



”A Biological Approach to Endodontic Irrigation - Taking a Step Forward”

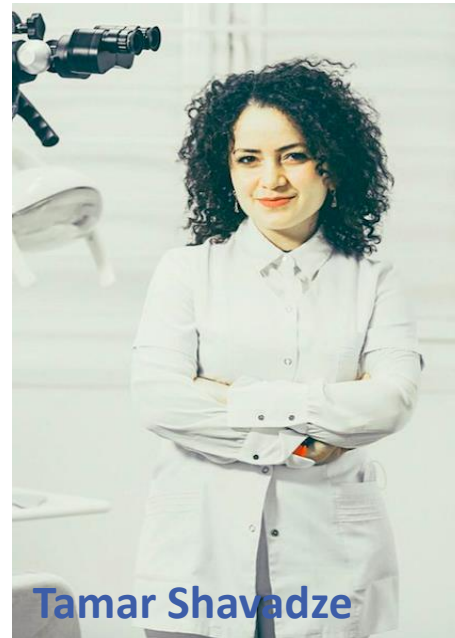
Natia Nizharadze, Tamar Shavadze, Ketevan Shalashvili, Marine Mamaladze

Tbilisi State Medical University; Iovel Kutateladze Institute of Pharmacochemistry;
Dental Clinic, Training and Research Center UniDent



Natia Nizharadze

n.nizharadze@tsmu.edu



Tamar Shavadze



Ketevan Shalashvili

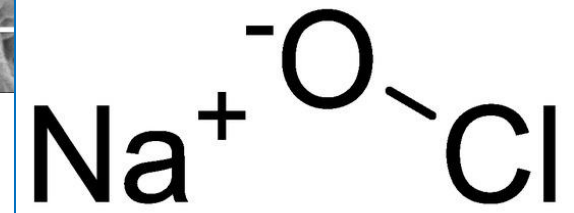
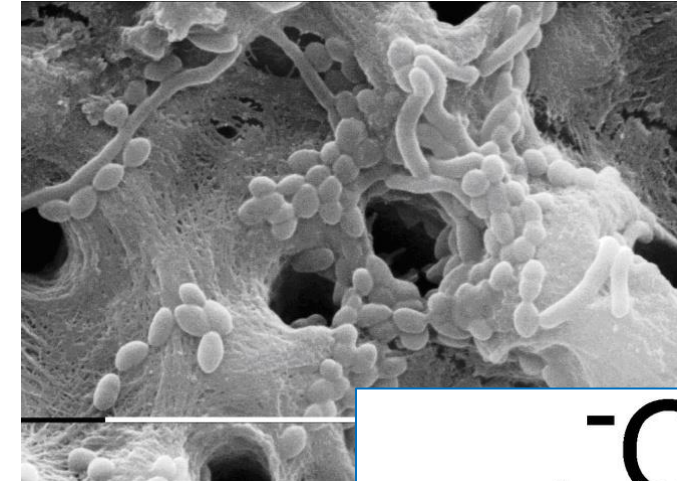
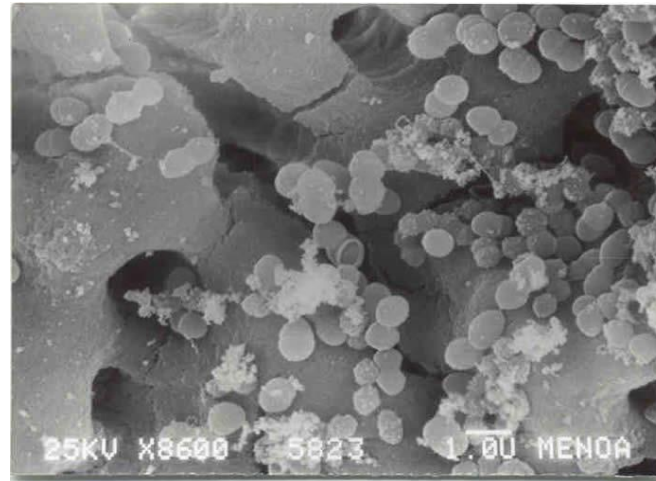
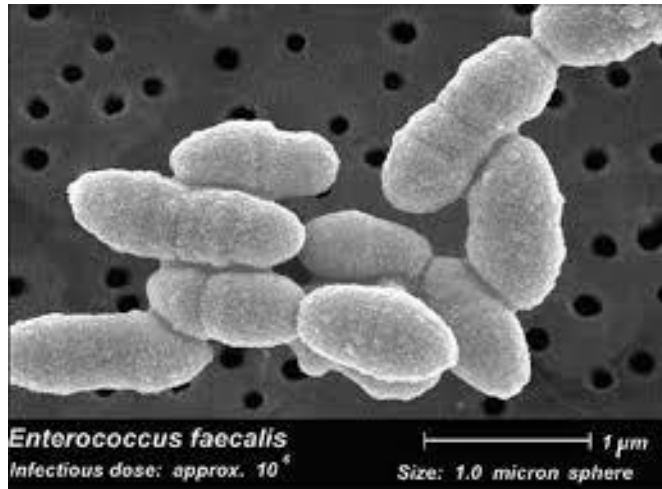


Marine Mamaladze





Resistant Endodontic pathogen - **Enterococcus faecalis** inside root canal before and after decontamination



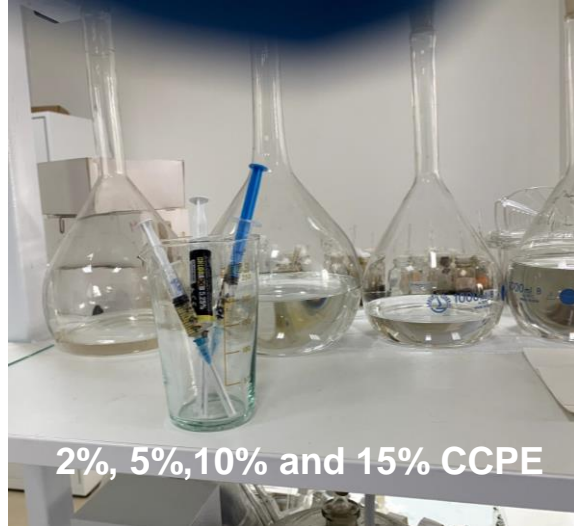
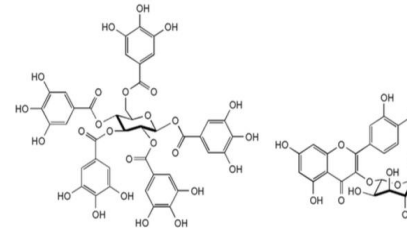
Endodontic research has always been focused on developing methods or endodontic irrigants that can completely remove the bacteria with minimal side effects. To overcome cytotoxicity, antimicrobial resistance and safety concerns of widely used endodontic irrigants, and to achieve predictable, complete disinfection of the root canal system, there is no doubt that a more innovative basic and biological approach is needed.



Alternatives based on natural substances look promising from this perspective, among which is the plant *Cotinus coggygia* Scop. (family Anacardiaceae), a well-known source of polyphenols, tannins with antimicrobial activities against a wide range of microorganisms, including the most resistant endo pathogen *Enterococcus faecalis*. Therefore, this plant was selected for our research.

Objectives

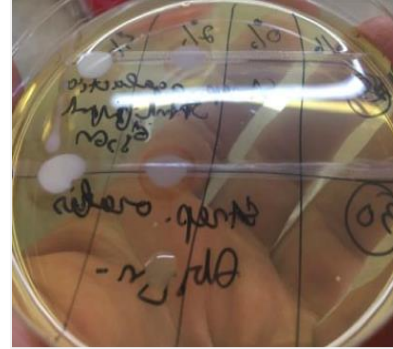
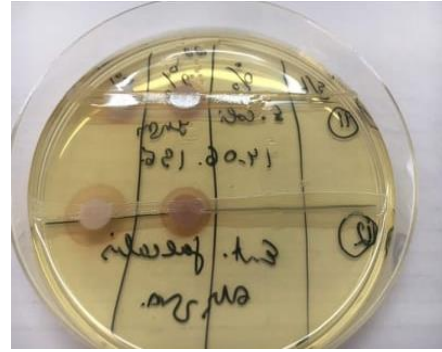
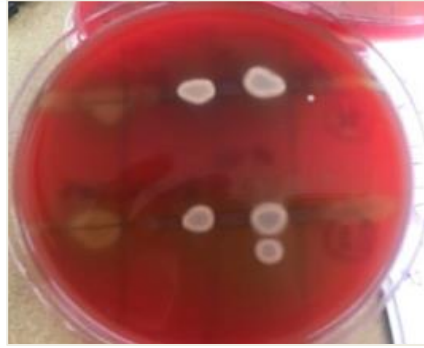
The goal of our preclinical research aimed to determine the antimicrobial efficacy of *Cotinus coggygia* Scop. polyphenols containing extract aqueous solutions against *Enterococcus faecalis*, and to define the safety margins as well as the potential irritative and allergenic effects to develop novel endodontic antibacterial irrigation solution.



Materials and methods

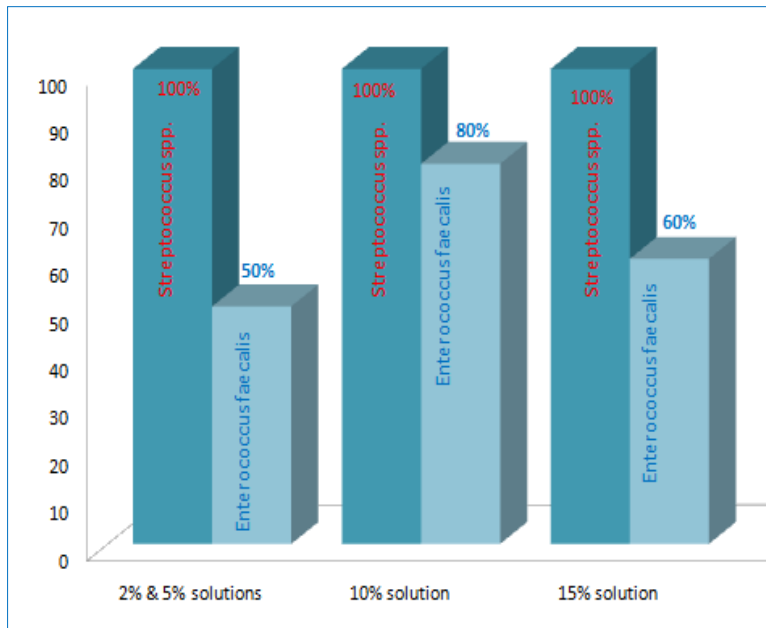
By the special, patented technology of obtaining biologically active substances - exclusively for our study unique formulation of cultivated in Georgia *Cotinus coggygia* Scop. leaves polyphenol extract (CCPE) has been developed and on its purified fraction various concentrations (2%, 5%, 10% and 15%) of experimental aqueous solutions were prepared. Efficacy of CCPE against endodontic pathogens (*Streptococcus* spp. and *Enterococcus* spp.) was determined by modified disc-diffusion method at the Laboratory of General Microbiology. The experiments determining the acute toxicity, local irritative properties, skin sensitization test were conducted in accordance with the OECD Guidelines for Chemical Testing followed with probit-analysis to precisely establish the median lethal doses (LD50) of CCPE.

Microbiological Efficacy and Safety of CCPE

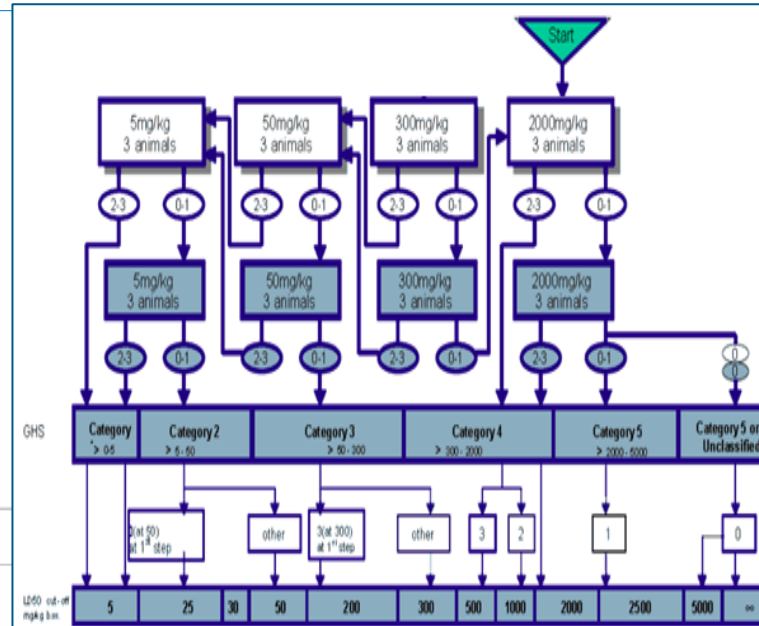


Results

CCPE solutions Antimicrobial Activity



Determination of median lethal dose (LD50)

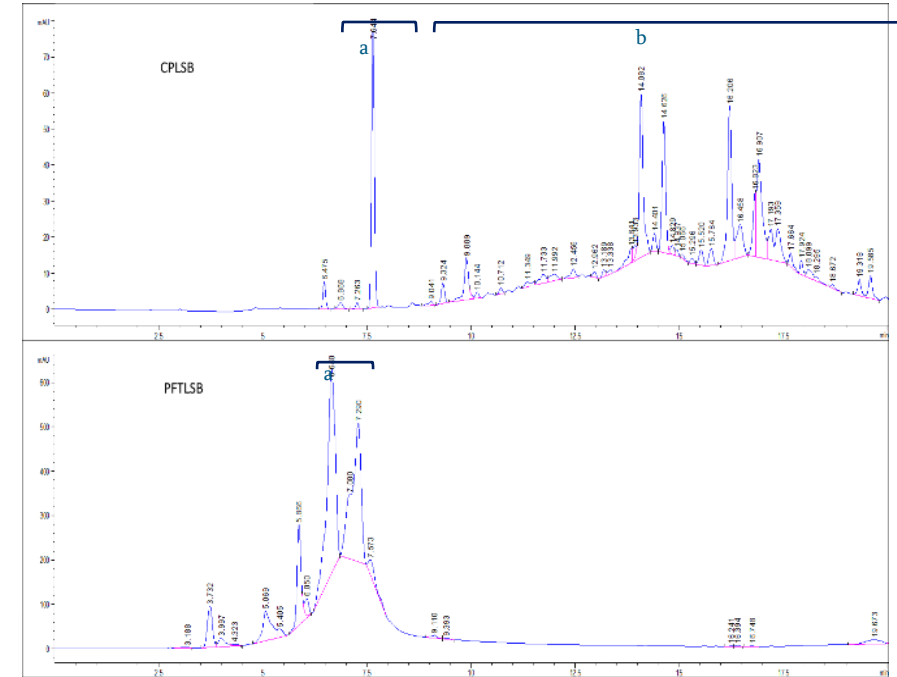
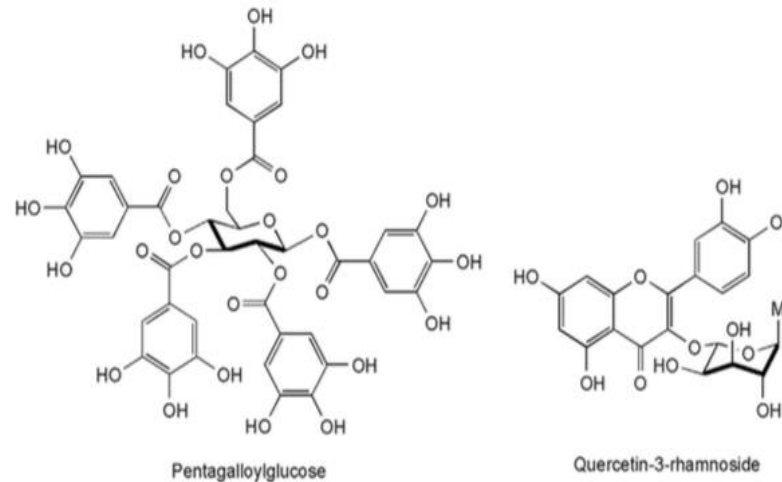


Microbiological research by modified disc-diffusion method has determined a wide range of antimicrobiological activity of CCPE. Besides we determined the optimal concentration (10%) of the experimental sample (CCPE) for inhibiting the most resistant Endodontic pathogen - Enterococcus faecalis. These results highlighted, that the antimicrobial activity of the test sample (CCPE) depends on the concentration of the test substrate and the taxonomic group of the microorganism. By the safety investigations of the CCPE no local irritating and allergenic properties have been revealed.



Summary and Conclusion

The Scientific and Practical potential of implementation of reliable, cost-efficient, and non-toxic herbal anti-microbial irrigation agent - CCPE in everyday practice for successful management and prevention of persistent endodontic infection has been highlighted through this scientific research. The study is in progress for recommending this novel herbal/bio preparation into everyday clinical practice.



THANK YOU FOR ATTENTION!