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3.5.1 QnM) Average number of Collaborative activities for research, faculty exchange, student exchange, industry-internship etc. per year for the last five years

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Dr.S. ELANCHEZHIYAN, M.D.S.,
PRINCIPAL

TO WHOMSOEVER IT MAY CONCERN

This is to certify that total number of Collaborative activities for research, faculty exchange, student exchange year-wised during the last five years details are given below:

Academic Year	2022-23	2021-22	2020-21	2019-20	2018-19
Total Number of Collaborative activities for research, faculty exchange, student exchange	2	3	3	2	2

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Collaborative activities for research, faculty exchange, student exchange, industry-internship - DOCUMENTARY EVIDENCE / AGREEMENT IN SUPPORT OF COLLABORATION

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ACADEMIC YEAR (2022-23)

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ACADEMIC YEAR 2022-2023

Year of collaboration	Title of the Collaborative activity	Name of the collaborating agency with contact details	Names of the participants	Source of financial support	Duration	Nature of the activity
2022-2023	Thesis work on the zoledronate gel	JSS college of pharmacy, Ooty	Dr. Jasmine Angel. J and JSS college of pharmacy, Ooty	Self	2 years	Research
2022-2023	Evaluation and comparision of shear bond strenghth and anti bacterial efficacy of Titanium dioxide nano particles and zinc dopped copper nano particles- An invitro study	Saveetha Dental college, Chennai	DR. S. Dharani and white lab material research centre, Saveetha Dental college, Chennai	self	1 year	Research

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" Rocklands", Post Box No. 20, Ooty - 643 001. The Nilgiris, Tamil Nadu, India.
+91 - 423- 2443393 / 94 jsscpooty@jssuni.edu.in www.jssuni.edu.in

JSS ACADEMY OF HIGHER EDUCATION & RESEARCH
(DEEMED TO BE UNIVERSITY) MYSURU

Dated : 09.02.2023

CERTIFICATE OF COLLABORATION

This is to certify that Dr. Jasmine Angel J. from the Department of Periodontics at JKK Nattraja Dental College and Hospital, Kumarapalayam - 638183, collaborated with us on her research work titled "Thesis work on the Zoledronate Gel" during the period 2022–2023. We commit to mutual contribution and upholding academic standards throughout our collaborative endeavor.

Dr.S.P.Dhanabal, Principal
JSS College Of Pharmacy
Ooty, Tamil Nadu

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Mrs. N. SENDAMARAAI
Chairperson

Prof. Dr. A. SIVAKUMAR, M.D.S.,
Principal

Ref.No:JKKNDC/MDS-20-21/13/01-22 **Date: 10.01.2022**

BONAFIDE CERTIFICATE

This is to certify that **DR. J.JASMINE ANGEL**, D/o. I. Joseph Peter, is studying in Second year MDS Course (Periodontics) in our institution for the academic year 2021 - 2022. The College is affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai and Recognized by The Dental Council of India, New Delhi.

This Certificate is solely issued for the purpose of doing **"Thesis Work on the Zoledronate Gel at JSS College of Pharmacy"**.

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From gowthamarajan k • gowthamsang@jssuni.edu.in

To JASMINE ANGEL J • jasmineangel.j@jkkn.ac.in

Date 27 Jan 2022, 10:55 am

Standard encryption (TLS).

See security details

Dear Dr
We are accepting your request for preparing the dental gel around10 grams for clinical studies .
The budget of this study is INR 5000/-..Kindly send the drug solution for preparing the requested gel
If you are accepting please transfer the project amount to
For online fund transfer
Name of the bank: PUNJAB NATIONAL BANK
A/C Name: JSS Consultancy Trust Account
Ac. No. 4390000100099427
RTGS Code: PUNB0439000
SWIFT NO. PUNBINBBDIB
Thanks

Show quoted text

--

—

With Regards

Dr Gowthamarajan K

Professor & Head,

Department of Pharmaceutics,

JSS College of Pharmacy,

(JSS Academy of Higher Education & Research),

WHITE LAB
Material Research Centre
SAVEETHA DENTAL COLLEGE AND HOSPITAL
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e-mail: whitelab.sdc@saveetha.com Website: whitelab.sdc.saveetha.com

Date: 13.12.2022

To whomsoever it may concern

This is to Certify that **Dr .S. Dharani,** Postgraduate student from Department of Orthodontics, JKK Nattraja Dental College, Komarapalayam, Namakkal, had come to White lab – Material Research Centre, Saveetha Dental College, Chennai, India for utilizing the following facilities namely, Antibacterial analysis, INSTRON E 3000 UTM and BRUKER- D8 Advance XRD as part of completion of her thesis entitled "Evaluation and Comparison of Shear Bond Strength and Antibacterial Efficacy of Titanium Dioxide Nanoparticles and Zinc Doped Copper Nanoparticles" – An In-vitro Study from 7-12-2022 to 10-12-2022.

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Dissertation submitted to

The Tamil Nadu Dr. M.G.R. Medical University

In partial fulfilment for the Degree of

MASTER OF DENTAL SURGERY

BRANCH V

DEPARTMENT OF ORTHODONTICS AND DENTOFACIAL ORTHOPAEDICS

2020– 2023

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Mrs. P.M. Saranyadevi, BA., Female Representative.

Ref No:JKKNDC/IEC/MDS-01/2023 **Date:28.01.2023**

To

Dr. S. Dharani,
Post Graduate Student,
Department of Orthodontics,
JKKN Dental College & Hospital.

******

Your Dissertation Studied titled **"EVALUATION AND COMPARISON OF SHEAR BOND STRENGTH AND ANTIBACTERIAL EFFICACY OF ADHESIVE RESINS MIXED WITH TITANIUM DI OXIDE NANOPARTICLES AND COPPER DOPED ZINC NANOPARTICLES"** presented to the Institutional Ethical Committee and was accepted after Discussion with committee members. It is for the IEC Clearance awarded.

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CERTIFICATE-I

This is to certify that this dissertation work titled **"EVALUATION AND COMPARISON OF SHEAR BOND STRENGTH AND ANTIBACTERIAL EFFICACY OF ADHESIVE RESINS MIXED WITH TITANIUM DI OXIDE NANOPARTICLES AND COPPER DOPED ZINC NANOPARTICLES"** is the bonafide work done by **DR.DHARANI . S** during the period of 2020-2023 under our supervision and guidance and to our satisfaction. This dissertation is submitted in partial fulfilment, for the degree of Master of Dental Surgery awarded by The Tamilnadu Dr.M.G.R. Medical University, Chennai in the Branch V Orthodontics and Dentofacial Orthopaedics. It has not been submitted (partial or full) for the award of any other degree or diploma.

M.karthi 30/01/23

GUIDE

Prof. Dr. M.KARTHI, M.D.S

HEAD OF THE DEPARTMENT

PROFESSOR & HEAD
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PRINCIPAL

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CERTIFICATE-II

This is to certify that **DR.S.DHARANI,** Post Graduate student (2020-2023) from the **DEPARTMENT OF ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS**, of registration number **243520500002** has done the dissertation titled **"EVALUATION AND COMPARISON OF SHEAR BOND STRENGTH AND ANTIBACTERIAL EFFICACY OF ADHESIVE RESINS MIXED WITH TITANIUM DI OXIDE NANOPARTICLES AND COPPER DOPED ZINC NANOPARTICLES"** under my direct guidance and supervision for the partial fulfilling of the regulations laid down by THE TAMILNADU DR. M.G.R MEDICAL UNIVERSITY,CHENNAI, FOR M.D.S BRANCH in the DEPARTMENT OF ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS.

M. Karthi 30/01/23

Prof Dr. M. KARTHI MDS .,

Guide & Supervisor sign with Seal

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CERTIFICATE – III

This is to certify that this dissertation work titled **"EVALUATION AND COMPARISON OF SHEAR BOND STRENGTH AND ANTIBACTERIAL EFFICACY OF ADHESIVE RESINS MIXED WITH TITANIUM DI OXIDE NANOPARTICLES AND COPPER DOPED ZINC NANOPARTICLES"** of the candidate **Dr. S.DHARANI** with registration Number **243520500002** for the award of **MASTER OF DENTAL SURGERY** in the branch of **ORTHODONTICS AND DENTOFACIAL ORTHOPAEDICS**. I personally verified the Ouriginal.com website for the purpose of plagiarism check and found that the uploaded thesis file contains from introduction to conclusion pages and results shows a 9% in the dissertation.

M. Karthi 30/01/23

Prof Dr. M. KARTHI MDS .,

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DECLARATION

I hereby declare that this dissertation entitled **"EVALUATION AND COMPARISON OF SHEAR BOND STRENGTH AND ANTIBACTERIAL EFFICACY OF ADHESIVE RESINS MIXED WITH TITANIUM DI OXIDE NANOPARTICLES AND COPPER DOPED ZINC NANOPARTICLES"** is a bonafide and genuine research work carried out by me under the guidance of **Dr. M.Karthi, Professor and HOD of Department of Orthodontics**, J.K.K.Nattraja Dental College and Hospital, Komarapalayam.

S. Dharani

Dr. S.DHARANI

Postgraduate student in Orthodontics

J.K.K.Nattraja Dental College and Hospital

Komarapalayam

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Date: 13.12.2022

To whomsoever it may concern

This is to Certify that **Dr .S. Dharani**, Postgraduate student from Department of Orthodontics, JKK Munja Dental College, Komarapalayam, Namakkal, had come to White lab – Material Research Centre, Saveetha Dental College, Chennai, India for utilizing the following facilities namely, antibacterial analysis, INSTRON E 3000 UTM and BRUKER- D8 Advance XRD as part of completion of her thesis entitled "Evaluation and Comparison of Shear Bond Strength and Antibacterial Efficacy of Titanium Dioxide Nanoparticles and Zinc Doped Copper Nanoparticles" – An In-vitro Study from 01-12-2022 to 10-12-2022.

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ACADEMIC YEAR (2021-22)

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ACADEMIC YEAR 2021-2022

Year of collaboration	Title of the Collaborative activity	Name of the collaborating agency with contact details	Names of the participants	Source of financial support	Duration	Nature of the activity
2021-2022	Evaluation of the clinical, radiological and biochemical analysis of 1% alendronate gel in the treatment of intra bony defects in chronic periodontitis patients - a randomized control clinical study	JSS college of pharmacy, Ooty	Dr.Mohamed Adhil k and JSS college of pharmacy, Ooty	self	1 year	Research
2021-2022	Evaluation of 1.5% of quercetin gel as an adjunct to scaling and root planning in chronic periodontitis patients - a clinical and biochemical study	JSS college of pharmacy, Ooty	Dr.kanimozhi K and Dr K.Gowthamarajan, JSS college of pharmacy	self	1 year	Research

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2021-2022	**Cone beam computerized tomographic analysis of canal configuration of human permanent maxillary first molars: A invitro study**	**3D Anbu Dental Diagnostics , Salem**	**Dr. Boopathi Raja and 3D Anbu Dental Diagnostics , Salem**	**self**	1 year	**Research**

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JSS ACADEMY OF HIGHER EDUCATION & RESEARCH
(DEEMED TO BE UNIVERSITY) MYSURU

Dated : 02.12.2021

CERTIFICATE OF COLLABORATION

This is to certify that Dr. **Dr.Mohamed Adhil K.** from the Department of Periodontics at JKK Nattraja Dental College and Hospital, Kumarapalayam - 638183, collaborated with us on his research work titled **"Evaluation of the clinical, radiological and biochemical analysis of 1% Alendronate gel in the treatment of intra bony defects in chronic periodontitis patients - a randomized control clinical study"** during the period during 2021 – 2022. We commit to mutual contribution and upholding academic standards throughout our collaborative endeavor.

Dr.S.P.Dhanabal, Principal
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EVALUATION OF THE CLINICAL, RADIOLOGICAL AND BIOCHEMICAL ANALYSIS OF 1% ALENDRONATE GEL IN THE TREATMENT OF INTRABONY DEFECTS IN CHRONIC PERIODONTITIS PATIENTS - A RANDOMIZED CONTROLLED CLINICAL STUDY

Dissertation submitted to

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY

In Partial fulfillment for the Degree of

MASTER OF DENTAL SURGERY

BRANCH II

PERIODONTICS

MAY 2022

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CERTIFICATE - I

This is to certify that Dr. MOHAMED ADHIL. K. Post Graduate student in the Department of Periodontics, J.K.K. Nattraja Dental College and Hospital, Komarapalyam has done this dissertation titled "EVALUATION OF THE CLINICAL, RADIOLOGICAL AND BIOCHEMICAL ANALYSIS OF 1% ALENDRONATE GEL IN THE TREATMENT OF INTRABONY DEFECTS IN CHRONIC PERIODONTITIS PATIENTS - A RANDOMIZED CONTROLLED CLINICAL STUDY" under my direct guidance during his post graduate study period 2019 - 2022.

This dissertation is submitted to THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY in partial fulfillment of the degree of MASTER OF DENTAL SURGERY, BRANCH II - PERIODONTICS.

Dr. S. THANGA KUMARAN,
Professor and Head,
J.K.K.N Dental College and Hospital,
Komarapalayam.

PROFESSOR AND HEAD,
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CERTIFICATE - II

This is to certify that this dissertation work titled **"EVALUATION OF THE CLINICAL, RADIOLOGICAL AND BIOCHEMICAL ANALYSIS OF 1% ALENDRONATE GEL IN THE TREATMENT OF INTRABONY DEFECTS IN CHRONIC PERIODONTITIS PATIENTS – A RANDOMIZED CONTROLLED CLINICAL STUDY"** of the candidate **Dr.MOHAMED ADHIL.K** with the registration number **241913102** for the award of **MASTER OF DENTAL SURGERY** in the **BRANCH II - PERIODONTICS**. I personally verified the urkund.com website for the purpose of plagiarism check. I found that the upload thesis file contains from introduction to conclusion pages and results shows 6 % of plagiarism in the dissertation.

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Periodontal disease is a chronic inflammatory conditions that affect the supporting structures of teeth which could leads to tooth loss [1].It is polymicrobial inflammatory disease and there are numerous etiological factors which play an important role in the initiation and progression of periodontal disease. The primary etiological factor is the bacterial biofilm that involves both direct and indirect tissue damage, through plaque bacterial products and bacterial induction of the host that activates inflammatory immune responses.

The main goal of periodontal treatment is not only to arrest the periodontal disease progression but also to regenerate the original architecture and function of periodontium[2]. The elimination of periodontopathogens containing biofilms remain the primary objective of periodontal therapy. The numerous methods have been used for reduction or elimination of pathogenic bacteria such as scaling, root planing, soft tissue curettage and flap surgeries. Traditional non-surgical periodontal treatment modalities have aimed at eliminating the gingival inflammatory process and preventing the progression of periodontal disease, whereas surgical procedures have been directed towards the elimination and/or regeneration of the defects caused by the disease [3].

Periodontal surgery is a part of the treatment of periodontal disease which is performed, in order to gain access to diseased areas for adequate cleaning, to achieve pocket depth reduction, clinical attachment level gain and to restore the periodontal tissues[4]. To accomplish these goals, numerous treatment modalities such as open flap debridement alone or combined with regenerative materials are performed. Currently, there are different grafting materials with or without barrier membranes have been used in adequate success for periodontal regeneration[5].

Various approaches are developed to overcome and achieve greater predictability with regenerative therapy. Usage of pharmacological agents can simultaneously eradicate infection and enhances new bone formation. These agents results in suppression of bone resorption or an acceleration of bone formation which could prevent alveolar bone loss in chronic periodontitis. This type of therapeutic approach might provide a new mechanism by which periodontal disease could be arrested[6].

Bisphosphonates are a unique class of pharmacological agent, which are chemically stable derivatives of inorganic pyrophosphate analogs[7]. It has been effectively used to treat metabolic bone diseases like paget's disease, hypercalcaemia of malignancy, osteoporosis and estrogen deficiency[8].It is also capable of inhibiting periodontitis associated osteoclastic activity and hence effective in protecting the alveolar bone in periodontitis [9].Among various bisphosphonates, Alendronate was chosen because it is more potent than any other drugs.[10]

Alendronate (4 - amino 1 - hydroxybutylidine bisphosphonate), a novel bisphosphonate is a very potent inhibitor of bone resorption[10]. Main action of Alendronate includes inhibition of the development of osteoclasts, reduction of its activity and apoptosis of osteoclast [11].Alendronate's also stimulate the formation of osteoblast precursors and mineralized nodules, thereby promoting early osteoblastogenesis [12].

As Alendronate can induce various gastrointestinal disturbances, an alternate approach of site specific local drug delivery method was used in our study. It provides sustained release of drug at the target site which minimizes the exposure of total body

to the drug [13]. Since Alendronate has optimum solubility, pH and particle size it has been formulated as gel form. The flow property of the gels was suited for site specific local application in the periodontal intrabony defects. In our study, 1% Alendronate concentration was chosen, as its release kinetics exhibits first order elimination [14].

Alendronate promotes osteoblast proliferation and differentiation of human periodontal ligament cells. It also has the ability to upregulate Alkaline phosphatase level, Osteocalcin, Osteopontin and OPG [15].Its marker level was reflected in GCF, which predicts the bone related status of periodontal tissues[16].

GCF-ALP activity has been shown to have a predictive value in chronic periodontitis in terms of bone formation.

Thus the present study is performed to evaluate the efficacy of 1% Alendronate gel to treat the intrabony defects in chronic periodontitis patients through clinical, radiological and biochemical procedures.

The aim of the present study is

To perform comparative evaluation of Clinical, Radiological parameters and assessment of Alkaline phosphatase level in open flap debridement alone and open flap debridement along with 1% Alendronate gel in the treatment of intrabony defects in patients with chronic periodontitis.

1. To determine changes in mean Plaque Index, Gingival Index and Oral Hygiene Index -Simplified at baseline, 3 and 6 months.
2. To compare the intergroup difference in mean Probing Pocket Depth and Clinical Attachment Level at baseline, 3 and 6 months.
3. To measure the intergroup difference in mean Intrabony Defect (IBD) depth reduction at baseline, 3 and 6 months.
4. To evaluate the intergroup difference in mean percentage of Intrabony Defect (IBD) depth reduction at 3and 6 months post therapy.
5. To evaluate the Alkaline phosphatase level in GCF at baseline, 7 and 14 days.

A randomized, controlled, split mouth, clinical study was conducted to evaluate the clinical and radiological effects of 1% Alendronate gel in the treatment of intrabony defects in chronic periodontitis patients and assessed Alkaline phosphatase level (ALP) in GCF samples collected in 9baseline, 7 and 14 days.

The participants for this study were selected from the outpatient section of the Department of Periodontics, J.K.K. Nattraja Dental College and Hospital, Komarapalayam, Tamilnadu, India. Ten patients, aged 20 to 50 years, of chronic periodontitis with the probing pocket depth of ≥ 5 mm were enrolled in this study. Patients were instructed about the utility and design of this clinical trial and informed signed consent were obtained. The study protocol was analyzed and approved by the Institutional Review Board in accordance with the Helsinki Declaration of 1975, as revised in 2000.

INCLUSION CRITERIA

1. Patients age limit of 20-50 years of both genders.
2. Probing pocket depth of ≥ 5 mm as assessed by William's periodontal probe.
3. Clinical attachment level (CAL) ≥ 4 mm.
4. Patients with minimum of two contralateral intrabony defect depth of ≥ 3mm.

EXCLUSION CRITERIA

1. Patients suffering from known systemic diseases.
2. Patients who are pregnant and lactating.
3. Patients who are smokers and alcoholics.

4. Patients who received any chemotherapeutic mouth rinse during past 6 months.
5. Patients who received surgical or non-surgical therapy in last 6 months.
6. Patients with aggressive periodontitis.
7. Patients who received any antibiotic therapy in the last 6 months.
8. Patients with known drug allergy.

STUDY DESIGN

The study was designed as a single blinded, randomized, controlled, split mouth, clinical study for a period of 6 months. The study population comprised of 10 subjects and a total of 20 intrabony defects with the probing pocket depth of ≥ 5 mm and intrabony defect depth of ≥ 3mm. Probing pocket depth standardization was done with acrylic stent in all the selected areas.

GROUP CRITERIA

Group I : Intrabony defects treated with Open flap debridement alone (Control sites).

Group II : Intrabony defects treated with Open flap debridement along with 1% Alendronate gel (Test sites).

FORMULATION OF THE 1% ALENDRONATE GEL:

The 1% Alendronate gel was formulated at the JSS college of Pharmacy, Ooty, Nilgris district, Tamil Nadu, India. Alendronate Powder (Molecular weight 352.12), was purchased from Apex healthcare private limited, India. 200 mg of Alendronate sodium was dissolved in 100 ml of distilled water. To this, 200 mg of Carbopol 934 P was added to get a concentration of 1 %. The mixture was stirred gradually and Carbopol was allowed to soak for 2 hours. 0.5 ml of triethanolamine was added to the gel and finally 30 mg of Methyl paraben and 10 mg of Propyl paraben were dissolved in 2 ml of Ethanol and added to the preparation. The *in vitro* release of the drug studied using dialysis membrane showed that 100 % of the drug was released in 14 hours.

The gel formulations were sterilized by autoclaving for 30 mins at 121ºC. The sterility of the formulations were tested using culture media for both aerobic and anaerobic bacteria. The formulations were later transferred to 2 ml syringes under sterile conditions and dispensed for clinical study.

CLINICAL PARAMETERS

The following variables were measured at baseline, 3 and 6 months.

1. Plaque Index (PI) - (Silness and Loe 1964)
2. Gingival Index (GI) - (Loe and Silness 1963)
3. Oral Hygiene Index - Simplified (OHI-S) - (JC Green and JR Vermillion 1964)
4. Probing Pocket Depth (PPD)
5. Clinical Attachment Level (CAL)

RADIOGRAPHIC PARAMETERS

Intrabony Defect (IBD) depth- difference in the change in the base of IBD (vertical distance from the CEJ to the crest of the base of the IBD).

CLINICAL PARAMETERS

Plaque Index (PI) - (Silness and Loe 1964)

The surfaces examined are the four gingival areas of the tooth: disto-facial, facial, mesio-facial and lingual.

Scoring criteria

0	No plaque in the gingival area.
1	A film of plaque adhering to the free gingival margin and adjacent area of the tooth. The plaque may be recognized only by running a probe across the tooth surface.
2	Moderate accumulation of soft deposits within the gingival pocket and on the gingival margin and/or adjacent tooth surface that can be seen by the naked eye.
3	Abundance of soft matter within the gingival pocket and/or on the gingival margin and adjacent tooth surface.

Good	**0.1-0.9**
Fair	**1.0-1.9**
Poor	**2.0-3.0**

The scores of the four areas of the tooth can be summed and divided by four to get the PI for the tooth. A score from

Gingival Index (GI) - (Loe and Silness 1963)

The tissues surrounding each tooth are divided into four gingival scoring units: disto-facial papillae, facial margin, mesio-facial papillae and entire lingual gingival margin.

0	No inflammation
1	Mild inflammation, no bleeding elicited on probing.
2	Moderate inflammation, bleeding on probing
3	Severe inflammation

The scores of the four areas of the tooth can be summed and divided by 4 to get the GI for the tooth.

0.1-1.0	Mild inflammation
1.1-2.0	Moderate inflammation
2.1-3.0	Severe inflammation

Oral Hygiene Index - Simplified (OHI-S) - (JC Green and JR Vermillion 1964)

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This is to certify that **Dr.Kanimozhi** from the Department of Periodontics at JKK Nattraja Dental College and Hospital, Kumarapalayam - 638183, collaborated with us on her research work titled on **"Evaluation of 1.5% of Quercetin gel as an adjunct to scaling and root planning in chronic periodontitis patients – A clinical and biochemical study"** during the period during 2021 – 2022 . We commit to mutual contribution and upholding academic standards throughout our collaborative endeavor.

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possible sir.

On Tue, 16 Mar, 2021, 4:58 pm gowthamarajan k, <gowthamsang@jssuni.edu.in> wrote:

> Dear Dr
> It is approved and kindly send the project INR 7000/- to
> Name of the bank: PUNJAB NATIONAL BANK
> A/C Name: JSS Consultancy Trust Account
> Ac. No. 4390000100099427
> RTGS code: PUNB0439000
> SWIFT NO. PUNBINBBDIB
> In due course of time i will submit the report.
>
> On Fri, Mar 12, 2021 at 9:22 AM K KANIMOZHI <kkm18696@gmail.com> wrote:
>
> > Good morning sir ,
> > I'm Dr. K. Kanimozhi from JKKN dental college and hospital, I request you to analyse MIC of 4 different concentration of quercetin (1%, 1.5%, 2%, 2.5%), and to prepare the suitable quercetin concentration as a gel. I hereby attaching the bonafide certificate,
> > dissertation synopsis, key articles sir. Kindly do the needful.
> >
> > Thanks in advance,
> > Dr. K. Kanimozhi

–

—

With Regards

Dr Gowthamarajan K

Professor & Head,

Department of Pharmaceutics,

JSS College of Pharmacy,

(JSS Academy of Higher Education & Research),

Ooty – 643001

Department of Pharmaceutics

Report

Preparation of 1.5 % Quercetin Gel:

Materials used	1. Quercetin 99 % (Kshipra Biotech Pvt., Ltd.,) 2. HPMC K15M 3 % (Colorcon)

Procedure:

- **HPMC gel Preparation (50 g)**
  - 3% of HPMC K 15 M was weighed accurately and slowly added into the water with continuous stirring using mechanical stirrer.
  - Then the mixture is kept for about 36 hrs to form a clear gel without any air bubbles.
- **Dispersion of Quercetin into the HPMC gel (1.5% w/w)**
  - About 1.5 % of Quercetin is weighed for 50 grams of gel and slowly added into the HPMC gel with gentle stirring using glass rod.
  - The prepared gel was stored in a suitable container.

Evaluation:

pH : 6.5 to 7

Appearance : Yellow in color
Uniform dispersion of Quercetin

Dr. K Gowthamarajan,
Study Director,
Department of Pharmaceutics,
JSS College of Pharmacy,
Ooty.

EVALUATION OF 1.5% QUERCETIN GEL AS AN ADJUNCT TO SCALING AND ROOT PLANING IN CHRONIC PERIODONTITIS PATIENTS - "A CLINICAL AND BIOCHEMICAL STUDY"

Dissertation submitted to

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY

In Partial fulfillment for the Degree of

MASTER OF DENTAL SURGERY

BRANCH II

PERIODONTICS

MAY 2022

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CERTIFICATE - I

This is to certify that **Dr. KANIMOZHI K,** Post Graduate student in the Department of Periodontics, J.K.K. Nattraja Dental College and Hospital, Komarapalayam has done this dissertation titled, **"EVALUATION OF 1.5% QUERCETIN GEL AS AN ADJUNCT TO SCALING AND ROOT PLANING IN CHRONIC PERIODONTITIS PATIENTS - A CLINICAL AND BIOCHEMICAL STUDY"** under my direct guidance during her post graduate study period 2019 - 2022.

This dissertation is submitted to **THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY** in partial fulfillment of the degree of **MASTER OF DENTAL SURGERY, BRANCH II - PERIODONTICS.**

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For Anbu Dental Diagnostics

Partner

"A CONEBEAM COMPUTERISED TOMOGRAPHIC ANALYSIS OF CANAL CONFIGURATION OF HUMAN PERMANENT MAXILLARY FIRST MOLARS: AN IN-VITRO STUDY"

Dissertation submitted to

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In partial fulfilment for the Degree of

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This is to certify that this dissertation work titled "A CONEBEAM COMPUTERISED TOMOGRAPHIC ANALYSIS OF CANAL CONFIGURATION OF HUMAN PERMANENT MAXILLARY FIRST MOLARS: AN INVITRO STUDY" is a bonafide research work done by **Dr.Boopathi Raja C**, Post Graduate student (2020-2023) in the Department of Conservative Dentistry & Endodontics under the guidance of **Dr. J.V. Karunakaran M.D.S**, PROFESSOR, Department of Conservative Dentistry & Endodontics, J.K.K.Nataraja Dental College. Komarapalayam - 638 183, Namakkal District, Tamil Nadu.

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DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation titled "**A CONEBEAM COMPUTERISED TOMOGRAPHIC ANALYSIS OF CANAL CONFIGURATION OF HUMAN PERMANENT MAXILLARY FIRST MOLARS: A INVITRO STUDY**" is a bonafide and genuine research work carried out by me under the guidance of **Dr. J.V. Karunakaran. M.D.S, PROFESSOR & GUIDE**, Department of Conservative Dentistry & Endodontics, J.K.K.Nataraja Dental College & Hospital, Komarapalayam - 638 183, Namakkal District, Tamil Nadu.

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Year of collaboration	Title of the Collaborative activity	Name of the collaborating agency with contact details	Names of the participants	Source of financial support	Duration	Nature of the activity
2020-2021	Evaluation of 1% of achyranthes aspera gel as an adjunct to scaling and root planning in chronic periodontitis patients - a clinical and biochemical study	JSS COLLEGE OF PHARMACY, OOTY	Dr.swathigan and Dr Aravindhanathan. V, Research scholar, JSS college of pharmacy	self	1 year	Research
2020-2021	Effects Of 1% Of Chitosan Gel In The Treatment Of Intrabony Defects In Chronic Periodontitis Patients . A Randomized Controlled Clinical Study	JSS COLLEGE OF PHARMACY , OOTY	Dr.Syed and Dr K .J. Thirumalai Subramaniam under the guidance of Dr K.Gowthamarajan, Research scholar, JSS college of pharmacy	Self	1 year	Research

2020-2021	Comparitive analysis of remaining dentin thickness in furcation groove region of maxillary first premolars after biomechanical preparation using different instrument protocols: A CBCT study	3D Anbu dental Diagnostics, Salem	Dr. Suresh Krishna and 3D Anbu dental Diagnostics, Salem	self	1 year	Research

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Dated : 09.03.2021

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Determination of Zone of Inhibition and related diffusion parameter

Procedure:

Zone of inhibition was determined for gel at a concentration of 0.075%, 0.1% & 0.125% of *Achyranthes aspera* gel by disc diffusion method. Agar plates were made by pouring nutrient agar suspension (sterilized) in cleaned petri dish to get 4 mm thickness (approx). Plates were kept under laminar air flow. 6 mm diameter agar media was cut and well has been made in order to inoculate the sample and sterilized in hot air oven. Then Gram negative *Porphyromonas gingivali* was cultured. Next day the appropriate gel formulation was inoculated (50 mg) and Zone of inhibition was seen.

Observation:

A B C

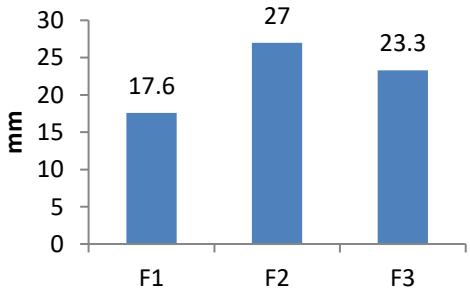
Fig.1 Zone of Inhibition by Disk Diffusion Studies (A- F1; B- F2; C-F3)

Study Outcomes:

Zone of inhibition was observed as follows

F1- 17.6 mm (Dia)
F2- 27 mm (Dia)
F3- 23.3 mm (Dia)

Comparative analysis in diffusion of *Achyranthes aspera*



F2 was found to have a more diffusion comparing to other formulations

15/10/2020

Thurday

Preparation of *Achyranthes aspera* gel (100 g)

Procedure:

- Water was weighed accurately and kept in a beaker for mechanical stirring
- Carbopol 934 LR was added gently into the beaker and stirring was continued for 30 mins
- ***Achyranthes aspera*** powder as mentioned different ratio in the table 2 was weighed accurately and completing dispersed in a gel with continuous stirring.
- After complete dispersion, Triethylamine has added in drop by drop till attaining the pH of 6.5-6.8
- Prepared gel was packed and stored

Table no: 2 Formulations

Ingredient	Purpose	F1	F2	F3
Achyranthes aspera	Active Ingredient	0.075 g	0.1 g	0.125 g
carbopol 934 LR	Gelling agent	2 %	2 %	2 %
Triethylamine	pH Modifier	QS till attaining pH 6.5-6.8	QS till attaining pH 6.5-6.8	QS till attaining pH 6.5-6.8
Water	Vehicle	QS to 100 g	QS to 100 g	QS to 100 g

Study Director

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15/10/2020
Thurday

Preparation of *Achyranthes aspera* gel (100 g)

Procedure:

- Water was weighed accurately and kept in a beaker for mechanical stirring
- Carbopol 934 LR was added gently into the beaker and stirring was continued for 30 mins
- ***Achyranthes aspera*** powder as mentioned different ratio in the table 2 was weighed accurately and completing dispersed in a gel with continuous stirring.
- After complete dispersion, Triethylamine has added in drop by drop till attaining the pH of 6.5-6.8
- Prepared gel was packed and stored

Table no: 1 Formulations

Ingredient	Purpose	F1	F2	F3
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Water	Vehicle	QS to 100 g	QS to 100 g	QS to 100 g

Study Director

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Date: Mon, 4 Jan 2021, 4:54 pm
Subject: Re: Draft Report
To: swathigan <swatkan@gmail.com>

On Mon, Jan 4, 2021 at 4:29 PM Aravindh Venkat <vsanathan97@gmail.com> wrote:

> Dear Sir,
> PFA for your reference
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From: **Aravindh Venkat** <vsanathan97@gmail.com>
Date: Fri, 23 Oct 2020, 2:34 pm
Subject: Re: Formulation Report
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On Fri, Oct 23, 2020 at 2:33 PM Aravindh Venkat <vsanathan97@gmail.com> wrote:

> Dear Sir,
> PFA for your reference
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>
> **With Thanks & Regards,**
>
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> Ph: +91 94883 44446, 9952 345 246
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> *"யாதும் ஊரே; யாவரும் கேளிர்;*
>
> *தீதும் நன்றும் பிறர்தர வாரா"*
>
> *- Puram (192)*

--

With Thanks & Regards,

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"யாதும் ஊரே; யாவரும் கேளிர்;

தீதும் நன்றும் பிறர்தர வாரா"

- Puram (192)

EVALUATION OF 0.1% ACHYRANTHES ASPERA GEL AS AN ADJUVANT TO SCALING AND ROOT PLANING IN THE TREATMENT OF CHRONIC PERIODONTITIS – "A BIOCHEMICAL AND CLINICAL STUDY"

Dissertation submitted to

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY

In Partial fulfillment for the Degree of

MASTER OF DENTAL SURGERY

BRANCH II

PERIODONTICS

MAY 2021

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Dated : 18.11.2020

CERTIFICATE OF COLLABORATION

This is to certify that Dr. Syed from the Department of Periodontics at JKK Nattraja Dental College and Hospital, Kumarapalayam - 638183, collaborated with us on his research work **"Effects of 1% Of Chitosan Gel In The Treatment of IntrabonyDefects In Chronic Periodontitis Patients. A Randomized Controlled Clinical Study"** during the period during 2020 – 2021. We commit to mutual contribution and upholding academic standards throughout our collaborative endeavor.

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EVALUATION OF THE CLINICAL AND RADIOLOGICAL EFFECTS OF 1% CHITOSAN GEL IN THE TREATMENT OF INTRABONY DEFECTS IN CHRONIC PERIODONTITIS PATIENTS - A RANDOMIZED CONTROLLED CLINICAL STUDY

Dissertation submitted to

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E.mail : jaspharm@hotmail.com, Website : www.jsscpooty.org

Oral Dental Gel Preparation

Product Name: 1% Chitosan Gel

Aim: To prepare a Thick Dental gel of Chitosan (Low Viscosity) for periodontal administration.

Materials & Instruments:

Material	Vendor	Code Number
Chitosan	Sigma Life Science	9012-76-4
Acetic Acid	SD Fine Chem Limited	37013
Millipore Water	JSS College of Pharmacy	NA

Instrument	Make	Model
Mechanical Stirrer	Remi Motor Limited	RQ-122

Methodology:

1% Acetic Acid solution: Take 10ml or equivalent quantity of acetic acid and mix it thoroughly with water and make the quantity to 1000ml.

1% Chitosan Gel: To the prepared 1% acetic acid solution add the weighed quantity of Chitosan equivalent to 1% (10gm) slowly until it disperses thoroughly. Place the dispersed solution containing Chitosan in Mechanical stirrer at 2000 rpm for 24 hours. Later the obtained product is kept undisturbed overnight.

Result:

1% Chitosan gel with thick viscosity was prepared and packed

PJ

PhD Scholar Thirumalai Subra... 02/02/20

To: syed d >

FW: Gel Preparation

Dear Sir,

Warm Greetings!

Hope you are doing Well.

Kindly check for the enclosure for the requirement.

Thank you.

—

With Regards,

K J Thirumalai Subramaniam

Under the Guidance of **Dr. K Gowthamarajan**,

PhD Scholar (Pharmaceutics),

Dept. of Pharmaceutics,

JSS College of Pharmacy,

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Ph : +91 8870061104

Email ID: thirumalai458@icloud.com

Man needs difficulties because they are necessary to enjoy success.

-Dr. A P J Abdul Kalam

EVALUATION OF THE CLINICAL AND RADIOLOGICAL EFFECTS OF 1% CHITOSAN GEL IN THE TREATMENT OF INTRABONY DEFECTS IN CHRONIC PERIODONTITIS PATIENTS - A RANDOMIZED CONTROLLED CLINICAL STUDY

Dissertation submitted to

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In Partial fulfillment for the Degree of

MASTER OF DENTAL SURGERY

BRANCH II

PERIODONTICS

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This is to certify that **Dr. SYED. D,** Post Graduate student in the Department of Periodontics, J.K.K. Nattraja Dental College and Hospital, Komarapalyam has done this dissertation titled **"EVALUATION OF THE CLINICAL AND RADIOLOGICAL EFFECTS OF 1% CHITOSAN GEL IN THE TREATMENT OF INTRABONY DEFECTS IN CHRONIC PERIODONTITIS PATIENTS - A RANDOMIZED CONTROLLED CLINICAL STUDY"** under my direct guidance during his post graduate study period 2018 - 2021.

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CERTIFICATE OF COLLOBORATION

This is to certify that DR. SURESH KRISHNA from the Department of conservative dentistry & Endodontics JKK Nataraja dental college and hospital kumarapalayam - 638183 has collaborated with us for his research work **on "COMPARITIVE ANALYSIS OF REMAINING DENTIN THICKNESS IN FURCATION GROOVE REGION OF MAXILILARY FIRST PREMOLARS AFTER BIOMECHANICAL PREPARATION USINGDIFFERENT INSTRUMENT PROTOCOLS:A CBCT STUDY"** during the period from 2021 May to December 2021 for Cone Beam tomographic analysis of the samples used in the study.

For Anbu Dental Diagnostics

Partner

"COMPARITIVE ANALYSIS OF REMAINING DENTIN THICKNESS IN FURCATION GROOVE REGION OF MAXILLARY FIRST PREMOLARS AFTER BIOMECHANICAL PREPARATION USING DIFFERENT INSTRUMENT PROTOCOLS: A CBCT STUDY"

Dissertation submitted to

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY

In partial fulfilment for the Degree of

MASTER OF DENTAL SURGERY

BRANCH IV

CONSERVATIVE DENTISTRY AND ENDODONTICS

MAY 2022

CERTIFICATE - I

This is to certify that **DR. SURESH KRISHNA .B,** *post graduate student (2019-2022) from the Department Of Conservative Dentistry and Endodontics, J.K.K.Nataraja Dental College, Komarapalayam, Namakkal District-638183, Tamilnadu has done the dissertation titled* **"COMPARITIVE ANALYSIS OF REMAINING DENTIN THICKNESS IN FURCATION GROOVE REGION OF MAXILLARY FIRST PREMOLARS AFTER BIOMECHANICAL PREPARATION USING DIFFERENT INSTRUMENT PROTOCOLS: A CBCT STUDY"** *under my direct guidance and supervision in the partial fulfillment of the regulations laid down by* THE TAMIL NADU DR. M.G.R MEDICAL UNIVERSITY, CHENNAI, FOR M.D.S BRANCH – IV CONSERVATIVE DENTISTRY AND ENDODONTICS DEGREE EXAMINATION. It has not been submitted (partial or full) for the award of any other degree or diploma.

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Year of collaboration	Title of the Collaborative activity	Name of the collaborating agency with contact details	Names of the participants	Source of financial support	Duration	Nature of the activity
2019-2020	Conebeam computerised tomographic analysis of furcation groove of maxillary first premolar: A invitro study	3D Anbu Dental Diagnostics, Salem	Dr. Preetha. C and 3D Anbu Dental Diagnostics, Salem	self	1 year	Research
2019-2020	Efficacy of Glycolic Acid on Debris and Smear Removal as a Final Rinse Solution in Curved Canals: A Scanning Electron Microscope Study	Department of Oral Medicine and Radiology, Faculty of Dental Sciences, Sri Ramachandra Institute of Higher Education and Research, Chennai, amil Nadu, India	Dr Premkumar, JKK Nataraja Dental College and Hospital and Dr Anbarasi Kaliyaperumal, Department of Oral Medicine and Radiology, Faculty of Dental Sciences, Sri Ramachandra Institute of Higher Education and Research	self	One year	Collaborative research

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Date : .....

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For Anbu Dental Diagnostics

Partner

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MASTER OF DENTAL SURGERY

BRANCH IV

CONSERVATIVE DENTISTRY AND ENDODONTICS

MAY 2021

CERTIFICATE

This is to certify that **DR. PREETHA .C** *post graduate student (2018-2021) from the Department Of Conservative Dentistry and Endodontics, J.K.K.Nataraja Dental College, Komarapalayam, Namakkal District–638183,Tamilnadu has done the dissertation titled* **"CONEBEAM COMPUTERISED TOMOGRAPHIC ANALYSIS OF FURCATION GROOVE OF MAXILLARY FIRST PREMOLAR: A INVITRO STUDY"** *under my direct guidance and supervision in the partial fulfillment of the regulations laid down by* THE TAMIL NADU DR. M.G.R MEDICAL UNIVERSITY, CHENNAI, FOR M.D.S BRANCH – IV CONSERVATIVE DENTISTRY AND ENDODONTICS DEGREE EXAMINATION. It has not been submitted (partial or full) for the award of any other degree or diploma.

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This is to certify that this dissertation work titled **"CONEBEAM COMPUTERISED TOMOGRAPHIC ANALYSIS OF FURCATION GROOVE OF MAXILLARY FIRST PREMOLAR: A INVITRO STUDY"** of the candidate **DR. PREETHA.C** *with registration number* ***241817101*** *for the award of* **Master of Dental Surgery** *in the branch of* **CONSERVATIVE DENTISTRY AND ENDODONTICS**. *I personally verified the urkund.com website for the purpose of plagiarism check. I found that the uploaded thesis file contains from introduction to conclusion pages and result and result shows* ***Zero*** *percentage of plagiarism in the dissertation.*

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Original Article

Efficacy of Glycolic Acid on Debris and Smear Removal as a Final Rinse Solution in Curved Canals: A Scanning Electron Microscope Study

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Abstract

Aim: This study aims to compare intraradicular smear layer removal efficacy of different concentrations of glycolic acid (GA), 17% ethylenediaminetetraacetic acid (EDTA), and 10% citric acid (CA) as final rinses in the canals of curved mesial root of mandibular first molars using the specific irrigant protocols. **Materials and Methods:** Fifty-eight mandibular first permanent molars with 15°–30° of curvature of the mesial roots were selected, standardized, mesiobuccal canal prepared using the rotary instrumentation. Sodium hypochlorite was used as initial rinse solution (8 ml). The samples were divided into control (n = 5) (I – Normal saline and II – 17% EDTA) and experimental groups (n = 8) (Groups III, IV, V, VI, VII, and VIII) based on the type of final rinse solution (5 ml) used, i.e. 2.5% GA, 5% GA, 10% GA, 17% GA, 37% GA, and 10% CA. Samples were split buccolingually, dehydrated, splutter coated, and examined under a scanning electron microscope. **Results:** Group IV presented the least amounts of smear among the GA experimental groups at the apical, middle, and coronal one-thirds of the root canal with a mean value of 2.6 ± 1.012, and on comparison with Group II, the results were comparable, and no significant difference found statistically (P > 0.05). **Conclusion:** The use of GA as final rinse solution for biomechanical preparation during endodontic therapy seems promising. Further evaluation in a clinical setting is recommended.

Keywords: *Final rinse solution, glycolic acid, irrigant solutions, scanning electron microscope, smear layer*

Submitted: 31-Mar-2021.
Revised: 15-May-2021.
Accepted: 27-Jul-2021.
Published: 10-Nov-2021.

Introduction

Biomechanical preparation during endodontic therapy prepares, cleanses, and eliminates microorganisms from within the canal system.[1] Smear is formed during the preparation of the canal system and contains both organic and inorganic components. No single irrigant solution effectively removes both.[2] The constituents of smear are propelled into radicular dentin for depths of up to 40 μm during canal preparation.[3-5] When surface active agents are used to enhance irrigant efficacy, capillary action, and adhesive forces further push smear for depths of up to 110 μm.[6,7] Cutting debris is forced variable distances into dentinal tubules during smear layer formation. These smear plugs, together with the smear layer decrease permeability, sensitivity, and surface wetness of radicular dentin.[8] The presence of smear acts as a physical barrier, prevents penetration of medicaments into dentinal tubules, and influences adaptation of obturating materials.[9,10] Different techniques have been suggested for effective smear elimination from canal ramifications.[11-13]

Different final irrigant solutions such have been tried for effective smear removal. Seventeen percent

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Access this article online

Quick Response Code:

Website: www.jpbsonline.org

DOI: 10.4103/jpbs.jpbs_310_21

How to cite this article: Venkataraman KJ, Boominathan SK, Nagappan R, Abraham CS, Kaliyaperumal A, Nachimuthu J, *et al.* Efficacy of glycolic acid on debris and smear removal as a final rinse solution in curved canals: A scanning electron microscope study. J Pharm Bioall Sci 2021;13:S1603-8.

ethylenediaminetetraacetic acid (EDTA) solution is still the most widely used final irrigant solution in endodontics.[14] Although EDTA is effective at smear removal, it has been found to have undesirable effects such as denaturation of collagen fibrils, erosion when used for longer exposure times, cytotoxicity when extruded beyond the apex, and environmental impact.

The search of a final irrigant that is biocompatible, effective in the removal of smear without causing damage to radicular dentin is needed to ensure successful treatment outcomes. Glycolic acid (GA) is extracted from sugarcane and other sweet vegetables. It is colorless, odorless, and easily dissolves in water. GA is commonly used in dermatology-related applications that range from skin moisturizing to deep chemical peeling. In dentistry, recent studies have shown GA to be less cytotoxic than EDTA and suitable for enamel and dentin etching during restorative procedures.[15,16] Due to its positive characteristics, GA may be a suitable agent to remove the smear layer from the root canal walls with minimal negative biological side effects.[17] The aim of this study was to determine the efficacy of GA in the removal of debris and smear when used a final rinse solution in curved canals. The null hypothesis was that there is no difference in debris and smear removal between GA, 17% EDTA, and citric acid when used as final rinse solutions in curved canals during endodontic therapy.

Materials and Methods

Human permanent mandibular first molars were collected, cleaned, teeth devoid of cracks, defects, restorations, and endodontically treated were selected. Fifty-eight teeth were analyzed using radiography. Teeth with intact apices, patent canals, having a mesial root curvature of 20°–35° were selected for the purpose of the study. After access preparation the two roots were separated, distal wall of mesial root restored with composite, dried, and coded. Apical third of the root covered with wax, embedded in transparent plastic cups with soft polyvinyl siloxane material to prevent irrigants from extruding the apex with the aim of simulating *in vivo* closed apex conditions. The mounted samples were then randomly divided into two control groups (n = 5) and six experimental groups (n = 8) [Table 1] Initial instrumentation done with hand files up to size 20 followed by rotary files from size S1 to F2 (Protaper gold, Dentsply, Maillefer, Ballaigues, Switzerland) as per the manufacturer recommendations. A total of 8 ml of the irrigant was used as initial rinse during biomechanical preparation procedure, and then, a final rinse of 5 ml of irrigant done as per respective group

Table 1: Irrigant groups

Groups	Initial irrigant	Final irrigant
I	Normal saline	Normal saline
II	5.5% NaOCl	17% EDTA
III	5.5% NaOCl	2.5% GA
IV	5.5% NaOCl	5% GA
V	5.5% NaOCl	10% GA
VI	5.5% NaOCl	17% GA
VII	5.5% NaOCl	37% GA
VIII	5.5% NaOCl	10% CA

EDTA: Ethylene diaminetetraacetic acid, GA: Glycolic acid, CA: Citric acid

for 3 min. Irrigant was delivered using a 28 G side vent ProRinse needle (Dentsply, Tulsa Dental) at working length. The needle was withdrawn 5 mm, inserted back to working length followed by rotation of needle by 180° three times alternatively during the first minute of irrigant delivery. A F2-size gutta-percha cone (Dentsply Maillefer, Ballaigues, Switzerland) was inserted to working length and withdrawn six times (manual dynamic activation). This customization was done to improve irrigant delivery and replacement at apical third. The irrigant was left alone for the third minute as per the final rinse protocol for the respective groups and a postfinal rinse of 10 mL of distilled water done. The samples were then carefully split longitudinally in a buccolingual plane using a diamond disc dividing them into two halves. The half containing the most visible part of apex of root selected, coded, and stored. The teeth were then placed in 10% neutral-buffered formalin solution at 18°C for 24 h and then postfixed in osmium tetroxide (1% w/v) for 2 h. They were dehydrated in graded solutions of isopropyl alcohol (Nice Chemicals Ltd, India). Separation markings of 5 mm at apical, middle, and coronal thirds were made on split half of the root, samples placed in ultraviolet sterilization chamber and subsequently stored in sterile pouches. The coded samples of each group were mounted on aluminum stubs with carbon tape (NEM TAPE NISSHIN EM.Co., Ltd) with the canal facing upward. Each specimen was coated with a 20–30 nm thin layer of gold in a gold sputter coating machine (QUORUM Q150RS, United Kingdom). The samples were then examined using a scanning electron microscope with a high resolution (ZEISS-SIGMA VP, Munchen, Germany). The photo micrographs were obtained at ×2000 magnification using digital image analysis software, and the most representative micrographs were taken for each millimeter of the specimen and were recorded for apical, middle, and coronal thirds, respectively. The results scored by independent operators, compared, and tabulated for their respective scores of smear, debris,

and erosion at apical, middle, and coronal thirds of the canal. Smear, debris, and erosion were evaluated using the criteria developed by Caron *et al*.,[18] Dadresanfar *et al*.,[19] and Torabinejad *et al*.,[20] respectively.

Results

The coronal third presented least amount of debris with a mean value of 2.5 ± 3.40 followed by the middle third with a mean value of 2.6 ± 3.0, and the most amount of debris was seen at the apical third of the canal with a mean value of 2.8 ± 3.10 [Chart 1 and Figure 1].

Among the experimental groups, Group IV presented the least amount of smear in the coronal, middle, and apical thirds with mean values of 3.06 ± 1.20, 3.40 ± 0.96, and 4.1 ± 0.65 respectively [Chart 2]. In this study, overall, Group VIII presented the least amounts of erosion among experimental groups at all levels [Chart 3].

Group IV is efficient in the removal of smear and debris, and on comparison with Group II, the results were comparable, and no significant difference found statistically ($P > 0.05$) [Chart 4].

Discussion

GA acid belongs to the group of alpha hydroxyl acids and is a colorless, odorless, and hygroscopic crystalline solid, with good solubility in water.[21] It is used in pharmaceutical industry as an organic component in cosmetic preparations[22] and as poly (lactic-co-GA) (PLGA) in tissue engineering applications. It is readily biodegradable and unlike EDTA, its waste disposal does not cause environmental issues.[23,24] Studies have demonstrated that GA has the ability to induce proliferation of fiibroblasts and collagen synthesis.[21,25,26] It has been suggested for surface etching of enamel and dentin.[16] These properties highlight the potential of GA for the use as rinse solution for the removal of debris and smear layer in endodontic therapy.

GA has been found to have properties and promise for use as a final rinse irrigation solution during endodontic therapy.[27] Surface tension of GA decreased in solutions of higher concentrations. The apatite to collagen ratio was found to reduce with increasing GA concentrations when used on dentin. The flexural strength of dentin was not affected by varying the concentration of GA.[28] In the present study, Group IV presented the least amounts of smear among all the GA groups at the coronal, middle, and apical thirds, respectively. Group II and Group VIII presented with the least smear scores among all groups.

Group IV was effective in the removal of smear and was nearly as efficient when compared to Group II at all thirds of the canal. On statistical comparison and analysis, there was not any significant difference between the Groups II and IV ($P > 0.05$) [Figure 2]. The present study was done in the curved mesiobuccal canal of the mesial root of the mandibular first permanent molar tooth where curvature and canal preparation was standardised.

GA has been recently tried in endodontics as a root canal irrigant and for its effect on the properties of dentin. This study has evaluated the role of GA as a

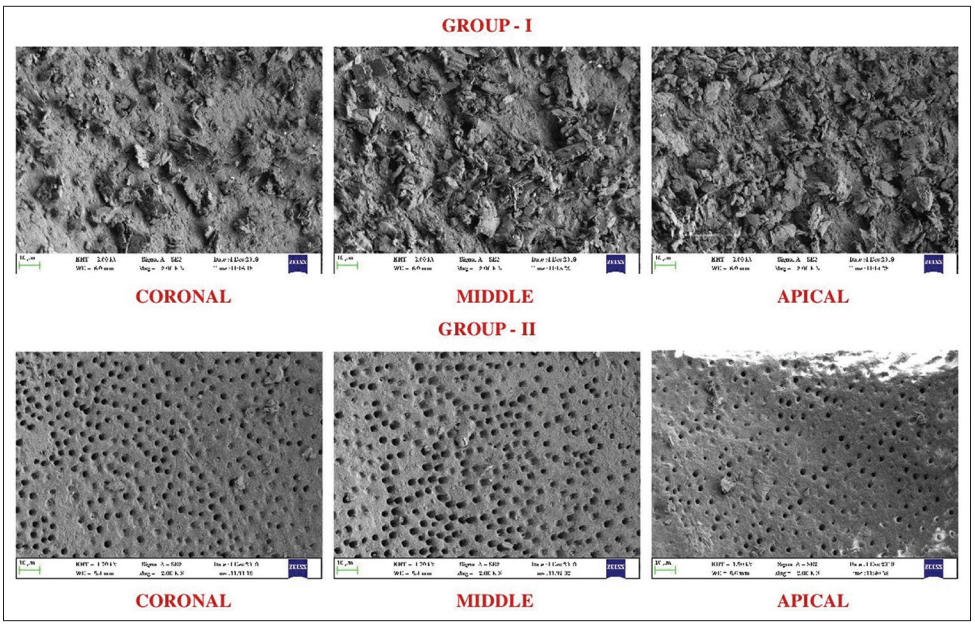

Figure 1: Scanning electron microscopic group comparison I and II

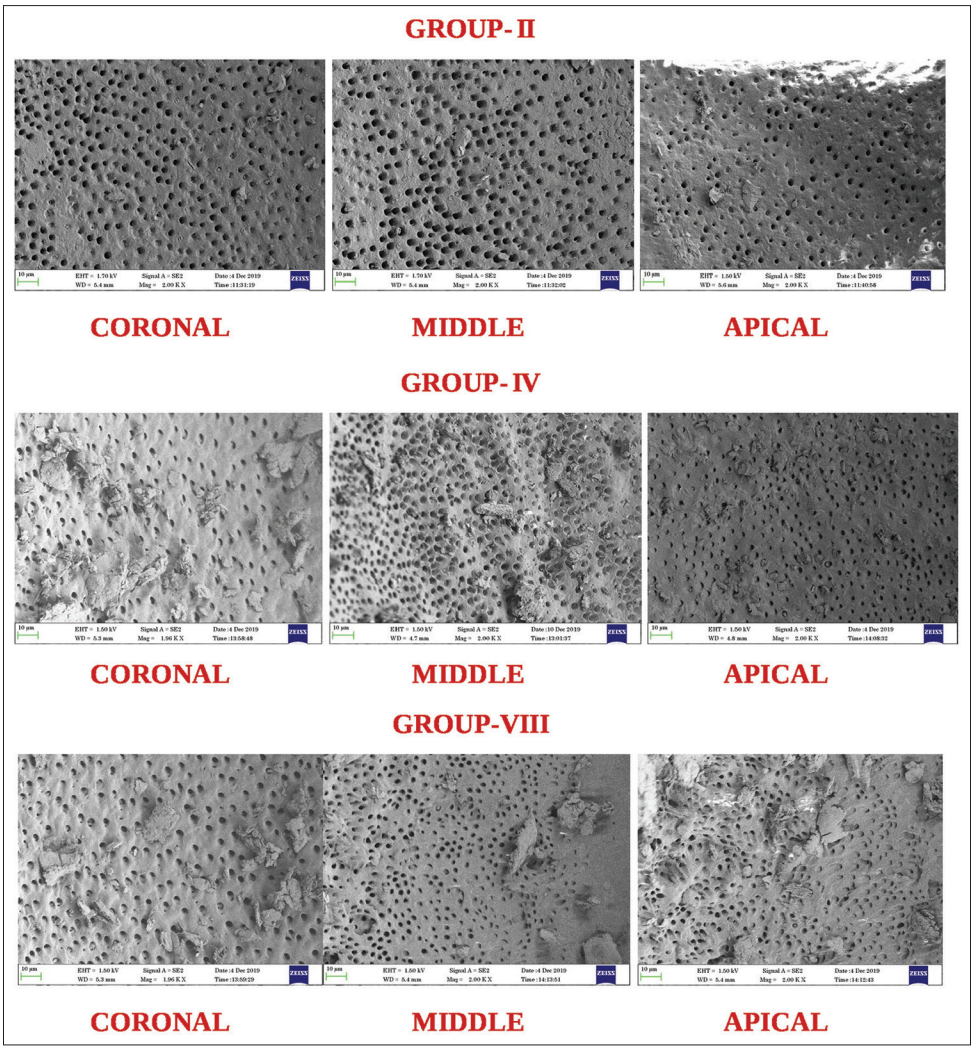

Figure 2: Scanning electron microscopic group comparison II, IV and VII

final rinse solution in specific irrigation protocols in the curved mesial roots of mandibular first permanent molars. Recent years have witnessed various drug delivery systems among which PLGA has gained enormous attention. As a copolymer of lactic and GA, it has exquisite properties such as biocompatibility, biodegradability, and allowing sustained and controlled release of encapsulated agent. GA has also been successfully used as a nanocarrier molecule.

PLGA, nanoparticles, have been used in the field of endodontics on a trial basis and many areas of application have been identified. The nanoparticles have an advantage due to their size as they can easily traverse the dentinal tubules, isthumi, cul-de-sacs, lateral canal, apical deltas, and other anatomical variations inherent in root canal anatomy where instrumentation is not feasible.[29] The use of PLGA encapsulated moxifloxacin nanoparticles has been shown consistent antibacterial property even in low doses against *Enterococcus faecalis*. Their ability for a programmed release, effectiveness have made them ideal for use as intracanal medicaments.[30] The role of compatible polymers being used as vehicles for drug delivery vehicles has paved way for newer methods for drug delivery within the root canal system. The advantage of these polymers is that they also biodegradable. The role and use of intracanal medicament during endodontic therapy is vital in eliminating the pathogenic endodontic microflora present within the ramifications of the root canal system without causing resistance. They are routinely used during endodontic therapy.

In an *in vitro* study of PLGA nanoparticles used in conjunction with the photosensitizer methylene blue and light against *E. faecalis* found that PLGA nanoparticles in conjunction with photoactive chemicals may be promising for use in intra canal antimicrobial management during endodontic therapy.[31] PLGA when used as a drug delivery agent has a lot advantages

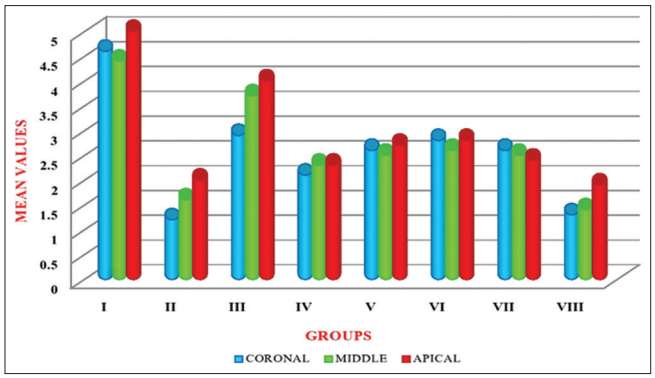

Chart 1: Average debris scores

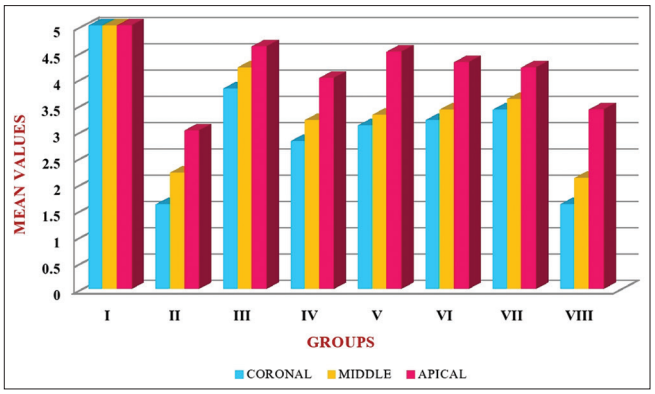

Chart 2: Average smear scores

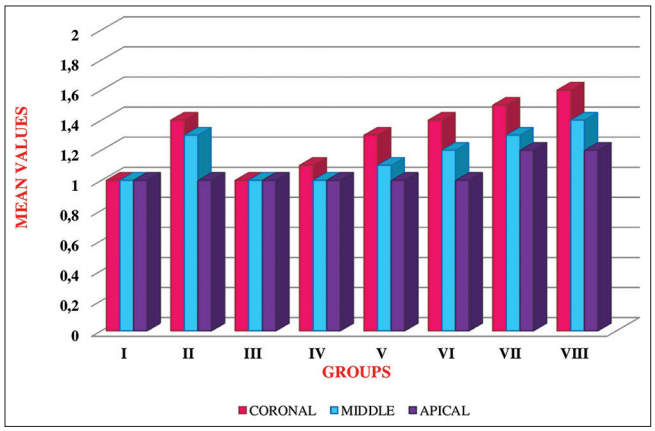

Chart 3: Average erosion scores

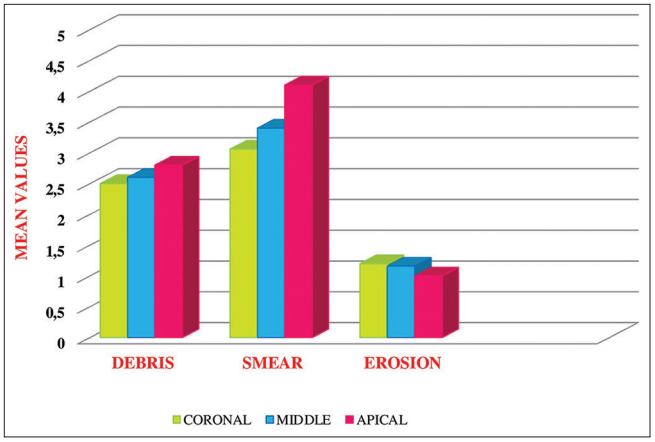

Chart 4: Mean scores

such as inertness, biodegradability, and smart release of the drug will take place only with changes with temperature, pH, and fluids which are commonly seen in inflammatory tissue changes. This happens due to the erosive changes of the drug delivery agent releasing the drug due to changes in the environment.

Researchers have also found that GA demonstrated greater capacity to eliminate *E. faecalis* from within the canal system than did EDTA which is a commonly used final rinse irrigation solution in a concentration of 17%.[6] GA has been tried as scaffolds for releasing antibiotics during regenerative endodontic procedures. It has been hypothesized that the use of this material as a scaffold in conjunction with dental pulp stem cells will restore dentin, innervation, and revascularization of the pulp.[32]

PLGA nanoparticles that contain lovastatin have been tried as a material for direct pulp capping and have been found to form tubular reparative dentin and a complete dentinal bridge.[33] The effects on pulp cells were found to be dose dependent. For clinical application, still an optimal dose regime and concentration have to be established for use in pulp capping procedures. The nanoparticles were found to have good biocompatibility, osteogenic, and odontogenic potential. GA has been evaluated for dental applications as a surface conditioner during restorative procedures and has been found to be effective. In the present study, overall, the Groups IV and VI presented the least amounts of erosion among experimental groups at the apical, middle, and coronal thirds of the root with overall mean values of 0.9 ± 0.4267 [Chart 3]. Among the experimental groups, Group VIII presented with the highest amount of erosion with loss of peritubular and intertubular dentin at all levels. Group II presented with similar levels of erosion as Groups IV and VI.

Conclusion

The use of GA as final rinse solution during biomechanical preparation during endodontic therapy seems promising. Further evaluation in a clinical setting is recommended.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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"COMPARITIVE EVALUATION OF DIFFERENT CONCENTRATIONS OF GLYCOLIC ACID, 17% EDTA, AND 10% CITRIC ACID AS FINAL RINSE SOLUTIONS FOR INTRARADICULAR SMEAR REMOVAL EFFICACY: A SEM STUDY"

Dissertation submitted to

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY

In partial fulfillment for the Degree of

MASTER OF DENTAL SURGERY

BRANCH IV

CONSERVATIVE DENTISTRY AND ENDODONTICS

MAY 2020

CERTIFICATE

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Sources included in the report:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6555385/

Instances where selected sources appear:

1

JKKN
Dental College & Hospital

J.K.K.NATTRAJA DENTAL COLLEGE & HOSPITAL
(MANAGED BY J.K.K. RANGAMMAL CHARITABLE TRUST)
Natarajapuram, NH-544 (Salem to Coimbatore),
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E- Mail : dental @jkkn.ac.in Web: www.jkkn.ac.in

ACADEMIC YEAR (2018-19)

JKKN
Dental College & Hospital

J.K.K.NATTRAJA DENTAL COLLEGE & HOSPITAL
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Year of collaboration	Title of the Collaborative activity	Name of the collaborating agency with contact details	Names of the participants	Source of financial support	Duration	Nature of the activity	Link to the relevant document
2018-2019	The evaluation of propolis (honey bee extract) as an adjunct to scaling and root planning in chronic periodontitis- A clinical, microbiological and biochemical study	JSS COLLEGE OF PHARMACY, OOTY	Dr. Dhivya R	self	1 year	Research	
2018-2019	Evaluation of canal configuration of human permanent maxillary first premolars: A conebeam computerised tomographic analysis	3D Anbu Dental Diagnostics, Salem	Dr. Leo Sujith Samuel	self	1 year	Research	

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JSS ACADEMY OF HIGHER EDUCATION & RESEARCH
(DEEMED TO BE UNIVERSITY) MYSURU

Dated : 12.03.2019

CERTIFICATE OF COLLABORATION

This is to certify that Dr.Dhivya . R from the Department of Periodontics at IKK Nattraja Dental College and Hospital, Kumarapalayam - 638183, collaborated with us on her research work titled **"The evaluation of propolis (honey bee extract) as an adjunct to scaling and root planning in chronic periodontitis- A clinical, microbiological and biochemical study"** during the period during 2018 – 2019. We commit to mutual contribution and upholding academic standards throughout our collaborative endeavor.

Dr.S.P.Dhanabal, Principal
JSS College Of Pharmacy
Ooty, Tamil Nadu

PRINCIPAL
J.S.S. COLLEGE OF PHARMACY
Rockland's, Ootacamund - 643 001

JSS COLLEGE OF PHARMACY
Rockland's
Ootacamund
643 001

Fwd: collagen

1 message

ganesh gnk <gnk@jssuni.edu.in> Mon, Oct 1, 2018 at 7:42 PM
To: drdhivyamds1310@gmail.com <drdhivyamds1310@gmail.com>

Dear Divya
Kindly find attachment regarding collagen discription and image

---------- Forwarded message ---------
From: **ARUN R** <arunpharma93@gmail.com>
Date: Sun, 30 Sep 2018 at 11:32 PM
Subject: collagen
To: ganesh gnk <gnk@jssuni.edu.in>

Collagen is the main structural protein in the extracellular space in the various connective tissues in animal bodies. As the main component of connective tissue, it is the most abundant protein in mammals,[1] making 25% to 35% of the whole-body protein content. Collagen consists of amino acids wound together to form triple-helices to form of elongated fibrils.[2] It is mostly found in fibrous tissues such as tendons, ligaments and skin.

Depending upon the degree of mineralization, collagen tissues may be either rigid (bone) or compliant (tendon) or have a gradient from rigid to compliant (cartilage). It is also abundant in corneas, blood vessels, the gut, intervertebral discs, and the dentin in teeth.[3] In muscle tissue, it serves as a major component of the endomysium. Collagen constitutes one to two percent of muscle tissue and accounts for 6% of the weight of strong, tendinous muscles.[4] The fibroblast is the most common cell that creates collagen. Gelatin, which is used in food and industry, is collagen that has been irreversibly hydrolyzed.[5] Collagen also has many medical uses in treating complications of the bones and skin.

--
R.Arun

--
Dr.GNK.Ganesh
Assistant Professor
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web: www.jssuni.edu.in email: gnk@jssuni.edu.in

INVOICE

The Director, CADRAT, JSS College of Pharmacy, Ooty
20, Rocklands
Ooty-643001, The Nilgiris, Tamil nadu
Phone +914232447536 Fax 0423-2442937

INVOICE JSSCP/OT/PBT/001
DATE: MAY 18, 2017

TO:
Dr. Divya MDS
Private agency

FOR: Propoliz loaded collagen dental film

I) FORMULATIVE DESCRIPTION	Duration	AMOUNT
1. Minimum Inhibitory concentration		Rs. 4000/-
2. Formulation and development		Rs. 13,000/-
	Service tax @ 15%	Rs. 2,550/-
	TOTAL	**RS. 19,550/-**

Make all checks payable to The Director, CADRAT, JSS College of Pharmacy, Ooty

Note:

- 100% of the total amount should be paid before the start of the study.
- The amount quoted for the formulation variables, analytical method development, *In vitro* and *in vivo* studies is subjected to change with change in methods and number of trails.

For online fund transfer
Name of the bank: PUNJAB NATIONAL BANK
A/C Name: JSS Consultancy Trust Account
Ac. No. 4390000100099427
RTGS code: PUNB0439000
SWIFT NO. PUNBINBBDIB

Authorized Signature with Seal

Professor & HOD
Department of Pharmaceutics
JSS College of Pharmacy
Udhagmamandalam - 643 001, TN.

Thank you for your business!

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(A unit of Shriram Scientific and Industrial Research Foundation)

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n ISO - 9001, 14001 & OHSAS 18001 Certified Institute

Website : www.shriraminstitute.org
E-mail id : customercare@shriraminstitute.org

TEST CERTIFICATE NO.: 0110000053516

Issued To: Dr.R.Dhivya
Client Code : H0181
HI-TECH NATURAL PRODUCTS (INDIA)LTD

NO.9, IST FLOOR ,CSC DDA MARKET ,POCKET-F, GTB ENCLAVE, DILSHAD GARDEN
DELHI
NEW DELHI-110093
Kind Attn: MR. VIRENDAR KAUL Sample

Date	31/08/2016
Job No.	1607-1-101-1477
Booking No.	**RG1617/1/3418**
Booking Date	**14/07/2016**
Customer Ref No.	
Customer Ref Date	**14/07/2016**

Description :
One sample described as Bee Propolis (Raw) was received.

(The sampling was not carried out by the Representative of Shriram Institute for Industrial Research. The sample particulars provided in test certificate are based on declaration by the party.)

TEST RESULTS
(As on Received Basis)

S.NC	Test Parameters	Observed Value	Protocol
1.	**Colour**	Dark Brown	**Visual observation**
2.	**Odour**	Characteristic	**Sensory evaluation**
3.	**Presence of wax**	Absent	**IS:4028-1992 (R-2002)**
4.	**Total fiavonoids, % by mass**	4.3	**SOP-SR1/FF/25 (UV-VIS)**
5.	**Total Plate Count, cfu/g**	210	**1S:5402-2012**
6.	**Yeast and Mould Count, efu/g**	<10	**IS:5403-1999 (Reaff. 2009)**
7.	**E.coli count, cfu/g**	<10 (Absent	**1S:5887 (P-1)-1976 (R-2009)**
8.	**Tetracycline, mg/kg**	Not Detected (LOQ-0.02trig/kg)	**SOP-SRI/RES_HONEY/005**
9.	**Chlortetracycline, mg/kg**	Not Detected (LOQ-0.02mg/kg)	**SOP-SRI/RESHONEY/005**
10.	**Oxytetracycline, mg/kg**	Not Detected (LOQ-0.02mg/kg)	**SOP-SRI/RES_HONEY/005**
11.	**Chloraraphenicol, mg/kg**	Not Detected (LOQ-0.3 tg/kg)	**SOP-SRI/RES_HONEY/005**
12.	**Purity**	≥95 %	

LOQ - Limit of quantification.

DOR : 14.072016 DOC : 09.08.2016

AUTHORISED GNATORY
EMPLOYEE CODE : (vs--% 90)

Phone : 91-11-27667267, 27667983, 2766780 Fax **1-27667676, 27667207**

See overleaf for term.

THE EVALUATION OF PROPOLIS (HONEY BEE EXTRACT) AS AN ADJUNCT TO SCALING AND ROOT PLANING IN CHRONIC PERIODONTITIS PATIENTS - "A CLINICAL, MICROBIOLOGICAL AND BIOCHEMICAL STUDY"

Dissertation submitted to

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY

In partial fulfillment for the Degree of

MASTER OF DENTAL SURGERY

BRANCH II

PERIODONTICS

MAY - 2019

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CERTIFICATE - I

This is to certify that **Dr. R. DHIVYA**, Post Graduate student in the Department of Periodontics, J.K.K. Nattraja Dental College and Hospitals, Komarapalyam has done this dissertation titled **"THE EVALUATION OF PROPOLIS (HONEY BEE EXTRACT) AS AN ADJUNCT TO SCALING AND ROOT PLANING IN CHRONIC PERIODONTITIS PATIENTS - A CLINICAL, MICROBIOLOGICAL AND BIOCHEMICAL STUDY"** under my direct guidance during her post graduate study period 2016 - 2019.

This dissertation is submitted to **THE TAMILNADU Dr. MGR MEDICAL UNIVERSITY** in partial fulfillment of the degree of **MASTER OF DENTAL SURGREY, BRANCH II – PERIODONTICS.**

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CERTIFICATE - II

This is to certify that this dissertation work titled **"THE EVALUATION OF PROPOLIS (HONEY BEE EXTRACT) AS AN ADJUNCT TO SCALING AND ROOT PLANING IN CHRONIC PERIODONTITIS PATIENTS - A CLINICAL, MICROBIOLOGICAL AND BIOCHEMICAL STUDY"** of the candidate **Dr. R. DHIVYA** with the registration number **241613101** for the award of **MASTER OF DENTAL SURGERY** in the **Branch II - PERIODONTICS**. I personally verified the urkund.com website for the purpose of plagiarism check. I found that the upload thesis file contains from introduction to conclusion pages and results shows 1 percentage of plagiarism in the dissertation.

S. Rayaal.

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+ 91 75983 33600

3D ANBU DENTAL DIAGNOSTICS LLP.,

CBCT Scan - 2D radiographs - 3D MODELS

A COMPLETE MAXILLOFACIAL DIAGNOSTIC CENTRE

22 / 26, L.I.C. Colony, Opp. New Bus Stand, Hotel Vasantham Road, Salem-04.

Date : .....

CERTIFICATE OF COLLOBORATION

This is to certify DR.LEO SUJITH SAMUEL from the Department of conservative dentistry & Endodontics , JKK Nataraja Dental College and Hospital Kumarapalayam - 638183 has collaborated with us for his research work on **"EVALUATION OF CANAL CONFIGURATION OF HUMAN PERMANENT MAXILLARY FIRST PREMOLARS: A CONEBEAM COMPUTERISED TOMOGRAPHIC ANALYSIS"** during the period from 2018 June to December 2018 for Cone Beam tomographic analysis of the samples used in the study.

For Anbu Dental Diagnostics

Partner

"EVALUATION OF CANAL CONFIGURATION OF HUMAN PERMANENT MAXILLARY FIRST PREMOLARS: A CONEBEAM COMPUTERISED TOMOGRAPHIC ANALYSIS"

Dissertation submitted to

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY

In partial fulfillment for the Degree of

MASTER OF DENTAL SURGERY

BRANCH IV

CONSERVATIVE DENTISTRY AND ENDODONTICS

MAY 2019

CERTIFICATE

This is to certify that **Dr. LEO SUJITH SAMUEL** *post graduate student (2016-2019) from the Department Of Conservative Dentistry and Endodontics, J.K.K.Nataraja Dental College, Komarapalayam, Namakkal District–638183, Tamilnadu has done the dissertation titled* **"EVALUATION OF CANAL CONFIGURATION OF HUMAN PERMANENT MAXILLARY FIRST PREMOLARS: A CONEBEAM COMPUTERISED TOMOGRAPHIC ANALYSIS"** *under my direct guidance and supervision in the partial fulfillment of the regulations laid down by* THE TAMIL NADU DR. M.G.R MEDICAL UNIVERSITY, CHENNAI, FOR M.D.S BRANCH – IV CONSERVATIVE DENTISTRY AND ENDODONTICS DEGREE EXAMINATION. It has not been submitted (partial or full) for the award of any other degree or diploma.

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This is to certify that this dissertation work titled **"EVALUATION OF CANAL CONFIGURATION OF HUMAN PERMANENT MAXILLARY FIRST PREMOLARS: A CONEBEAM COMPUTERISED TOMOGRAPHIC ANALYSIS"** of the candidate **DR.LEO SUJITH SAMUEL** *with registration number* **241617102** *for the award of* **MDS** *in the branch of* **CONSERVATIVE DENTISTRY AND ENDODONTICS**. *I personally verified the urkund.com website for the purpose of plagiarism check. I found that the uploaded thesis file contains from introduction to conclusion pages and result and result shows* **ZERO** *percentage of plagiarism in the dissertation.*

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