CERTIFICATE

Three Day International Virtual Workshop

On

Research Article Writing, Editing and Publishing

This is to Certify that Dr. Man Mohan, Assistant professor chemistry ABVGC Sunni Shimla Himachal Pradesh has participated in the Three Day International Virtual Workshop on Research Article Writing, Editing and Publishing Jointly Organized by Lavender Literary Club, India, Cape Comorin Trust, India, Malaysian Industrial Relations & Human Resource Association (MIRHA), Malaysia from 12 – 14 October 2023

Dr. Zameer Gulzar
Organizing Secretary

Dr. R. S. Regin Silvest
Cape Comorin Trust

Dr. Frank Joison Sathya
President, Lavender Literary Club

Certificate of Participation

This Certificate is Awarded to

DR. MAN MOHAN

For Successful Completion of Orientation Program on NAAC Accreditation Process Conducted by Accreditation Ranking and Certification Network of India (ARCNET India) and CliMed Research Solutions, India, on December 28, 2023.

DR. AJIT SINGH
CEO & Founder
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Adviser and Trainer, ARCNET INDIA

Teaching Learning Centre
Ramanujan College, University of Delhi
(Accredited Grade 'A++' by NAAC)
In collaboration with
KM.MAYAWATI GOVT GIRLS P G COLLEGE Badalpur, GB Nagar, Uttar Pradesh
under the aegis of
MINISTRY OF EDUCATION
PANDIT MADAN MOHAN MALAVIYA NATIONAL MISSION ON TEACHERS AND TEACHING

Ministry of Education

This is to certify that

Dr. Man Mohan

of

ABV Govt. College Sunni Shimla Himachal Pradesh

successfully completed a 4-Week Faculty Induction/Orientation Programme for

"Faculty in Universities/Colleges/Institutes of Higher Education"

from *22 October – 20 November, 2023* and obtained

Grade *A+*.

Blockchain Hash: 0x962592d04e900240f44e3113807b81f2a276deb6bb9290284b19759e72f3b318

Prof. S. P. Aggarwal
(Principal & Director)
TLC, Ramanujan College

Prof.(Dr.) Divya Nath
(Principal & Convener)
Km.Mayawati Govt Girls P G College

Dr. Rajiv Nayan
(Programme Coordinator)
Ramanujan College

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DR MAN MOHAN

For successful completion of the Online Faculty Training Program on "Design, Development and Launch of Value Added Course Using Power of AI". During the program, participants received the detailed hands on training on applications of Artificial Intelligence to create in demand online value added courses. The training Program was conducted from 8th January to 12th January, 2024 by Accreditation, Rankings and Certification Network of India (ARCNET India), an academic venture of CliMed Research Solutions, Gurugram, Haryana.

ASingh

Dr Ajit Singh
President, ARCNET India
CEO, CliMed Research Solutions

CLIMED RESEARCH SOLUTIONS
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GURUGRAM 122 001

MRathore

Dr MS Rathore
Trainer
NAAC Accreditation

CERTIFICATE OF PARTICIPATION

This certificate is proudly presented to

DR MAN MOHAN

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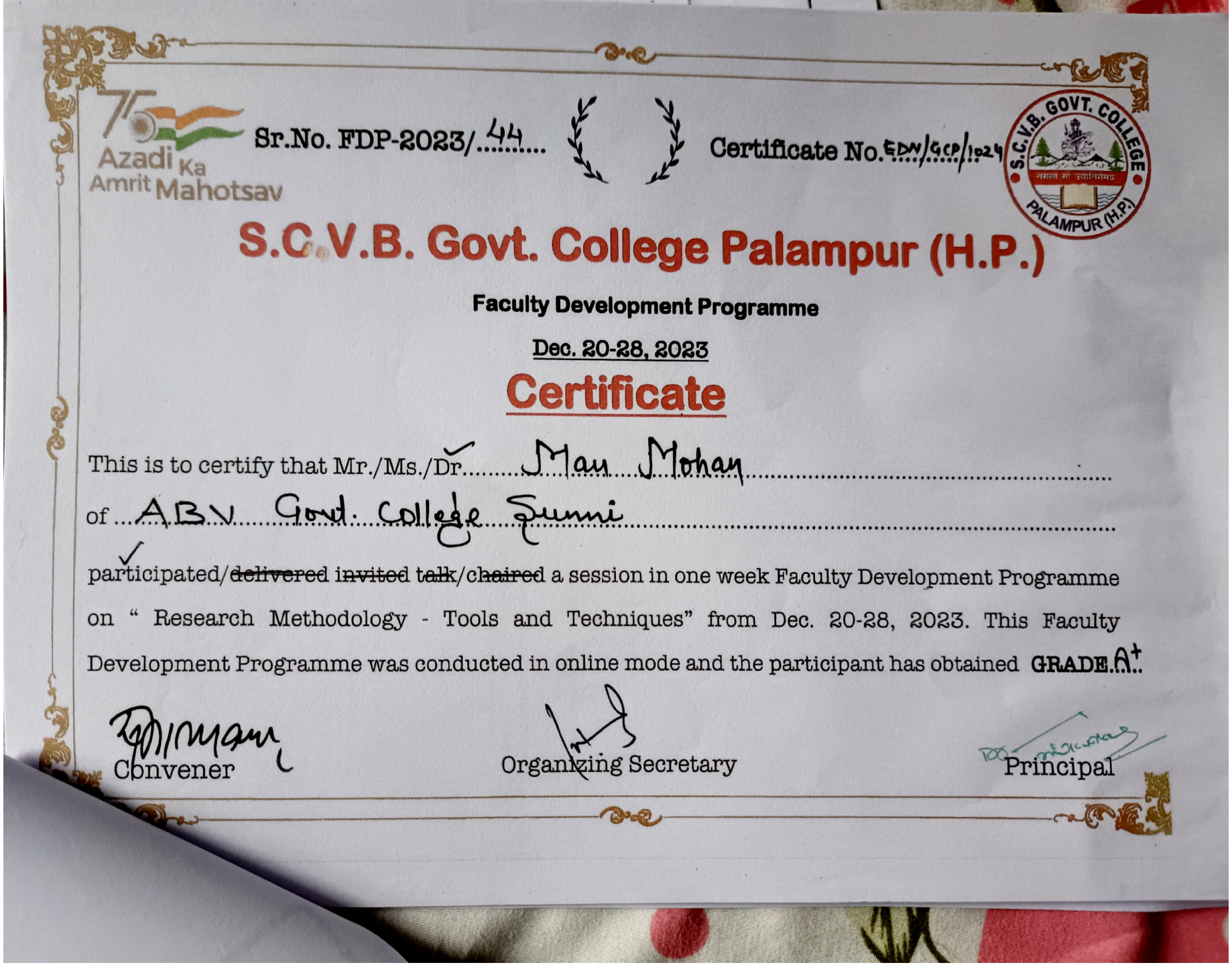
DR. MAHENDRA SINGH RATHORE
NAAC ACCREDITATION TRAINER

CLIMED RESEARCH SOLUTIONS
CliMed
GURUGRAM

DR. AJIT SINGH
EXECUTIVE DIRECTOR, ARCNET INDIA



Azadi Ka Amrit Mahotsav

Sr.No. FDP-2023/44

Certificate No. SDW/GCP/1024

S.C.V.B. GOVT. COLLEGE PALAMPUR (H.P.)

S.C.V.B. Govt. College Palampur (H.P.)

Faculty Development Programme

Dec. 20-28, 2023

Certificate

This is to certify that Mr./Ms./Dr. Man Mohan

of ABV Govt. College Sunni

participated/~~delivered~~ ~~invited~~ ~~talk~~/~~chaired~~ a session in one week Faculty Development Programme on " Research Methodology - Tools and Techniques" from Dec. 20-28, 2023. This Faculty Development Programme was conducted in online mode and the participant has obtained **GRADE A+**

Convener

Organizing Secretary

Principal

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1 DAY NATIONAL SYMPOSIUM ON
NAAC ACCREDITATION & NEP 2020 :
CONNECTING THE DOTS & EMPOWERING ACADEMIA

11TH JUNE, 2024

A collaborative initiative by

ABV Government College, Sunni, Shimla & Government College, Chail-Koti, Shimla

Certificate

This is to certify that Prof/Dr/Mr/Ms. Man Mohan

of ABV Govt. Degree College Sunni, Shimla has attended the One Day National Symposium on NAAC Accreditation & NEP 2020: Connecting the Dots & Empowering Academia as a Resource Person//participant/ Speaker in the session Titled .....

Dr. Deepshikha Bhardwaj
Patron

Dr. Subhash Kapta
Convenor

Dr. R.L. Sharma
Patron

Duty Certificate

It is certified that Dr. Manmohan [redacted] Asstt. Professor (Chemistry) has attended a two hour motivational lecture on Development of Scientific Temper among Students/pre-vocational Education /carrier counselling (Science) to the students of GSSS Dharogra under (RAA) today on dated 16-12-2023 and is hereby relieved of his duties on dated 16-12-2023(AN).

Place : Dharogra

Dated : 16-12-2023

16/12/2023

Principal

GSSS Dharogra

Shimla HP

Government of India

Ministry of Education

Department of Higher Education

Statistics Division

New Delhi

Certificate

Reference No. C-11505-2022

This is to certify that Dr. Man Mohan of Atal Bihari Vajpayee Govt. Degree College Sunni, District Shimla has successfully uploaded the data of All India Survey on Higher Education(AISHE) 2022-2023.

RRajesh

(Shri R. Rajesh)

Deputy Director General

Dated: 10/02/2024

PROF. RAM CHAND PAUL NATIONAL SYMPOSIUM

ON

SUSTAINABLE DEVELOPMENT IN CHEMICAL SCIENCES
"INNOVATION·IPR·ENTREPRENEURSHIP"

ORGANIZED BY

Department of Chemistry & Centre of Advanced Studies in Chemistry

Panjab University, Chandigarh

Certificate of Presentation

Registration No. 15

This certificate is awarded to ~~Prof./~~Dr./Mr./~~Ms.~~ Man Mohan

of Department of Chemistry, HPU, Shimla

~~partic~~ipating/presenting an ~~Oral~~/Poster presentation entitled ~~Applications of High Ener~~ Radiation for Designing of Psyllium Polysaccharide Based Copolymeric Network Hydrogels for Biomedical Uses

in the Prof. R.C. Paul National Symposium organized during 21-22 February, 2023.

Prof. Sonal Singhal
Chairperson

Prof. Navneet Kaur
Convener

Dr. Subash C. Sah
Secretary

PHONES :

HIMACHAL PRADESH UNIVERSITY
SUMMER HILL, SHIMLA-171005

Ref. No. HPU/Exams.(Degree Cell)Ph.D./2022/Prov. Cert. Dated : 11.09.2023

PROVISIONAL CERTIFICATE

Certified that **Mr. Man Mohan** S/o **Sh. Duni Chand**, Enrolment No. **07-GCM-147** has been declared qualified for the award of the degree of Doctor of Philosophy in the subject **Chemistry** under the Faculty of **Physical Sciences** from this University vide Notification No. **Ph.D.2023-17** dated **01.09.2023.**

Title of the Thesis:

"SYNTHESIS AND CHARACTERIZATION OF PSYLLIUM BASED HYDROGELS BY RADIATION INDUCED CROSSLINKING FOR USE IN DRUG DELIVERY APPLICATIONS".

The formal degree shall be issued in the University Convocation to be held in due course of time.

Deputy Registrar (Exams.)
Deputy Registrar (Exams),
Himachal Pradesh University,
Shimla - 171005

Himachal Pradesh University, Shimla-5 **Ph.0177-26330008**
(NAAC Accredited "A" Grade University.) **hpunss14@gmail.com**
O/o the Programme Coordinator (NSS)

No. 2/94-95/HPU/NSS: -

Dated: -20.02.2024

OFFICE ORDER

As per the recommendation of Principal, Dr.Sushmita Thakur, Asstt.Prof. in Economics and Dr.Man Mohan, Asstt. Professor in Chemistry are hereby appointed as Programme Officer(s) to conduct N.S.S. activities of Unit-1 & Unit-II in Govt. College Suni Distt. Shimla H.P. from the date of taking over the charge of the scheme for a period of one year. This term is likely to be extended from time to time but not exceeding two years depending upon the performance of the Programme Officers. The Programme Officers will be entitled for monthly pocket allowance as per NSS manual out of NSS funds placed at the disposal of the College from the date of taking over the charge of the scheme.

They being the Incharge of the Institute NSS Unit will not hold the charge of any other activity like N.C.C., Hostel Wardenship, Bursarship, Sports and any other charge involving regular extra duties or remuneration in the College during this period.

They will have to go for training and orientation course within six months of his appointment or whenever organized by Regional Director, Institute of Youth Development Sector-12, Chandigarh failing which they shall not be eligible to continue as NSS Programme Officer.

(Dr.Vinay Kumar Sharma)
Programme Coordinator, NSS

Endst.No.Even Dated:- 20.02.2024

Copy for information and necessary action to: - 420

1. The Principal, Govt. College Suni Distt. Shimla-171301 w.r. to his office letter No.EDN-GCS-56/2016-NSS-2044 dated 20.02.2024.
2. The State NSS Officer, H.P. State NSS Cell, Deptt. of Youth Affairs and Sports, H.P. Govt. Secretariat, Shimla-2.
3. Dr.Sushmita Thakur, Asstt. Prof. in Economics GDC Suni, Distt. Shimla H.P.
4. Dr.Man Mohan, Asstt. Prof. in Chemistry GDC Suni, Distt. Shimla H.P.

Programme Coordinator, NSS
H.P. University, Shimla-171005

Bioactive Carbohydrates and Dietary Fibre 29 (2023) 100351

Contents lists available at ScienceDirect

Bioactive Carbohydrates and Dietary Fibre

journal homepage: www.elsevier.com/locate/bcdf

Fabrication of arabinoxylan psyllium-phosphated polymers for biomedical applications

Baljit Singh *, Ankita Kumari, Prerna Sharma, Man Mohan

Department of Chemistry, Himachal Pradesh University, Shimla, 171005, India

ARTICLE INFO

Keywords:
Hydrogel
Phosphated polymers
drug Delivery

ABSTRACT

Dietary fibers are known for their therapeutic role in colon ailments and enhancement of gut microbial growth. Dietary fiber psyllium has been explored as dietary supplement for the treatment of gastrointestinal problems like constipation, colon inflammation and diverticulitis. Hence, in the present work, psyllium has been used to design the hydrogel based drug delivery (DD) system. The antibiotic drug cefuroxime encapsulated arabinoxylan psyllium-phosphated network hydrogels were prepared for drug delivery to colon problems to synergize the effect of antibiotic drug. These grafted and crosslinked copolymers were characterized by solid state ^{13}C NMR, FTIR, TGA-DTG, DSC, SEM, AFM and XRD. The presence of FTIR peak at 1153.30 cm^{-1} (due to –P═O of poly (BMEP) and at 977.53 cm^{-1} (due to *P–O–C* of poly (BMEP) and absence of peak at around 130 ppm in solid state ^{13}C NMR confirmed the incorporation of the phosphate polymers [poly (bis [2-methacryloyloxy] ethyl phosphate [(poly (BMEP)] in to copolymer hydrogels. XRD results indicated the amorphous nature of the polymers. The mesh size (ξ) and crosslink density (ρ) of network hydrogel was found 74.763 nm and 0.74 × 10^{-5} mol/cm^3 respectively which indicated the porous nature of the hydrogels. Polymers showed 0.50 N mucoadhesion with mucosal membrane. The haemolysis was found less than 5% during blood-polymer interaction indicated blood compatible nature of polymers. The sustained diffusion of cefuroxime was observed with non-Fickian mechanism with Korsmeyer-Peppas best fit kinetic model. Overall, results indicated the suitability of arabinoxylan psyllium-phosphated polymers for drug delivery applications.

1. Introduction

Recently, phosphated polymers have been explored for various biomedical applications. The poly (bis [2-methacryloyloxy] ethyl phosphate [(poly (BMEP)] is a hydrophilic and negatively charged pH responsive polymer. The inherent properties of phosphorous-containing polymers make them suitable material for drug delivery devices (DDD). The poly (BMEP) based network hydrogels have been designed to deliver the anti cancer drugs to gastrointestinal region (Eswaramma et al., 2017). The tamarind gum-poly (BMEP) grafted polymers have been applied in controlled delivery of for encapsulated anti-cancer drug to colon (Nagaraja et al., 2021).

In biomedical applications, these phosphate-modified polymers have been applied for scaffolds formation for bone tissue engineering applications. The presence of phosphate group on the surface of biomaterials helps in anchoring on bone cell surface which is important for tissue regeneration (Dadsetan et al., 2012). In addition, presence of phosphate groups in the hydrogels has also increased biocompatibility of network hydrogels and induced biodegradability (Gonçalves et al., 2016). In case of agricultural applications, the phosphated polymers release the phosphate after degradation to enhance the plant growth. These phosphated hydrogels can also provide water and mineral to the plant for a longer period (Anil et al., 2019; Reddy et al., 2016).

The psyllium is a dietary fiber which is applied in drug formulations as excipient in the form of suspending agent (Rao et al., 2011) and gelling agent (Sami et al., 2020) due its mucilaginous nature. The presence of hydrophilic groups in its constituents arabinoxylan (L-arabinose, D-xylose), and D-galacturonic acid (Kumar & Sharma, 2014) increases water holding capacity. Its therapeutic role as laxative agent in constipation and anti-inflammatory agent in colon inflammations have also been well recognized (Niu et al., 2019). In the present work, cefuroxime impregnated psyllium-poly (BMEP) based network hydrogels were prepared for DD applications.

Cefuroxime is an antibiotic under the class cephalosporin which is useful for the treatment of respiratory infections. It has also been administered for genitourinary and skin infections (Mrestani et al.,

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journal homepage: www.elsevier.com/locate/bcdf

Design of ciprofloxacin impregnated dietary fiber psyllium-moringa gum-alginate network hydrogels via green approach for use in gastro-retentive drug delivery system

Baljit Singh *, Vikrant Sharma, Man Mohan, Rohit, Prerna Sharma, Kaka Ram

Department of Chemistry, Himachal Pradesh University, Shimla, 171005, India

ARTICLE INFO

Keywords:
Hydrogel
Drug delivery
Polymer
Cryo SEM

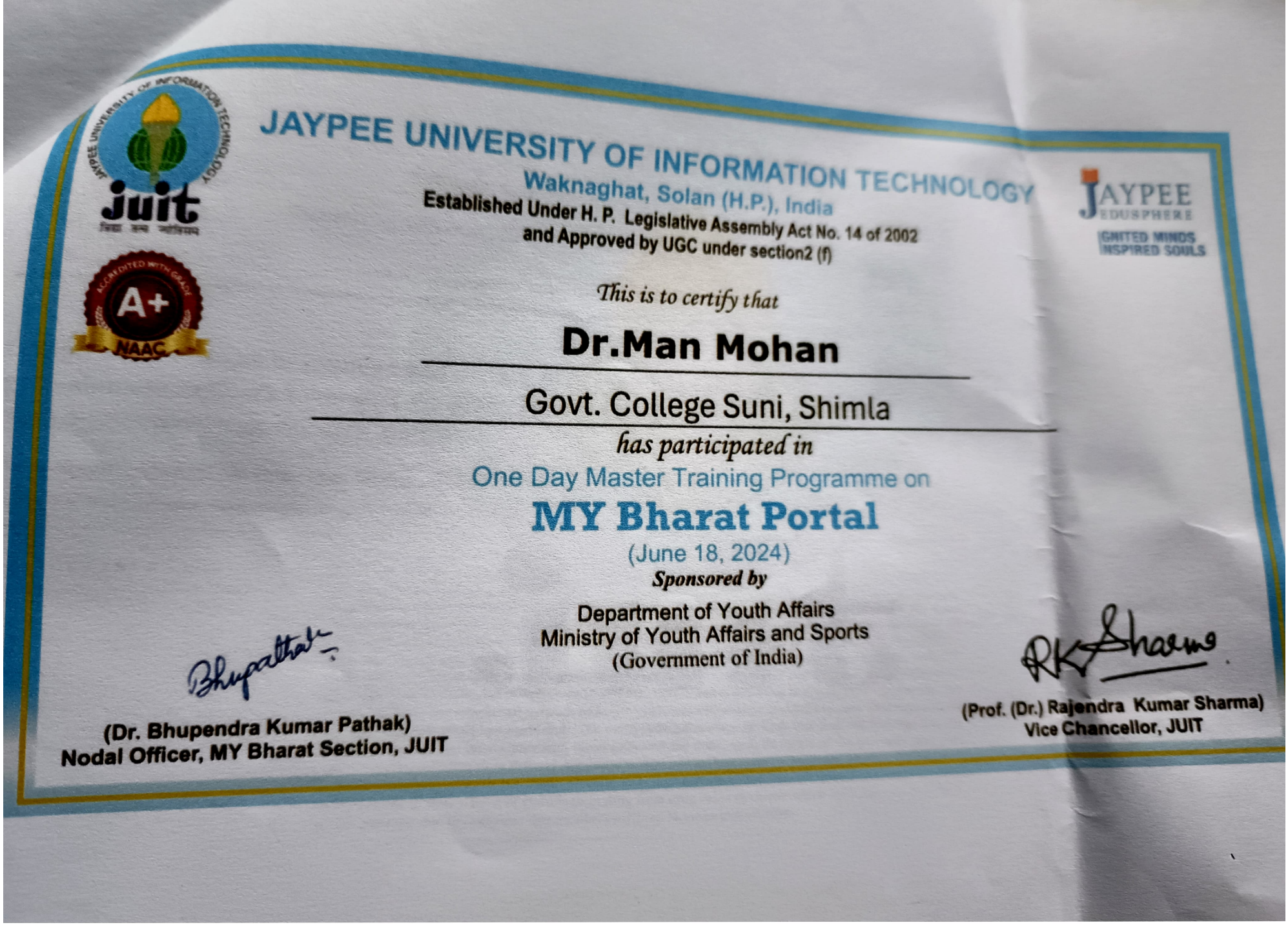
ABSTRACT

In order to improve the pharmacokinetic deficiencies and bioavailability of therapeutic agent used in the upper gastro intestinal tract (GIT), herein this article gastro-retentive drug delivery system (DDS) were developed via green approach from medicinally important polysaccharides psyllium, moringa gum and alginate. The antibiotic drug ciprofloxacin was impregnated into DDS. These polymeric DDS were characterized by cryo-SEMs, FTIR, ^{13}C NMR and XRD analysis. The simulated gastric fluid uptake was reduced with rise in crosslinking during ionotropic gelation. The diffusion of ciprofloxacin was non-Fickian and it was fitted in Korsmeyer-Peppas model. The porous nature of the crosslinked network hydrogel beads was observed in cryo SEM images. XRD indicated the amorphous nature of the hydrogel beads. The haemolytic index value of beads was observed less than 5%. The results of the polymer interactions with blood indicated the non-hemolytic nature of the polymers with their suitability for controlled drug delivery applications. The antioxidant property indicated 64.03 ± 0.29% DPPH radicals scavenging assay of the beads. Overall, anti-ulcer activity of the DDS for gastric ulceration could be enhanced due to slow release of ciprofloxacin drug from drug delivery carrier which itself has antiulcer therapeutic potential due to composed dietary fibers psyllium-moringa gum-alginate.

1. Introduction

Recently, various polysaccharide based formulations have been explored in food and pharmaceutical industries especially in designing the drug delivery systems (DDS) which can enhance their efficiency and site specificity (Bodmeir, Oh, & Parmar, 1989; Murata, Nakada, Miyamoto, Kawashima, & Seo, 1993; Lee, Sokoalaski, & Royer, 1981; Sa, 1991). The gastro retentive DDS are required to maintain the desired drug concentration in the stomach for treatment of associated ailments. The floating nature of these DDS improves poor bioavailability of drugs with narrow therapeutic window in the upper part of gastrointestinal tract (GIT) (Hwang, Park, & Park, 1998). These DDS are promising drug carriers to increase the gastric retention time and bioavailability of the drugs (Streubel, Siepmann, & Bodmeier, 2006; Arora, Ali, Khar, Ahuja, using alginate-gelatin for cefadroxil drug encapsulation. The floating metronidazole tablets have been designed with hydroxypropylmethylcellulose HPMC- psyllium-carbopol in the presence of sodium bicarbonate and these formulations have showed floating behaviour and indicated buoyancy time for 8 h. The delayed release of metronidazole drug has helped the suppression of *H. pylori* from stomach of ulcer patients (Asnaashari, Khoei, Zarrintan, Adibkia, & Javadzadeh, 2011).

The different polysaccharides present in the DDS not only exhibit a behaviour of simple linear combination of their properties but also reflect the addon properties in drug delivery carriers. These new hybrid network hydrogel structures could also be applied as drug delivery carriers for drugs of low and high partition coefficients (Florjancic, Zupancic, & Zumer, 2002). DDS based on the blending of the psyllium



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Govt. College Suni, Shimla

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(June 18, 2024)

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Nodal Officer, MY Bharat Section, JUIT

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Vice Chancellor, JUIT

Duty Certificate

It is certified that Dr. Manmohan Singh Thakur Asstt. Professor (Chemistry) has attended a two hour motivational lecture on Development of Scientific Temper among Students/pre-vocational Education /carrier counselling (Science) to the students of GSSS Dharogra under (RAA) today on dated 16-12-2023 and is hereby relieved of his duties on dated 16-12-2023(AN).

Place : Dharogra

Dated : 16-12-2023

16/12/2023

Principal
GSSS Dharogra
Shimla HP

Principal
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Distt. Shimla, H.P. 171019