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Antibacterial and antioxidant activity of the leaves of *rhus leptodictya*

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Rhus leptodictya commonly known as a mountain karee belongs to the family Anacadeceae and has been used since antiquity in tradition medicine. In the present study antimicrobial and antioxidant potentials of the leaves of *Rhus leptodictya* were studied, followed by isolation of at least one active compound which showed antibacterial and antioxidant potentials. Extractions were performed based on the polarity of the solvent used. The solvents used were hexane, dichloromethane, ethyl acetate, acetone and methanol. Dichloromethane was found to be extracting more compounds than the other used solvents. Thin layer chromatography (TLC) was used to determine the chemical composition of the extracts by employing different solvent systems. The results showed that, of the solvent systems used, namely ethyl acetate: methanol: water (EMW) 40: 5: 1; chloroform: ethyl acetate: formic acid (CEF) 5: 4: 1 and benzene: ethanol: ammonium hydroxide (BEA) 90:10:1, BEA produced better separations. To determine the antioxidant potential of the leaves, 2.2-diphenyl picrylhydrazyl (DPPH) was used. Different spot with different R_f values were found to be active by show of yellow colour on the TLC plate. The yellow colour is due to the proton gained by DPPH when it reacts with active compound. Bioutography results showed that different leaves were active against selected bacterium. Minimum inhibitory concentration studies showed that the methanol extract was more active against *B.subtilis* and *S.pnuemonia* at concentration less than 0.1 mg/ml respectively. Dichloromethane extract was found to be the least effective on *S.pneumonia*, as compared to the methanol, acetone and ethyl acetate extracts. In terms of the total activity, the ethyl acetate concentration showed better total activity than the other extracts studied in this research.

A new compound 7,8-trihydroxy-2-(4'hydroxy phenyl)-3-5-[5",6"-dihydroxy-2"-O-(4"'hydroxyphenyl)-4-1t-chromen-4"-one]-41t-chromen-4-one was isolated and characterized by H^1-NMR,C^{13}-NMR, MS and IR. According to the literature search, this compound has never been isolated from any plant and it has showed both antioxidant and antibacterial activity.

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Implication of sustainable and genomic tools for date palm improvement to black scorch disease

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Date palm is an important subsistence crop in arid regions due to its ability to grow under harsh environmental conditions such as high temperature. Nevertheless, the ideal conditions for its growth and production are also favorable to fungal diseases such as black scorch disease which is caused by *Ceratocystis radicicola*. Our study aims to improve date palm to black scorch disease using different sustainable and genomics tools. Here, we reported for the first time that *C. radicicola* is the causal agent of black scorch disease in Qatar. The whole genome of the causal agent was sequenced; de novo assembled and annotated using the next generation sequencing and bioinformatics tools. The resulting draft genome was 28.1 Mb in length, comprised of 5480 genes. The annotated genome of *C. radicicola* will provide a basis for understanding fundamental biological mechanisms in this pathogen which will eventually help in designing an effective genetic control of black scorch disease. Towards a sustainable agricultural control of this disease, we developed an eco-friendly method of biological control through isolation, identification and examination the effectiveness of bio-agents in controlling black scorch disease. Results from both *in vitro* and *in vivo* demonstrated the efficacy and utility of using bio-agents to control black scorch disease in date palm. Additionally, RNA-sequencing approach is being employed to profile the transcripts of date palm genome in response to *C. radicicola* infection to identify genes that might involve in resistance. Altogether, results from this study will help in improving date palm yield and increase the sustainable food supply.

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