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

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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 betel*) and F2 (25% *Syzygium polyantha* and 75% *Piper betel*) 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 betel* 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.

### Keywords

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

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