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**COMPARISON BETWEEN ACTIVITY AND MECHANISM OF INHIBITION OF ESSENTIAL OIL BETEL LEAF (*Piper betle*, Linn) WITH EUGENOL AGAINST SOME OF BACTERIAL PATHOGENS**

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**ABSTRACT**

Betel (*Piper betle*, L) leaf is traditionally known to be useful for the treatment of various diseases like bad breath, boils and abscesses, conjunctivitis, constipation, headache, hysteria, itches, mastitis, mastoiditis, leucorrhoea, otorrhoea, ringworm, swelling of gum, rheumatism, abrasion, cuts and injuries etc as folk medicine. This research has the objective of comparing the antibacterial activity as well as the mechanism of inhibition between essential oil betel leaf (*Piper betle*, linn) and eugenol as the basis for choosing a substance to be developed as antimicrobial drug. The betel leaf was obtained from Balitro Bagor, distilled by steam distillation process. The essential oil of betel leaf that obtained was analyzed by Gas Chromatography-Mass Spectroscopy. The activity test of anti-bacterial of essential oil of betel leaf (*Piper betle*, linn) and eugenol was carried out by using the method mikrodilution against the bacterium *Proteus mirabilis*, *Proteus vulgaris*, *Salmonella thypimurium*, *Shigella flexneri*, and *Streptococcus mutans*. For detect the mechanism of cell damage process of bacteria was observed leakage of proteins and nucleic acids by using Ultra Violet-Visible spectrophotometer and the leakage of cations  $K^+$  and  $Ca^{2+}$  was observed by using Atomic Absorption Spectrum. While bacterial cell morphology change was observed by using Scanning Electron Microscope (SEM). From the research was obtained, a minimum inhibitory concentration (MIC) of essential oil of betel leaf for *Proteus mirabilis* 9% (v/v), *Proteus vulgaris* 6% (v/v), *Salmonella thypimurium* 5% (v/v), *Shigella flexneri* 11% (v/v), and *Streptococcus mutans* more than 17% (v/v). while for eugenol MIC values for *Proteus mirabilis* 0,4% (v/v), *Proteus vulgaris* 0,5% (v/v), *Salmonella thypimurium* 0,2% (v/v), *Shigella flexneri* 0,5% (v/v), and *Streptococcus mutans* 0,4% (v/v). Test results nucleic acid and protein leakage and leakage of cations  $K^+$  and  $Ca^{2+}$  greatly increased from 1 MIC to 2 MIC concentration of the tested bacteria compared with the normal controls. While the observations that was detected by using Scanning Electron Microscope showed worse cell damage by giving the higher doses to bacteria. Plasma cell membrane damage and coagulation of the nucleoid by eugenol worse than essential oil of betel leaf (*Piper betle*, linn)

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