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Protective effects of mouthwash formulations of Syzygium polyantha (L.) and Piper betel (L.) on oral microbiota-induced gingivitis

(2024) *Healthcare in Low-Resource Settings*, 12 (1), .

DOI: 10.4081/hls.2023.11768

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Abstract
Using a combination of natural ingredients as a mouthwash was expected to have a synergistic effect in preventing gingivitis, a common oral disease. The objective of this study was to elucidate the anti-inflammatory effect of different proportions of mouthwash infusions: F1 (75% Syzygium polyantha and 25% Piper betle) and F2 (25% Syzygium polyantha and 75% Piper betle) on oral microbiota causing gingivitis. Twenty-four Rattus norvegicus were divided into four groups, and bacteria were injected into the periodontal sulcus. The anti-inflammatory effect was assessed by calculating the reduced number of polymorphonuclear (PMN) leukocytes. A cytotoxicity test was carried out on the normal fibroblast cell line 3T3-L1. There were no significant differences in the decreased number of PMN leukocytes ($p = 0.079 > 0.05$). Both F1 and F2 showed results of cell viability approaching 100% of living cells at concentrations of 0.29 ppm and 0.04 ppm, equivalent to 0.058% and 0.029%, respectively. This study concluded that both formulations of Syzygium polyantha and Piper betle have potential effects on gingivitis prevention. They had an effectiveness level almost similar to Chlorhexidine gluconate 2%. The toxicity value of formulation F1 is superior to that of formulation F2. Further studies concerning the toxicity of the mixtures and their effect on oral biofilm are needed. © The Author(s), 2023.

Author Keywords
anti-inflammation; gingivitis; mouthwash formulations; Piper betle leaves; Syzigium polyanta leaves

Funding details
LB.02.01/3.1/ 3388.C /2021
Funding details
this research was supported by a research grant from Director of Bandung Polytechnique of Health: No LB.02.01/3.1/ 3388.C /2021.we are fully appreciative of all the researchers who helped in this study. We are grateful to have received grants from the Indonesian Ministry of Health (RISBINAKES).

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Publisher: Page Press Publications

ISSN: 22817824
Language of Original Document: English
Abbreviated Source Title: Healthc. Low. Resour. Setting.
2-s2.0-85192146034
Document Type: Article
Publication Stage: Final
Source: Scopus