assay of drug(s) in their Dosage forms" in the subject **Pharmacy** under the faculty of **Science and Technology** to be undertaken by you. The financial assistance of the University would be limited to **Rs.55000/-** (Rupees Fifty Five thousand only) for the project of two years period, subject to the conditions given below. An amount of **Rs.42500/-** (Rupees Fourty Two thousand and Five Hundred only) will be released as the first installment on submission of Undertaking and permanent/regular Certificate.

Sr. No	Purpose	Amount Sanctioned Rs.	Amount being released as 1st installment Rs.
	Non-Recurring		**100%**
01	Equipments	30000	30000
	Recurring		**50%**
02	Contingency (including special needs)	5000	2500
03	Chemical and Glassware	20000	10000
	Total	**55000**	**42500**

The grant is subject to the terms & conditions as mentioned belows:

1. A certificate of undertaking of the conditions governing the research project should be sent immediately to this office as per Annexure-I.
2. PI has to submit the certificate from competent authority in respect of permanent/regular teacher of the College in the given format as per Annexure-II.
3. Utilization Certificate (UC) and detailed report should be submitted time to time to this University.
4. Mid-term evaluation will be preferred and if satisfactory second installment is will be released, failing which final installment will not be disbursed & the PI has to return the 1st installment with interest.
5. Date of Sanction letter is the date of implementation.
6. PI has to submit the final UC and detail project report duly signed by Principal and C.A. with publication within one month after completion of project. The research paper should be published in UGC recognized Journals/Peer Reviewed Journals. The copy of the published papers/ acceptance letters/communicated papers must be attached with final report.
7. Every correspondence regarding this scheme should be done though the Principal of the College.
8. You have to submit revised proposal based on the comments given by experts if any.
9. All Pro-forma (Undertaking, UC, Statement of Expenditure, Field work, Annual/Final report etc.) is available on University website www.srtmun.ac.in. These proforma should be submitted in duplicate for office use.

-sd-
Dy. Registrar
Academic Planning & Development Section

Encl: As above

Copy to: 1. The Principal, SSS Indira College of Pharmacy, Vishnupuri Nanded.
2. The Finance & Account Officer, this University.

C:\Users\ADMIN\Desktop\1. Sanctioned letter- MRP\Colleges Sanctioned Letter of Faculty wise\Science & Technology.doc/MK

Principal
Indira College of Pharmacy
Vishnupuri, Nanded-06.

JSL

DESIGN | DEVELOP | DELIVER

JSL HEALTH SCIENCES PVT LTD.

Date: 17th May, 2021

To
The Principal
Indira College of Pharmacy
Vishnupuri, Nanded-431606, Maharashtra

Dear Sir,

Sub: Sponsorship for a financed project - Project approval - Reg.
Ref: Your Letter No. SSSICOP/2021-22/48-A, Dated 26/04/2021

With reference to the above, your study proposal and project budget have been assessed. Following careful assessment by our team, we have decided to approve an amount of **₹ 6,25,000 (Rupees six lakh and twenty five thousand only)** for the following proposed projects.

S.No.	Title of the proposed projects
1	Design and 3D printing of dental bones for surgery planning
2	3D Printing medicated custom surgical bone plates, screws, and pins made with polylactic acid
3	3D Design and printing of different formulations proposed for personalized medication
4	Extraction of Banana Pseudostem fibers and its application as Surgical sutures and surgical gauge
5	Design of vegetable capsule shells using natural polymers
6	Vegetable coating using natural polymers for increasing shelf life
7	Silver Nitrate patch for wound healing using natural polymers

We wish that the project will be executed in the proposed time-line and successfully.

All the best...

JSL Health Sciences Private Limited Hyderabad

A. Vamsi

Authorized Signatory

Research and Development Division: 5-35/50, Plot No. 193, Prashanthi Nagar, Kukatpally, Hyderabad, Medchal-Malkajgiri Dist, Telangana-500072, India
GST No.: 36AAECJ8890Q1ZJ IEC No. AAECJ8890Q D-U-N-S Number: 85-316-0776
website: www.jslhsci.com email: info@jslhsci.com

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PROJECT SUMMERY REPORT

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Formulation and Evaluation of Econazole Nitrate Gel

In the present study an attempts were made to formulate and evaluate topical gels of Econazole nitrate. All the gels were evaluated for their appearance, pH, drug content, rheological properties, skin irritation test, in-vitro release, stability studies and anti-fungal activity The pH range of Carbopol gels, HPMC k-15 gels and sodium alginate gels were found to be suitable for topical application. The drug content of formulated gel was performed and Anti-fungal activity of formulated gel using Candida albicans agar plate method was performed. The percentage of zone of inhibition observed for carbopol and Sodium alginate showed good results. There was no signs of any interaction between drug and polymers through the FTIR studies. F3 and F9 was selected as the best formulations and evaluated for the above parameters.

From the above work it was concluded that formulation F3 and F9 showed good release showing good zone of inhibition confirming the presence of antifungal activity. Selected formulations showed positive results in the parameters like pH, drug content, zone of inhibition, spreadability etc. Which can be concluded due to the presence of carbopol and Sodium alginate polymers.

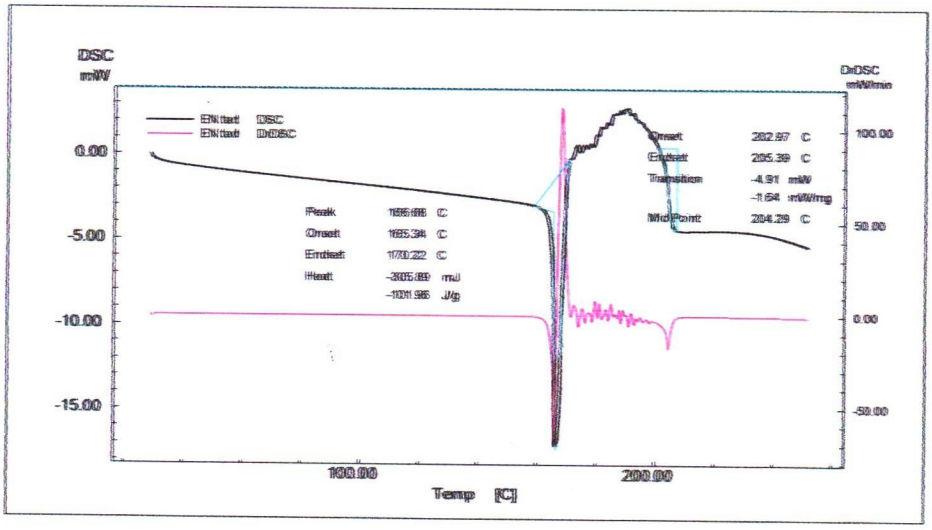

Figure No: 01 DSC of Econazole Nitrate

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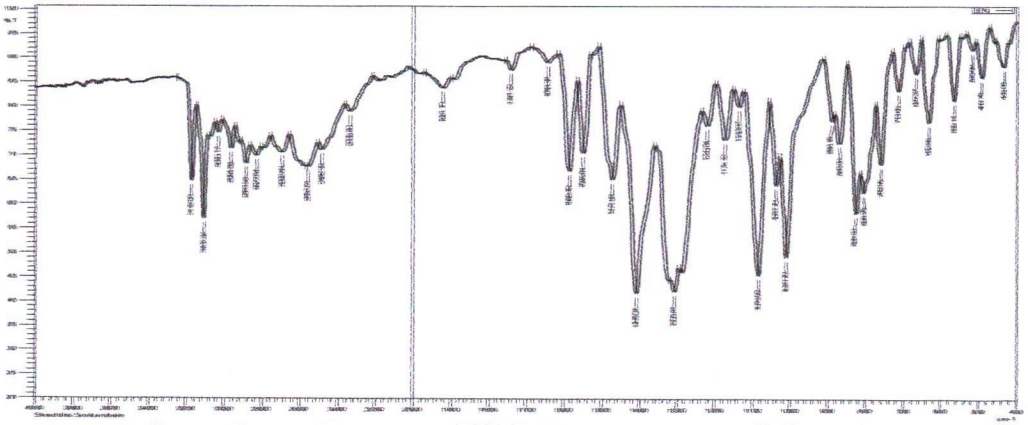

Figure No: 02 FTIR Spectrum of Econazole Nitrate

In vitro drug diffusion study of all gel formulation result shows the F9 gel formulation shows more drug release as compared to other formulations

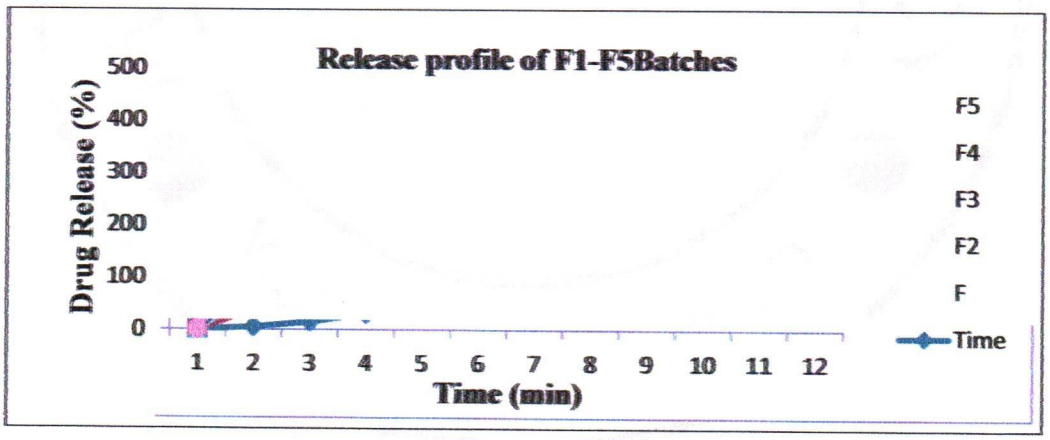

Figure No: 03. % Drug release of Topical gel Formulation (F1-F5)

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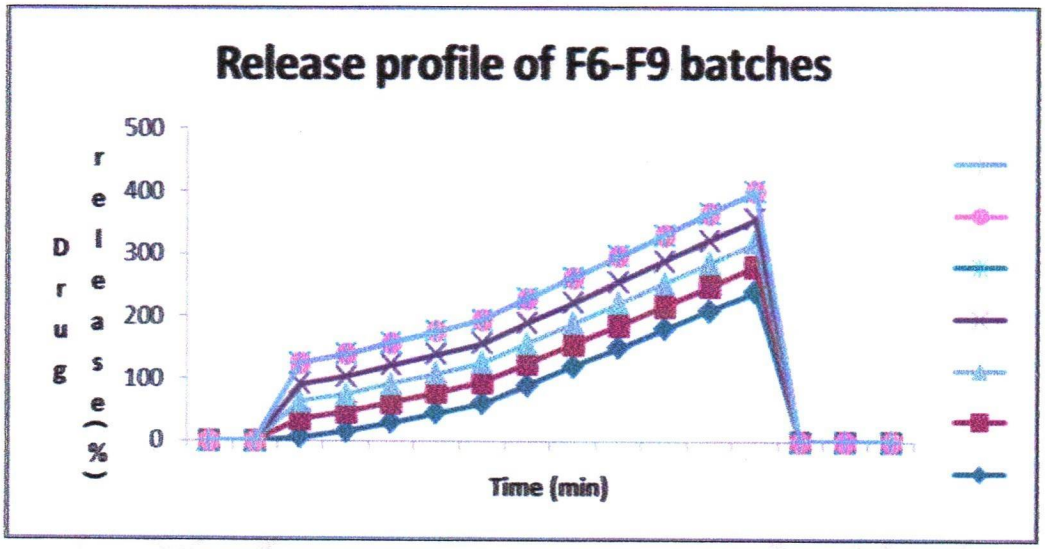

Figure N0:04. % Drug release of Topical gel Formulation (F6-F9)

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Formulation and Evaluation of Dispersible Tablets of Linezolid

The immediate release tablet of Enterococcal drug Linezolid were prepared developed and evaluated to increase solubility and bioavailability of low soluble drug by using wet granulation method. The tablets were prepared by varying concentrations and compositions of microcrystalline cellulose, sodium starch glycolate, hydroxyl propyl methyl cellulose, magnesium stearate, and colloidal silicon dioxide for seven trial batches. The drug excipient compatability study was studied by photostability study. No significant changes were observed in photostability study. The tablets were evaluated for disintegration test, content uniformity, and friability. Invitro drug release profile Linezolid was examined in four different media PH0.1N HCL, PH4.5 acidic buffers, PH6.8 phosphate buffer and PH3.0 citrate buffer for 45 minutes. The drug release for trial batch no.7 shows 100.4% of drug release and innovator shows 102% of drug release. The formulation trial no 6 and 7 showed no significant changes during the study period of accelerated stability study for 3 months. The result of all formulation 7 showed that good developed formulation of immediate release tablet containing Linezolid drug was similar to the marketed product with all respect and stable to effect of temperature and humidity.

Table 2: Comparative Dissolution Profile of in four different media of innovator formulation

Brand Name	Innovator Tablets TABLETS 600mg			
B. No.	0316			
Medium	0.1 N HCL	pH 4.5 Acidic buffer	pH 6.8 Phosphate buffer	pH 3.0 Citrate buffer
Time (min)	%Release	%Release	% Release	%Release
0	0	0	0	0
5	18	27	0.0	0.0
10	50.3	34.7	0.0	79.2
20	68.7	39	0.0	91.5
30	79.7	42.8	0.0	94.7
45	86.5	44	0.0	95.3

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Table 3: Results of the Physical Evaluation

Batch No.	TRL/01	TRL/02	TRL/03	TRL/04	TRL/05	TRL/06	TRL/07
Weight per tablet (mg)	399	406	402	407	413	402	413
In process Parameters	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated
LOD	1.75%	3.0%	1.8%	1.75%	2.13%	1.8%	2.7%
Bulk Density (g/ml)	0.39	0.37	0.42	0.39	0.413	0.39	0.403
Tapped Density (g/ml)	0.51	0.52	0.55	0.51	0.511	0.5	0.525
Carr Index	23.5	28.4	23.63	23.5	19.6	22	23.23
Hausner Ratio	1.30	1.40	1.30	1.30	1.24	1.28	1.30
% fine Passed Through 60 Mesh	44	39	24	41	28	32	34
Angle of repose of final blend	27	23	23	23.9	26.56	29	30.4
Thickness (mm)	4.89-4.93	4.48-4.5	4.48-4.5	4.92-4.98	4.77-4.8	4.93-4.98	4.7-4.8
Hardness (N)	110-122	193-206	193-206	110-128	120-121	115-138	95-115
Disintegration Time (min.sec)	5min50sec 5min55sec	13min40sec 14min15sec	15min50sec 16min45sec	5min50sec 6min45sec	8min15sec 9min50sec	1min25sec 1min30sec	1min11sec 1min5sec
Friability (%) (100 rotation)	0.09%	0.09 %	0.09 %	0.09 %	0.19%	0.11 %	0.12%

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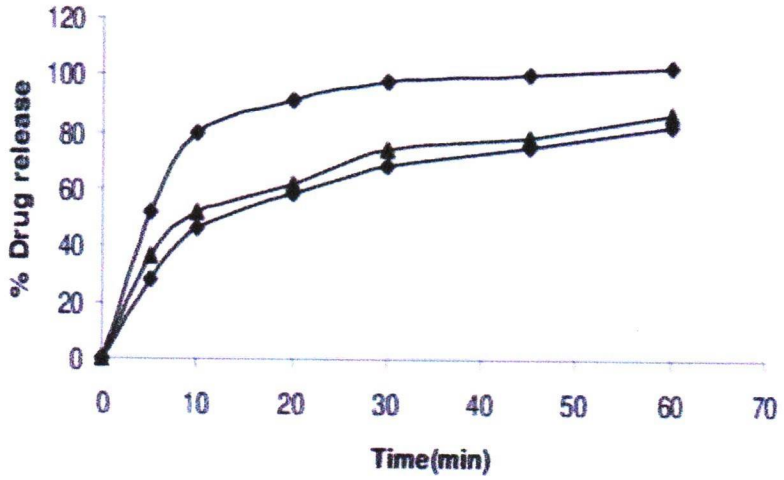
Table 4*: Invitro* release profile (dissolution profile) of batches

Brand Name	Linezolid Tablet 600 mg						
	% Drug Release (pH 3.0 Citrate buffer)						
Time (min)	TRL/01	TRL/02	TRL/03	TRL/04	TRL/05	TRL/06	TRL/07
10	56	69	56	89	90	92	96
20	69	75	89	95	96	94	97
30	77	76	97	96	95	95	98
45	89	87	99	97	94	96	99

Table 5 Comparative invitro release profile of formulation with innovator formulation.

Brand name	Linezolid 600mg	Innovator tablet 600mg	Linezolid 600mg	Innovator tablet 600mg	Linezolid 600mg	Innovator tablet 600mg	Linezolid 600mg	Innovator tablet 600mg
Batch no	TRL/07	DAS 123	TRL/07	DAS 123	TRL/07	DAS 123	TRL/07	DAS 123
Medium	0.1N HCL	0.1N HCL	P^{H} 6.8 buffer	P^{H} 6.8 buffer	P^{H} 4.5 buffer	P^{H} 4.5 buffer	P^{H} 3.0 Citrate buffer	P^{H} 3.0 Citrate buffer
Time (min)	%Release	%Release	%Release	%Release	%Release	%Release	%Release	%Release
10	48	50.3	0	0	32.6	34.7	96	79.2
20	65	68.7	0	0	38	39	97	91.5
30	80	79.7	0	0	41	42.8	98	94.7
45	87	86.5	0	0	43	44	99	95.3



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The drug was standardized. The preformulation study was done to check the compatibility between the drug and the excipient. From the preformulation study, some of the excipient was selected for the formulation development. Various formulas were developed to match the parameter with marketed product by using different excipient in different proportions and combinations by wet granulation technique. Development of formulation was completed with the final formula. Stability study was conducted on tablets of batch 06 and batch 07 as per the ICH guidelines and FDA guidelines. Tablets were evaluated for in vitro dissolution measurement and in vitro release profile, after one month. No significant changes were observed in any of the studied parameters during the study period, thus it could be concluded that formulation was stable. The stability study revealed that there was no significant change in dissolution profile. From results of all formulation concluded that developed formulation of immediate release tablet containing Linezolid drug was similar to marketed product with all respect and stable to effect of temperature and humidity.

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PROJECT SUMMERY REPORT

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Sahayog Sevabhavi Sanstha's
INDIRA COLLEGE OF PHARMACY
Sahayog Educational Campus, Vishnupuri, Nanded-431606
(Approved by PCI, AICTE, New Delhi, Recognized by Govt. of Maharashtra & Affiliated to SRTMU, Nanded.)

1. Design and 3D printing of dental bones for surgery planning

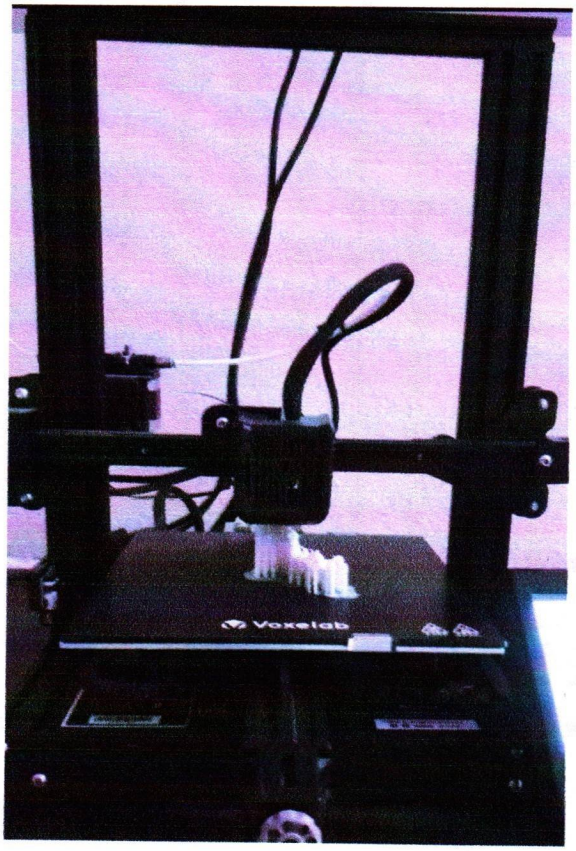
Summary Report

As per the designs provided by you, the following models were designed in 3D software, .stl files were generated.

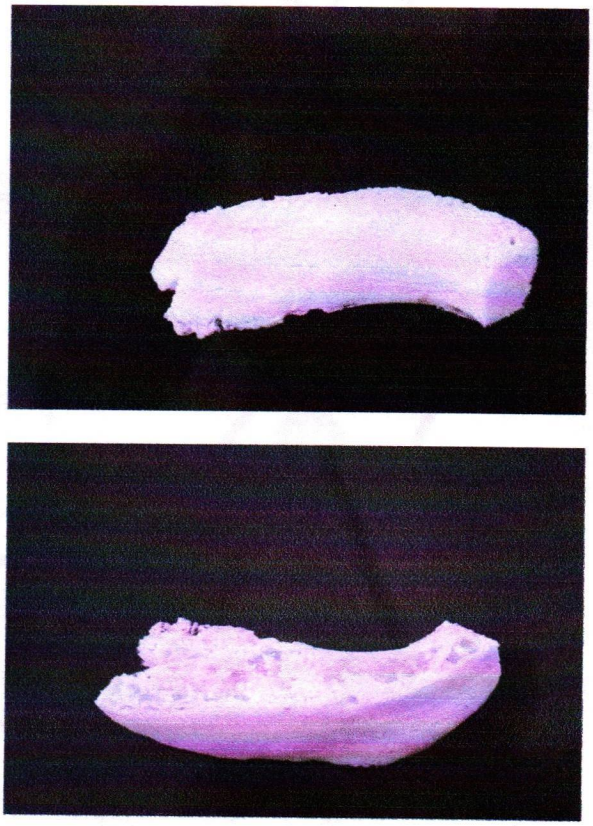
MRI scans of dental bones were converted into .stl files.

The .stl files were sliced using Ultimaker CURA software and then the parts were printed.

Photographs of some Samples are presented here.



3D Printer FDM



Dental Bones

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Sahayog Sevabhavi Sanstha's

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Sahayog Educational Campus, Vishnupuri, Nanded-431606

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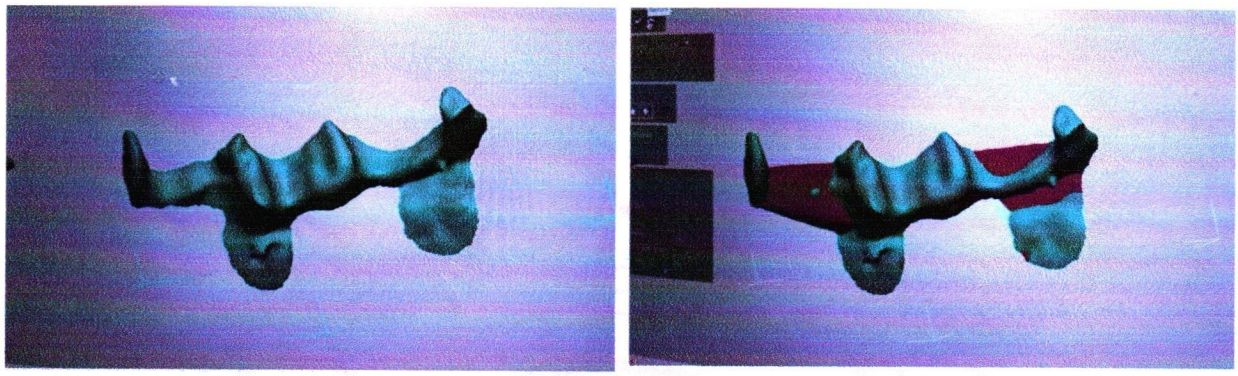
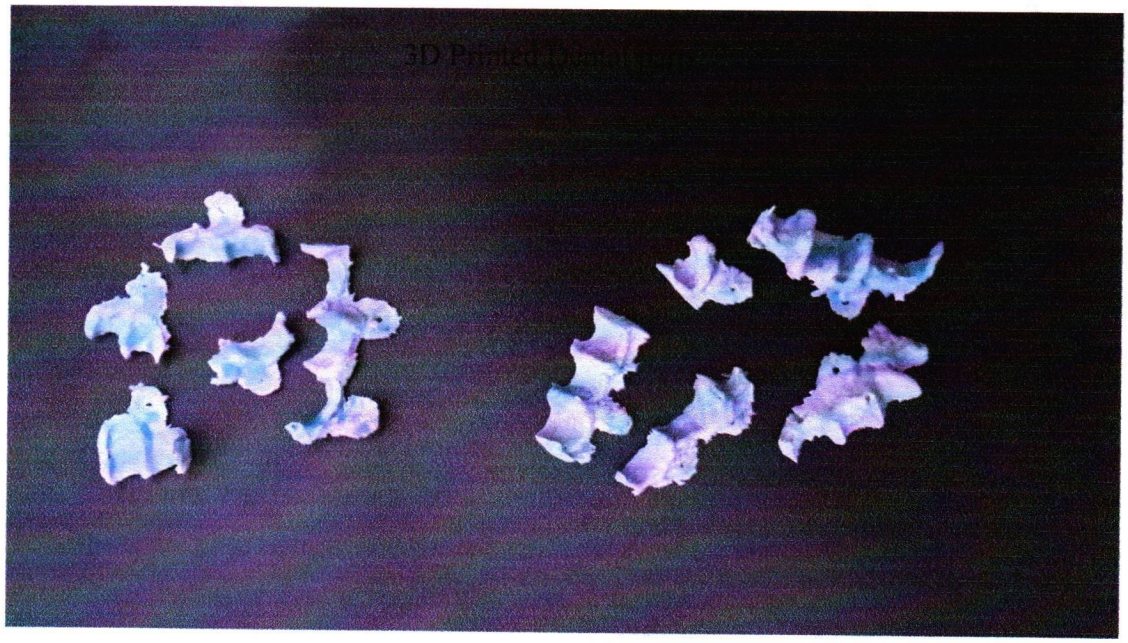
3D design of Dental Parts converted from MRI scans



3D Printed parts



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Sahayog Educational Campus, Vishnupuri, Nanded-431606
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2. 3D Printing medicated custom surgical bone plates, screws, and pins made with polylactic acid

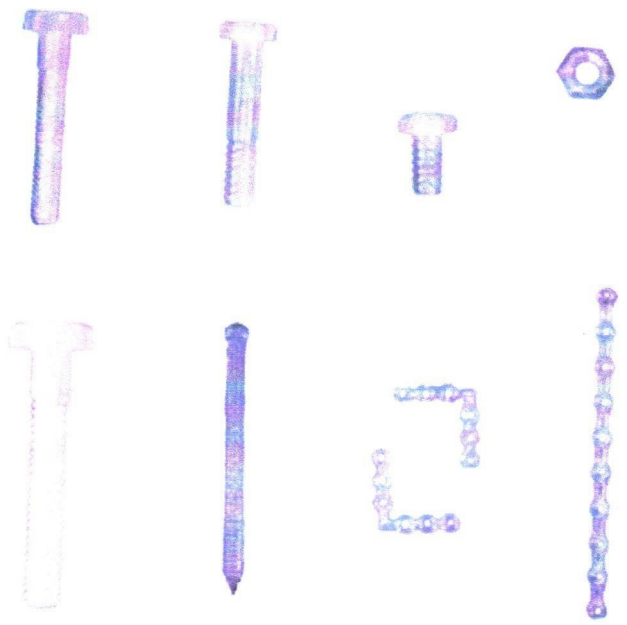
Summary Report

As per the designs provided by you, the following models were designed in 3D software, .stl files were generated.

Medicated Filaments are prepared using Felfil Evo Filament Extruder.

Drugs were added and printed using our FDM 3D printers.

Photographs of some Samples are presented here.



3D printed PLA parts

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Indira College of Pharmacy
Vishnupuri, Nanded-06.

Sahayog Sevabhavi Sanstha's

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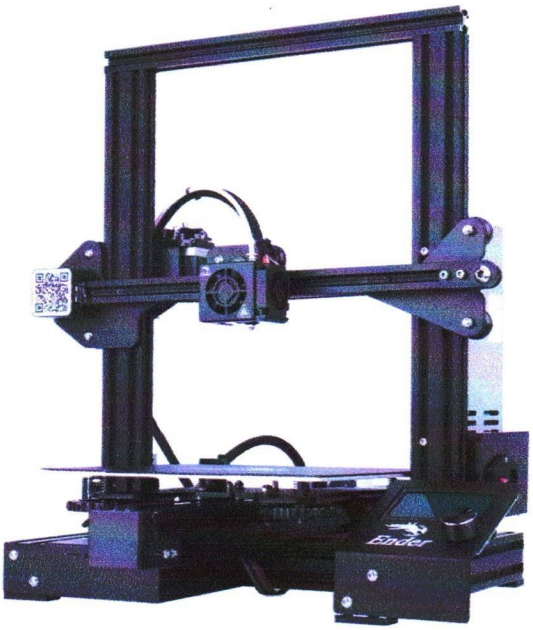

FDM 3D Printer used for the study

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Sahayog Educational Campus, Vishnupuri, Nanded-431606

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3. 3D Design and printing of different formulations proposed for personalized medication

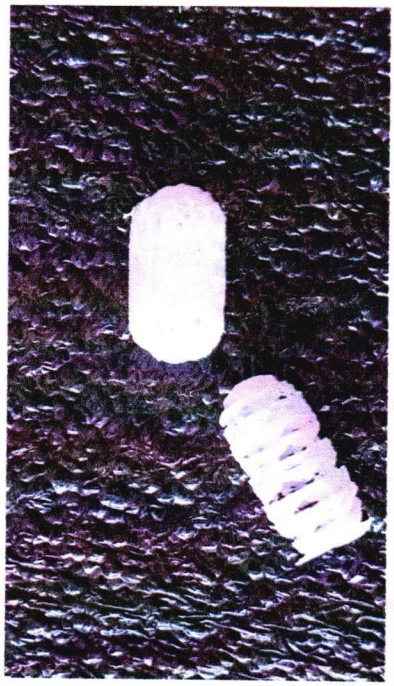
Summary Report

As per the designs provided by you, the following models were designed in 3D software, .stl files were generated.

Various designs such as capsules, tablets, spherical dosage forms were created.

The .stl files were sliced using Ultimaker CURA software and then the parts were printed.

Photographs of some Samples are presented here.



Porous Capsules

Capsule

Sphere

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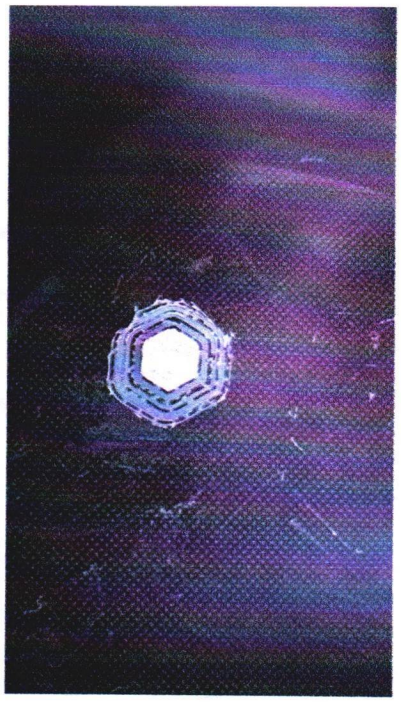
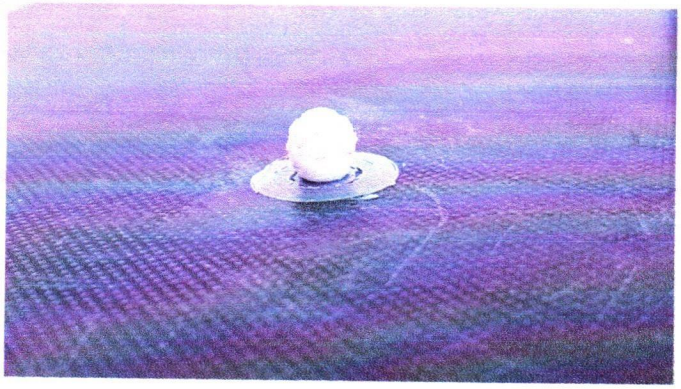
Microspheres



Hexagonal Tablet



Mini Sphere

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Tablets printed using 3D powder layer binder jetting process

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Vishnupuri, Nanded-06.

4. Extraction of Banana Pseudostem fibers and its application as Surgical sutures

Summary Report

The summery of suture is to develop an ideal suture material encourages us to explore novel suture biomaterials with superior characteristics to the current commercially available products. Surgical sutures play a crucial role in the development of post- operative wound infection by acting as a substrate for biofilm formation which leads to dehisced wounds. In this context, the present invention meets this need by fabricating banana (Musa balbisiana) fibre into an advanced antimicrobials releasing suture biomaterial (BSc) for the prevention of post-operative wound infection. In the present study, an attempt was made to develop a suture biomaterial from the pseudo stem of bananas which is an agricultural by productIt has improved activity against gram positive bacteria in comparison to ciprofloxacin. The surface modified suture possesses excellent tensile strength along with the desirable physico-chemical properties of an ideal suture. The fabricated suture was found to be biocompatible and also exhibited the sustained release of drugs.

Suture material developed from banana pseudo stem fiber was impregnated with Moxifloxacin and chitosan growth factors with the aid of a hydro-gel system. In the present study, an attempt was made to develop a suture biomaterial from the pseudo stem of bananas which is an agricultural by-product. Furthermore, it has improved activity against gram positive bacteria in comparison to ciprofloxacin. The surface modified suture possesses excellent tensile strength along with the desirable physico- chemical properties of an ideal suture. The fabricated suture was found to be biocompatible and also exhibited the sustained release of drugs. Furthermore, the BSc sutured animals showed pronounced wound healing through the reduction of infection and related inflammatory markers at the wound site. Additionally, the findings of this study could potentially contribute towards the promotion of banana cultivators by adding value to the agricultural waste.

Advantages Of Banana Suture the sutures help wound healing by letting the edges of the wounds come closer which facilitates the healing process and they provide greater tensile strength

In the present study, an attempt was made to develop a novel suture biomaterial from the pseudo stem of banana fiber which is an agricultural byproduct. Furthermore, the suture was functionalized with moxifloxacin based hydrogel containing antimicrobial agents and chitosan. The surface modified suture

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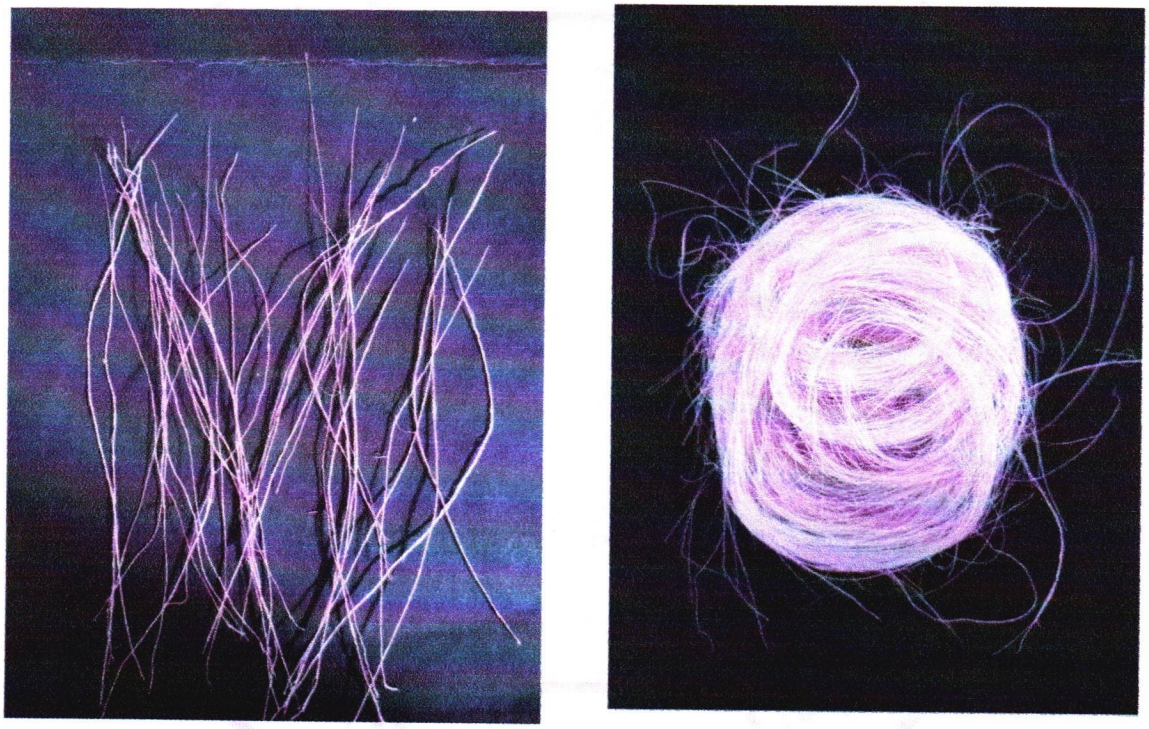
possesses excellent tensile strength along with the desirable physico-chemical properties of an ideal suture. The fabricated suture was found to be biocompatible and also exhibited the sustained release of drugs for up to144h. The Banana suture exhibited a significant antimicrobial activity against infectious microbes in vitro. Furthermore, the Banana sutured animals showed pronounced wound healing through the reduction of infection and related inflammatory markers at the wound site. Additionally, the findings of this study could potentially contribute towards the promotion of banana cultivators by adding value to the agricultural waste.



Sutures prepared from Banana pseudo stem fibers and fibers extracted Banana pseudo stem

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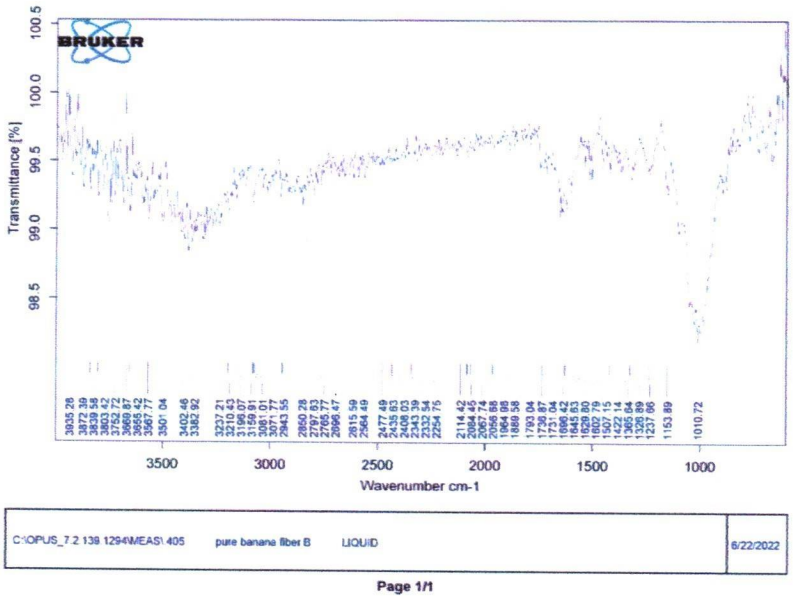

FT IR of Banana pseudo stem fiber

Measurement of suture properties.

Property	**Banana Suture**
Tenacity (g/tex)	698.54
Elongation (%)	8.25
Knot strength (g/tex)	354.4
Elongation with knot (%)	19
Diameter (mm)	0.178

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5. Design of vegetable capsule shells using natural polymers

Summary Report

Pectin is a purified polysaccharide substance obtained from the various plant sources such asinner peel of citrus fruits, apple, raw papaya that is ready available. Pectin Soluble in cold water, forming a viscous colloidal solution and pH ranges from 5.5-8 may be used as coating agent, film former and rate controlling polymer for sustained release for oral capsule shell. Due to high viscosity grade may be used to retard the release of drug from a matrix in tablet and capsule. Pectin may be used as stabilizing and suspending agent.

Pectin's are dissolved more readily in water that they form gel like substance. In cold acid solution it is more stable. We investigated the relationship between the dissolution profile of pectin and the rate of drug release. Thus our result shows that vegetable capsule shells prepared using pectin's are beneficial because of their high solubility in limited amount of medium. Pectin's may be excellent vehicle for capsule shell for oral drug delivery because of their safety and properties that enables controlling release at specific sites that has a limited amount of aqueous medium, such as oral cavity. we think that it is necessary to investigate the drug release profile from pectin in the simulated fluid at the site to be applied, such as an artificial salivary solution.

Physical characters of pectin

Physical description	Yellowish-white solid
Color	Yellowish white
Odor	Odorless
Taste	Mucilaginous taste
Melting point	141 °C
Solubility	Dissolves more readily in water
Stability	In cold acid solution it is more stable

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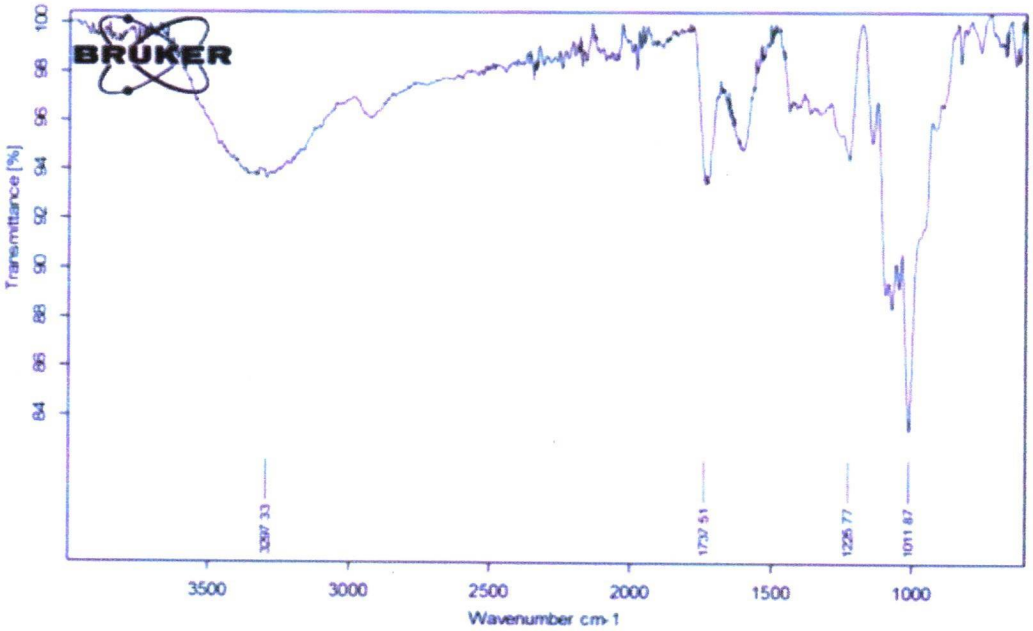

FTIR spectra of pectin

In-vitro dissolution profile for optimized formulation:

S.no	Time in mints	% Drug release
1	10	30.78
2	20	42.32
3	30	66.14
4	40	79.27
5	50	83.34
6	60	99.21

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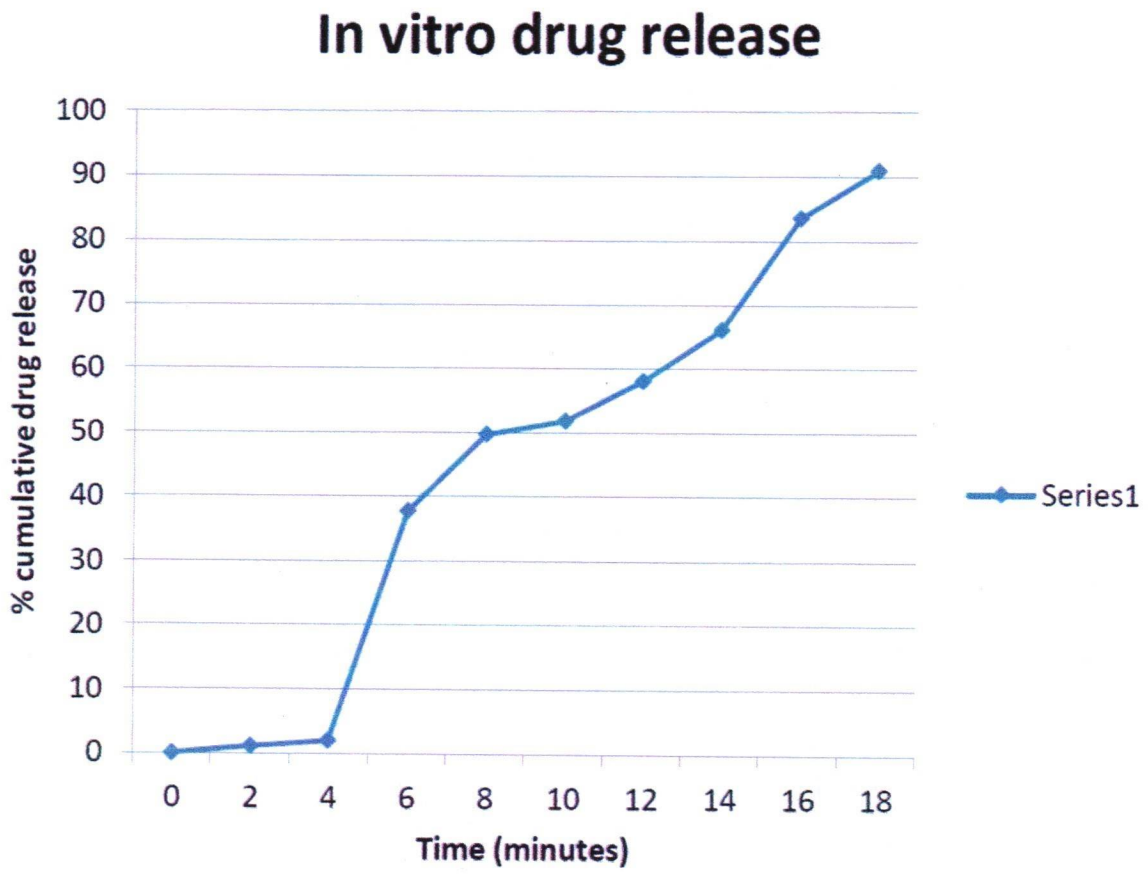

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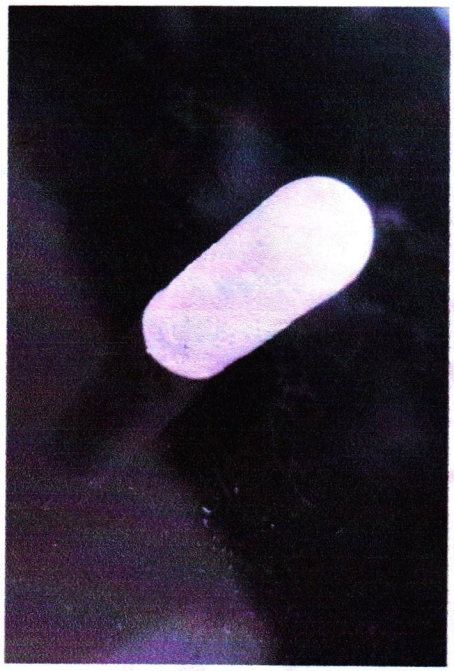
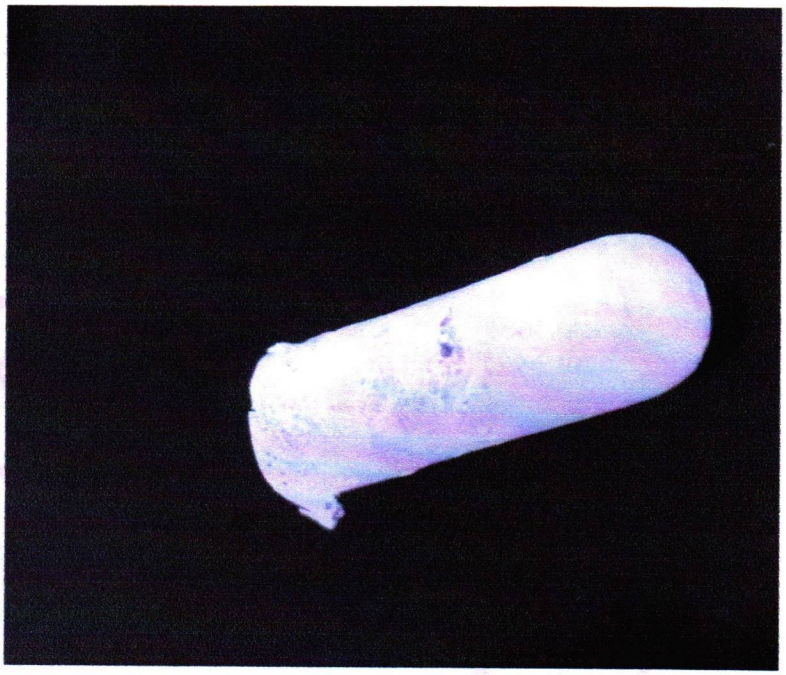


Vegetable Capsule



Capsule Body

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6. Vegetable coating using natural polymers for increasing shelf life

Summary Report

The results of the study proved that effect of coatings based on chia mucilage polymer is the successful and effective method for prolonging the shelf life, sustaining quality attributes of tomato during storage of 21 days at room temperature. All the coated samples exhibited lower degradation in TSS, titratable acidity in contrast to non-coated samples. Moreover, significant delay was found in weight loss. The best coating in case of maintaining microbial quality is 1.5 % of chia seed polymer. Overall, all the coated samples were acceptable at end of storage study for 21 days whereas non-coated samples were acceptable till day 10.

Edible films can be produced from materials with film forming ability. Components used for the preparation of edible films can be classified into three categories: hydrocolloids, lipids and composites. Hydrocolloid films possess good barrier properties to oxygen, carbon dioxide, and lipids but not to water vapor. Most hydrocolloid films also possess superb mechanical properties, which are quite useful for fragile food products. However, potential functions and applications of the films and coatings warrant increased considerations. Extensive research is still needed on the methods of films formation and methods to improve film properties and the potential applications.

Edible coating containing natural extracts has been widely used for extending the shelf life of fruits present study found for the first time that the use of chia seed extract has a positive influence on the physicochemical traits of the fruit. , were proved to retard the ripening process of tomato with a maximum retention of phenolic compounds compared with uncoated fruit samples. Moreover, the retention of phytochemicals was correlated with better antioxidant capacity in samples coated with chia seed mucilage.

Edible films and coatings are fast emerging as alternatives to the synthetic packaging materials. Research and development efforts have resulted in many new types of edible films and coatings which are at par with their synthetic counterparts in terms of functionality. Their biodegradability and edibility make them obvious choice for packaging of food commodities. However, there are

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still many grey areas which need to be worked upon to improve the commercial properties of edible films and coatings.

Chia seed Mucilage was extracted by hydration process. The optimal extraction (%) yield of 6% was possible at room temperature using seed water ratio of 1:30. After extraction the yield of dried mucilage was 6% w/w obtained. The isolated sample was subjected to identification; this showed presence of carbohydrates, Alkaloid, Glycosides, Flavonoids, phenols in sample powder. The results for loss of drying showed value of 8.09 ± 0.61 % w/w and Ash values were found 7.09 ± 0.33.Result obtained of chia mucilage powder observed that powder is White, grey, black and brown in colour, characteristic odour, bitter in taste, oval in shape.

The present study shows that coating on tomatoes with chia seed mucilage powder delayed the ripening process by inhibiting the respiration rate of this fruit. This suggests that chia seed mucilage powder coating not only maintained firmness but also improved the postharvest quality during storage at room temperature. The chia seed coating is biodegradable, easily applied, and less expensive (compared with other hydrocolloids and commercial waxes) and it can be used commercially to prolong the storage life of tomatoes.

The results of the present experiment showed that edible coating might be the effective post-harvest treatment to extend shelf life while maintaining the fruit physico-chemical qualities of local tomatoes during storage at room temperature.

The application of coatings is a novel strategy for stably maintaining bioactive compounds because of the interesting results that have been achieved. It is an original strategy for managing bioactive compounds. The best results were obtained in the fruits, which were coated with the 1.5 % chia seed polymer were the most effective, exhibiting a decrease in the weight loss percentage and physicochemical parameters, such as acidity and TSS. Coating is an effective alternative for preserving the postharvest quality of tomato fruits, thereby increasing their shelf life.

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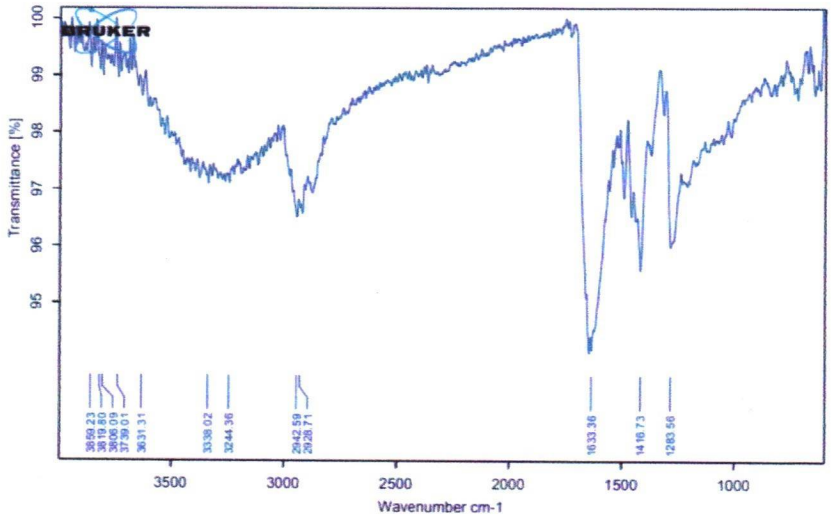
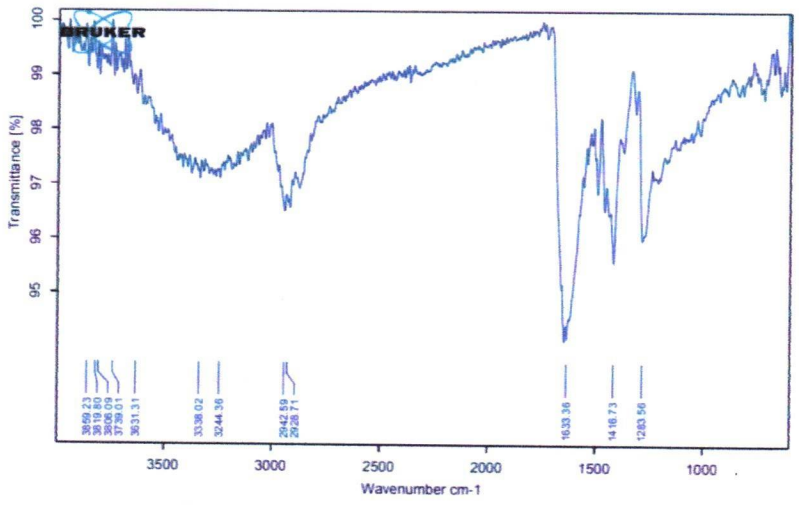


FTIR of chia seed film



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FTIR of Chia powder

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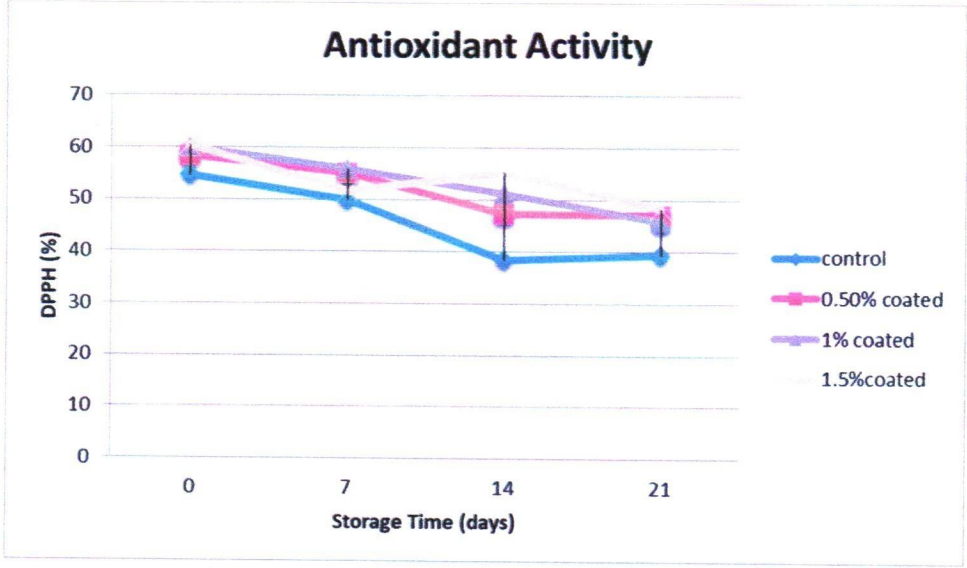

Changes in Antioxidant capacity of Tomato fruit during storage Time

Regarding the antioxidant activities, Table 3 presents the percentages of inhibitions of the DPPH radical in the tomato fruits with respect to the storage time at different chia mucilage powder coating concentrations. 1.5 % inhibited up to 48.19 ± 0.95% of the antioxidant activity of the tomato fruits on day 21, which was higher than those of (C) Control (39.52 ± 0.30%).

Days	Coated			
	Control	0.5 %	1 %	1.5 %
0	54.61± 1.32	58.31±1.07	59.92±1.23	60.40±1.31
7	49.91± 0.41	55.13±1.23	55.84±0.71	51.57±1.23
14	38.38± 1.01	47.29±1.22	51.05±0.84	55.19±0.36
21	39.52± 0.30	47.10±1.36	45.86±1.13	48.19±0.95

Antioxidant activity in tomato fruit during 21 storage period

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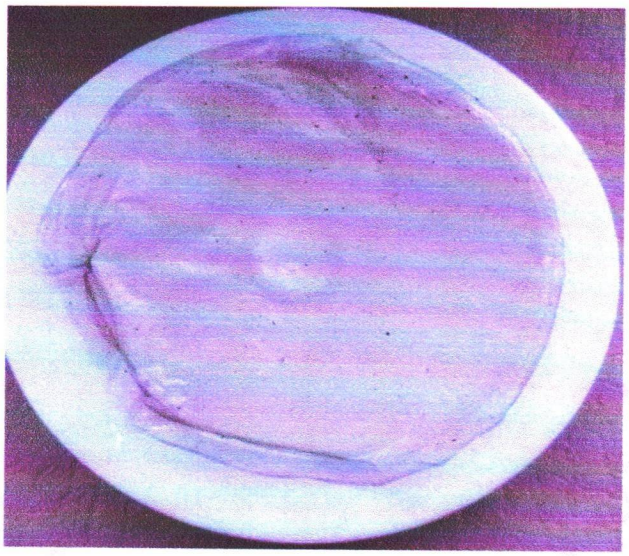
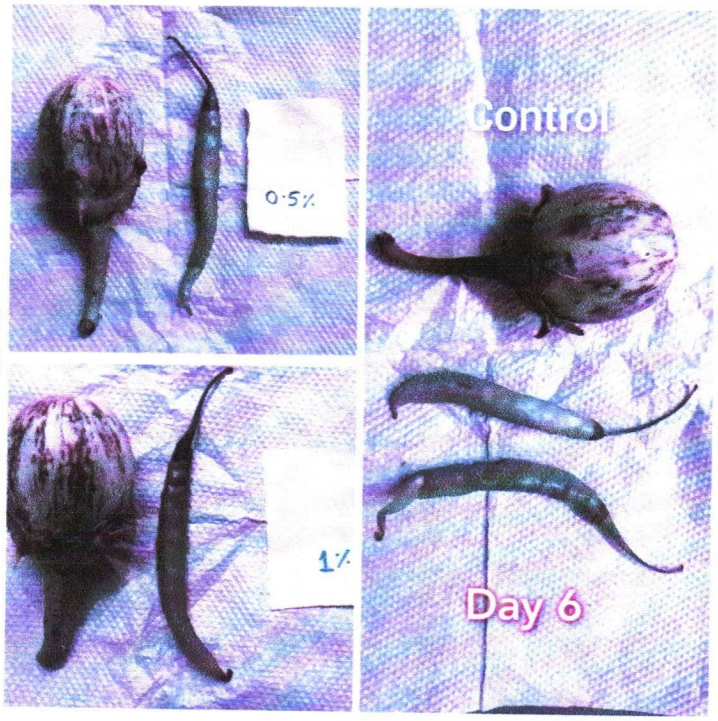


Chia mucilage edible film



Vegetables coated with chia seed mucilage

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7. Silver Nitrate patch for wound healing using natural polymers

Summary Report

Film dressings are expected to absorb wound exudate and expand upon their application to a wound. Therefore, the expansion study of films is an important indicator of their ability to absorb wound exudate (swelling) and release antibiotics . The expansion profile of AX-PT, investigated in a simulated wound environment, is shown in

These results suggest that AX-PT films were hydrated and expanded rapidly in the initial hours, and thereafter, the rate of expansion gradually slowed down. The AX-PT films reached 63.5%, 64.1%, and 55.5% expansion after 4 h. The expansion (%) of AXPT5 films was significantly lower than that of AXPT3 and AXPT4 films. The lower expansion (%) of the AXPT5 films can be correlated to the presence of more AX, which produced stronger interaction among the components of the films (as observed in the results of the mechanical strength), resulting in lower absorption of water.

Moreover, it is evident from the photographs of the AX-PT films that disk-shaped AX-PT films expand uniformly in all directions. However, after 4 h, the AXPT3 films started to degrade from the edges. As reported previously, films suitable for wound dressing should not only absorb exudate but also retain their shape without converting into free-flowing gels . Therefore, it can be concluded from the results of the expansion study that AXPT4 and AXPT5 films are more suitable for wound dressing applications owing to their ability to absorb wound exudate, while retaining their shape.

The in vitro release profile of SN(antibiotic) from the AXPT3D and AXPT4D films was investigated using FDC and PBS as release media in the receptor chamber. The release profile of SN . It is evident from these results that the drug release from both films was higher in the first 8 h. AXPT4D released ~75% of the loaded antibiotic in 8 h, while

AXPT5D released ~66% of the antibiotic in 8 h. Moreover, the antibiotic release from AXPT4D was faster and higher as compared to that fromAXPT5D in the initial hours. The higher release

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rate fromAXPT4D can be due to the faster expansion (water absorption rate) of AXPT4D as compared to AXPT5D, as discussed. However, both films exhibited almost equal

Maximum antibiotic release after 24 h, indicating that the films hold the provided antibiotic fora long period of time at infected wounds. These results suggest that inclusion of PT in the film formulation prolongs the release time of the SN compared to the previously report. The regression coefficient (R2) values of these mathematical models designatKorsmeyer–Peppas as the best-fitting model. The R2 values of AXPT4D and AXPT5D for Korsmeyer–Peppas were 0.985 and 0.978, respectively, while the values ofthe diffusion coefficient (n) were 0.560 and 0.584, respectively. These diffusion coefficient values suggest that the main mechanism governing the SN release from AX-PT films was non-Fickiantransport . These findings from mathematical modeling imply that the SN release was mainly controlled by the expansion (swelling) of AX-PT films .Release SN profile from AX-PTfilms. The regression coefficient ($R2$) values of these mathematical models designate Korsmeyer–Peppas as the best-fitting model. The $R2$ values of AXPT4D andAXPT5D for Korsmeyer–Peppas were 0.985 and 0.978, respectively, while the values of the diffusion coefficient (n) were 0.560 and 0.584, respectively. These diffusion coefficient values suggest that the main mechanism governing the SN release from AX-PT films was non-Fickian transport . These findings from mathematical modelling imply that the SN release was mainly controlled by the expansion (swelling) of AX-PT film.

The results of the assessment of the antibacterial effect of the AX-PT films against bacteria that are commonly found in infected wounds . These results reveal that the blank AX-PT film did not show significant antibacterial, while the standard SN solution and AX-PT films exhibited significant antibacterial activity against tested bacteria. Moreover, the values of the ZOI signify that the SN-loaded AXPT4D andAXPT5D films effective.

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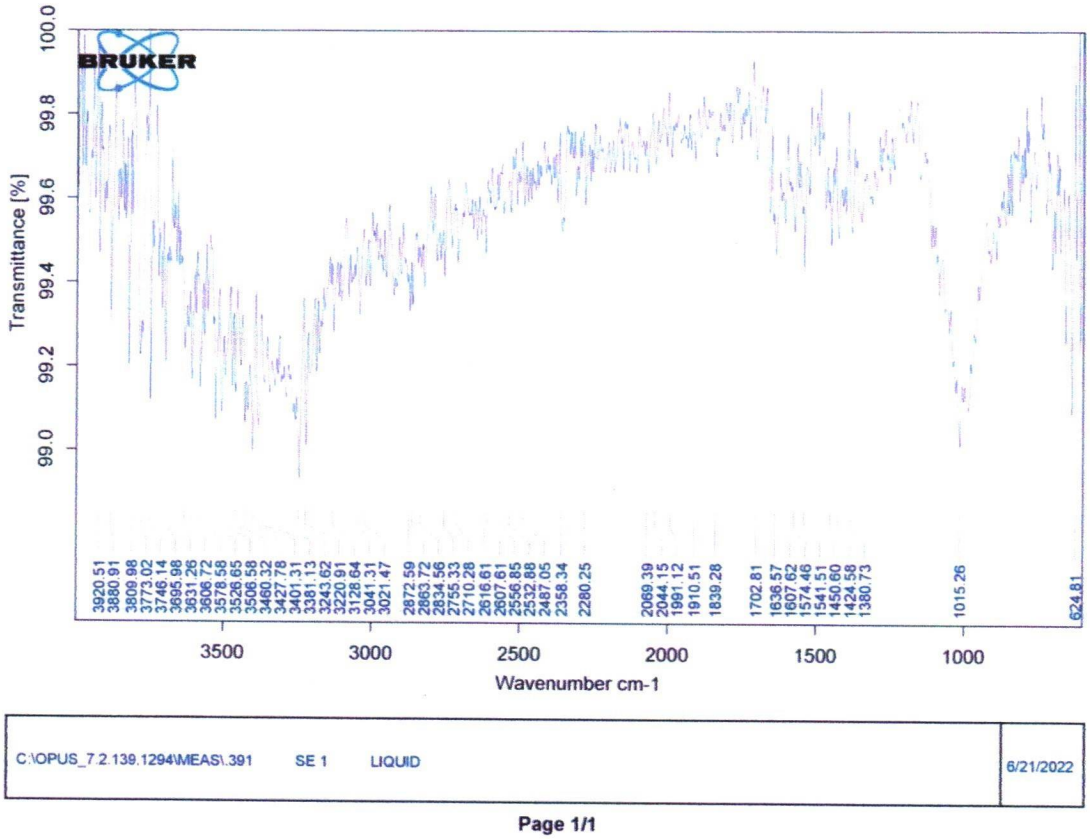

Figure: FTIR spectrum of Psyllium 100% film

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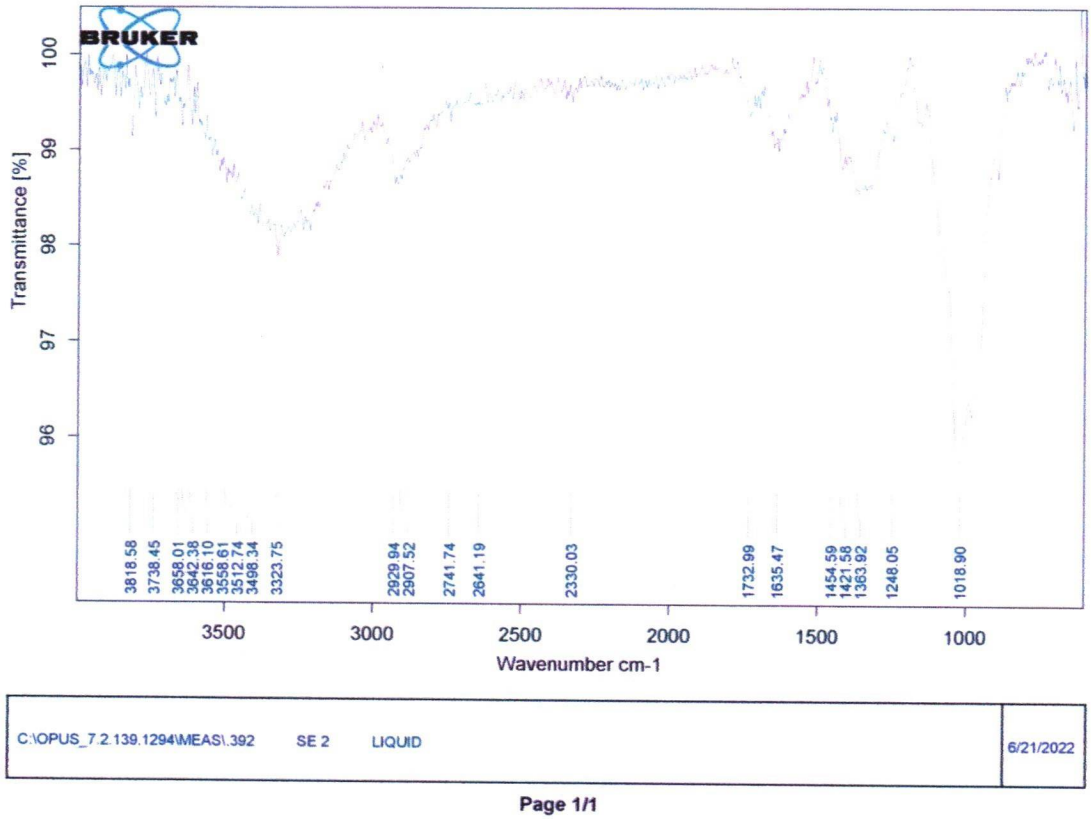

Figure: FTIR spectrum of Psyllium + 10% $AgNO_3$ film

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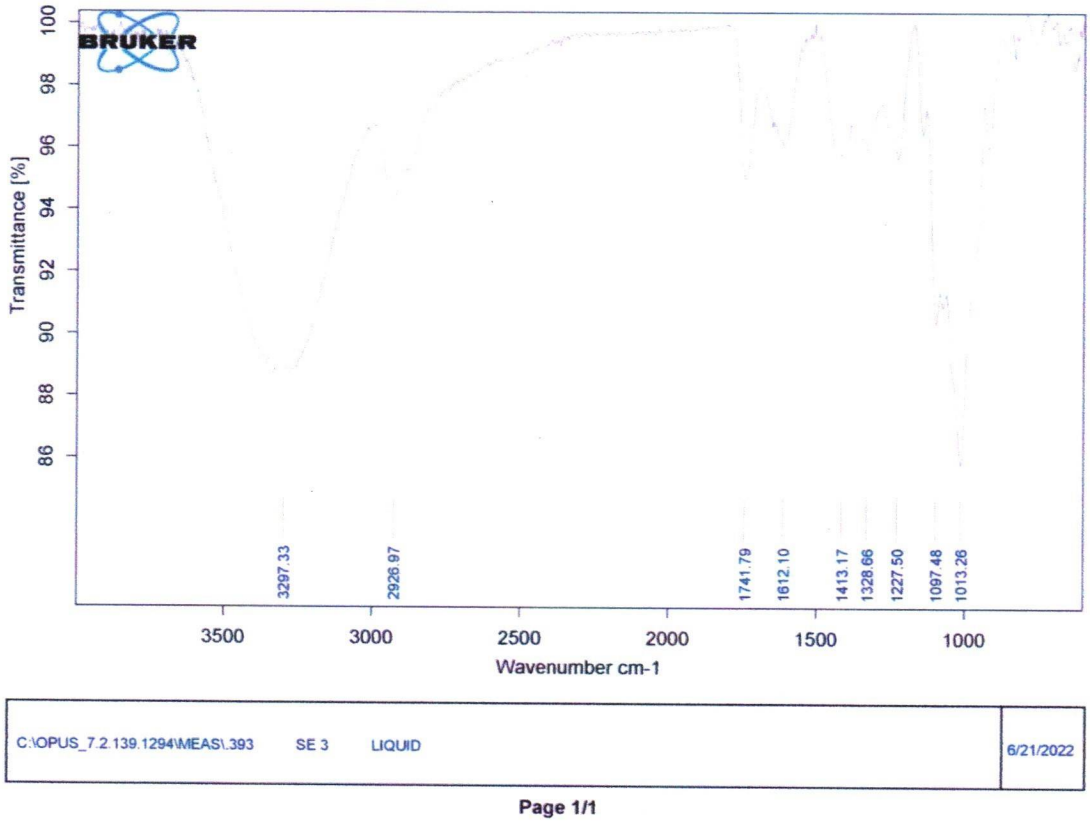

Figure: FTIR spectrum of Pectin 100% film

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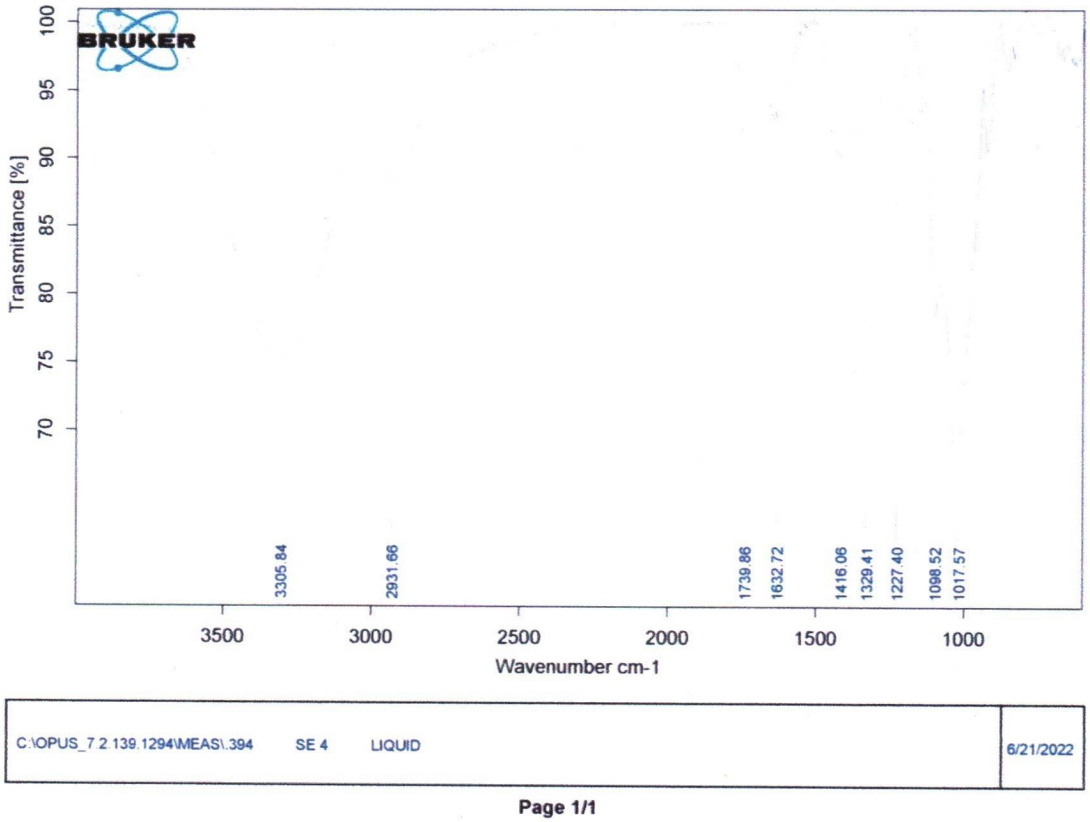

Figure: FTIR spectrum of Psyllium 25%+ Pectin 75% film

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Wound healing films

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