Title: Clinical and Microbiological Evaluation of the Implact of Thioglycosides Extracted from White Mustard on Oral Hygiene.

Abstract

Contemporary dentistry explores natural substances as alternative or adjunctive agents for the prevention and treatment of oral diseases. Plants from *Brassicaceae* family are a particularly rich source of bioactive compounds, mostly thioglycosides. The most common thioglycosides are sinalbin in white mustard *(Sinapis alba)* and sinigrin in black mustard *(Brassica nigra)* and brown mustard *(Brassica juncea).* Their enzymatic conversion by seed myrosinase produces allyl isothiocyanate (AITC), a molecule with pronounced antibacterial, anti-inflammatory and antifungal activities.

To date only in-vitro investigations on glucosinolates especially isothiocyanates was performed on animal models. Their therapeutic potential in dentistry has remained unexplored. The present dissertation aims to provide a clinical evaluation of the ability and efficacy of incorporating thioglycosides into homecare oral hygiene products.

The thesis consists of two original papers, randomised clinical trials that assessed toothpastes enriched with white-mustard extract. Together, they are a comprehensive evaluation of the mustard extract as an adjunct in gingivitis management, dental-plaque reduction and caries-risk mitigation at both microbiological and clinical levels.

The first publication, "Clinical Effect of Thioglycosides Extracted from White Mustard on Dental Plaque and Gingivitis: Randomized, Single-Blinded Clinical Trial", reports a 12-month study in which a toothpaste containing thioglycosides from the low-erucic cultivar 'Bamberka' was evaluated for its impact on plaque accumulation parameters (PI, API) and gingival parameters (BoP, GI). Participants using the enriched formulation exhibited a significant reduction in all periodontal parameters versus controls, with the most pronounced benefits observed at six months and persisting throughout the study. These findings substantiate the value of topical thioglycosides as adjuncts in gingivitis therapy.

The second publication, “The Clinical and Antibacterial Effects of a Herbal Toothpaste Containing White Mustard Sinapis alba Extract: A Randomized Clinical Trial”, describes a double-blind, randomised clinical trial that extended the assessment to antibacterial outcomes. After four weeks, statistically significant reductions in salivary *Streptococcus mutans* and *Lactobacillus spp.* colony counts were recorded in the test group, accompanied by reduction in PI and BoP. These results demonstrate that mustard derived bioactives can effectively lower cariogenic bacterial loads and decrease gingival inflammation parameters, suggesting their utility in caries and periodontal disease prevention.

This dissertation addresses a research gap regarding the dental application thioglycosides extracted from white mustard. It represents the first *in vivo* implementation of these compounds within a dental context. The conclusions may open a foundation for future investigations and the development of plant-based oral care products with validated clinical efficacy.