ANTIBACTERIAL ACTIVITY AND ISOLATION OF SOME ORGANIC CONSTITUENTS FROM THE SEEDS OF *TRIGONELLA FOENUM-GRAECUM* LINN. (PE-NATHA) AND *MYRISTICA FRAGRANS* HOTT. (ZADEIK-PO) USED IN TRADITIONAL MEDICINE FORMULATIONS

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ABSTRACT

In the present investigation, *Trigonella foenum-graecum* Linn. (Pe-natha seed) and *Myristica fragrans* Hott. (Zadeik-po seed) were selected as the plant materials because they are the chief ingredients in Myanmar Traditional Medicine Formulations used for the treatment of various types of diseases. In general, the present research is focused on the study of antibacterial activity of various extracts and isolation, identification of some organic constituents from *Trigonella foenum-graecum* Linn. (Pe-natha seed) and *Myristica fragrans* Hott. (Zadeik-po seed). Their polar, nonpolar extracts and essential oil of Pe-natha seed and Zadeik-po seed were tested on 20 species of bacterial strains by agar disc diffusion method. Dichloromethane, ethylacetate, ethanol, aqueous extracts of Pe-natha and essential oil, ethanol extract of Zadeik-po showed antibacterial activity. However, dichloromethane, ethylacetate and ethanol extracts of Pe-natha exhibited antibacterial activity effectively against *Staphylococcus aureus* and *Escherichia coli* bacterial strains. From this observation, it can be inferred that dichloromethane, ethylacetate and ethanol extracts of Pe-natha might be effective in the formulation of medicine for the treatment of diseases such as pneumonia, urinary tract infection, bloody diarrhea and pediatric diarrhea. Minimum Inhibitory Concentration (MIC) values of active dichloromethane, ethylacetate and ethanol extracts of Pe-natha were also determined by agar plate dilution method on 4 species each of *Staphylococcus aureus* and *Escherichia coli*. The lowest MIC values of dichloromethane, ethylacetate and ethanol extracts

(0.0625, 0.125, 0.0625 $mgcm^{-3}$) were obtained with *Staphylococcus aureus* MLW 96. The essential oil of Zadeik-po exhibited pronounced antibacterial action against all tested 20 bacterial strains. From this investigation it may be deduced that essential oil of Zadeik-po can be effective in the formulation of medicine for the treatment of diseases: namely; pneumonia, urinary tract infection, diarrhea, dysentery, cholera and typhoid. In addition, MIC values of active essential oil of Zadeik-po were also tested on 3 species of *Escherichia coli* and 2 species of *Staphylococcus aureus* by employing micro plate dilution method. The lowest MIC (0.0625 $mgcm^{-3}$) was obtained with *Escherichia coli* LT. Chromatographic separation of active dichloromethane extract of Pe-natha on silica gel yielded three compounds; β-Sitosterol (0.02%, mp 138°C), Betulin (0.035%, mp 236–237°C), Dioscin (0.098%, mp 274–276°C). From active ethylacetate extract only one compound, Vitexin (0.195%, mp 262–264°C) was isolated. Furthermore, α-Pinene (0.5%, bp 155–156°C), Myristicin (0.03%, bp 173°C) and Eugenol (0.01%, bp 255°C) were isolated from active essential oil of Zadeik-po by silica gel column and preparative thin layer chromatographic methods. All these Isolated compounds were identified by UV, FT-IR, ^{1}HNMR, ^{13}CNMR, EIMS, ESIMS, and GC-MS spectroscopic methods. Betulin is not a reported constituent in Pe-natha. The presence of Betulin in Pe-natha can be reported as a new finding. The isolated Betulin, Dioscin, Vitexin from Pe-natha were found to exhibit the antibacterial activity against *Escherichia coli* and *Staphylococcus aureus*. Therefore they might be effective in the formulation of medicine for the treatment of diseases such as pneumonia, urinary tract infection,

bloody diarrhea and pediatric diarrhea. Myristicin and Eugenol showed antibacterial property against the *Staphylococcus aureus, Escherichia coli, Shigella boydii, Samonella typhi* and *Vibrio cholerae*. But in the case of α-Pinene, it is active against all these bacterial strains except *Samonella typhi*. From these observations, it can be inferred that Myristicin and Eugenol may be used in the formulation of medicine for the treatment of diseases: namely; pneumonia, urinary tract infection, diarrhea, dysentery, cholera and typhoid.

Key words: Antibacterial activity, *Escherichia coli,* Betulin, Vitexin, Dioscin, Myristicin, Eugenol