Bioautographic screening for natural quinolone antimicrobial agents from *Glycosmis pentaphylla* (Retz) DC., *Ruta angustifolia* (L.) Pers. and *Lunasia amara* Blanco

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INTRODUCTION

World-wide, plants have provided a source of inspiration for novel drug compounds, as plant-derived medicines have made large contributions to human health and well-being. They may become the base for the development of new drugs and lead to the treatment of infectious disease which is the number one cause of death accounting for approximately one-half of all deaths in tropical countries (Iwu et al.,1999). This phenomenon demonstrate the increased interest for research in antimicrobial activity of medicinal plants including this study which focused on natural quinolone compounds. The quinoline alkaloids are a group of alkaloids with diverse structural types. The 4-oxygenated quinolone and 2-substituted 4-quinolone are the types of quinoline alkaloids that possess the chromophore structures which are similar to the pharmacophore of the conventional 4-quinolone antimicrobial agents. Therefore it is presumed that these types of natural quinoline alkaloids could also share the same activity as the conventional quinolone antimicrobial agents. Although these conventional agents demonstrate an excellent treatment against so many infectious diseases, the emergence of quinolone resistance against some microbes has been a disturbing feature of microbial infection (Shigemura, et.al., 2003).The species which have been reported to possess antimicrobial are selected namely *Glycosmis pentaphylla* (Retz) DC, (Areerat et al., 2008) *Ruta angustifolia* (L.) Pers. (Norazian, M.H., 2006) and *Lunasia amara* Blanco (Thomas et al, 2007). The objective of this study is primarily to search for naturally occurring quinolone antimicrobial agents from three excellent plant sources of quinolone alkaloids, which are *Glycosmis pentaphylla* (Retz.) DC., *Ruta angustifolia* (L.) Pers. and *Lunasia amara* Blanco. It is aim that the natural alkaloids will provide new structural types of quinolone antimicrobial agents in view to overcoming microbial resistance towards the conventional agents.

RESULT

The column chromatography on the crude alkaloidal extracts has afforded two fractions containing major alkaloids from *G. pentaphylla* and one fraction each from *R. angustifolia* and *L. amara*. TLC Agar Overlay Bioautographic screening for antimicrobial active alkaloids has revealed four antimicrobial active alkaloids. Two alkaloids, labeled as GP-3 and RA-3 which were active against *S. aureus* and *C. albicans* have been detected from the stem bark fraction of *G. pentaphylla* and the leaf fraction of *R. angustifolia,* respectively. Two major alkaloids were found active against both *S. aureus* and *E. coli*, which were the alkaloid labeled as GP-4 from the leaf fraction of *G. pentaphylla* and LA-4 from *L. amara* leaf fraction.

MATERIALS AND METHODS

The plant materials, which include the leaves and root barks of *G.pentaphylla*, and the leaves of *R. angustifolia* and *L. amara* were dried and powdered for experimental used. Acid-base extraction was employed following the continuous extraction by hexane and acetone to furnish the crude alkaloidal extracts. The extract was then fractionated by column chromatography, which fractions, yielding major alkaloidal compounds were selected to be screened by using TLC Agar Overlay Bioautographic Assay for antimicrobial active quinolone alkaloids against *Staphylococcus aureus* ATCC 25923, *Escherichia coli* ATCC 25922 and *Candida albicans* ATCC 90028.

***Ruta angustifolia* (L.) Pers.**

***Lunasia amara* Blanco**

***Glycosmis pentaphylla* (Retz.) DC.**

***Figure 1* : Schematic diagram for the procedure**

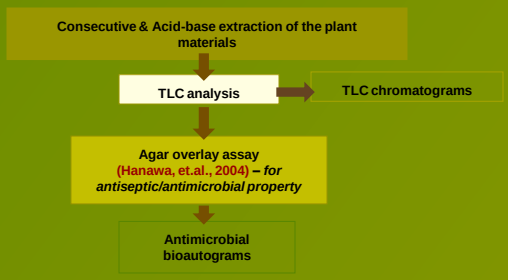


***Figure 1* : Bioautograpic profile for antimicrobial active alkaloid labelled RA-3 from *R. angustifolia* leaf fraction.**

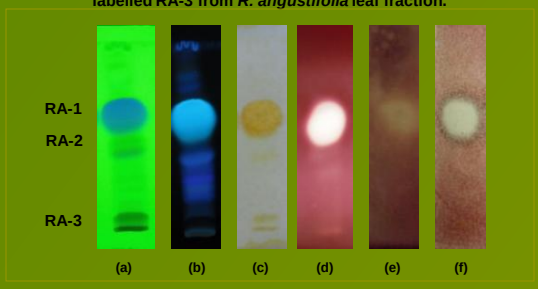


***Figure 2* : Bioautograpic profile for antimicrobial active alkaloid labelled LA-4 from *L. amara* leaf fraction.**

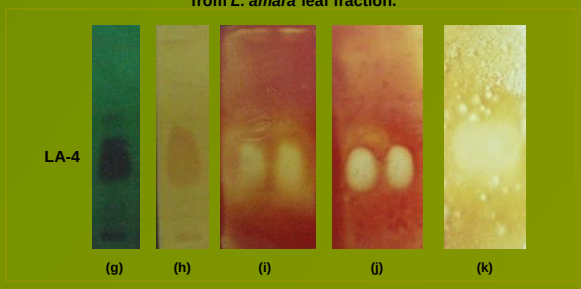


***Figure 2* : Bioautograpic profile for antimicrobial active alkaloid labelled GP-3 from *G. pentaphylla* root bark fraction.**

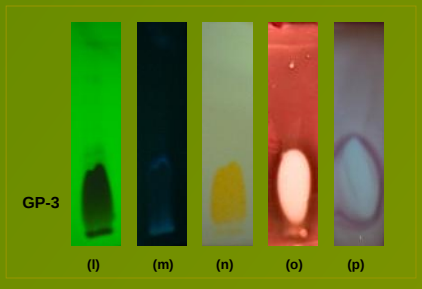
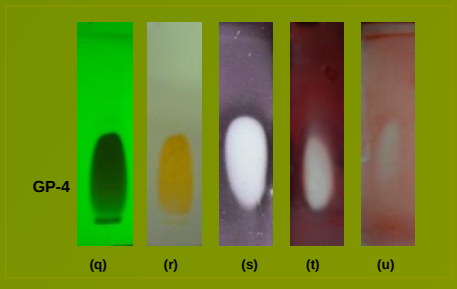


***Figure 4* : Bioautograpic profile for antimicrobial active alkaloid labelled GP-4 from*G. pentaphylla* leaf fraction.**



Key :

(a),(g),(l),(q) : Chromatogram viewed under UV_{254} light.
(b), (m) : Chromatogram viewed under UV_{365} light.
(c),(h),(n),(r) : Chromatogram sprayed with Dragendorffs' reagent.
(d),(i),(o),(s) : Bioautogram against *S. aureus* ATCC 25923
(e),(i),(p),(t) : Bioautogram against *E. coli* ATCC 25922.
(f),(u) : Bioautogram against *C. albicans* ATCC 90028.
(k) : Bioautogram against *T. rmentagrophytes.*

- Antimicrobial compounds were detected as clear spots against pink background of viable microorganisms.

CONCLUSION

The reported results of all three plant species therefore proved to have high potential in providing new structural types of lead compounds for synthesizing new drugs to overcome microbial resistance towards conventional quinolone antimicrobial agents.

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