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Phytochemical investigation of *Salsola kali* extract

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Abstract

The present study focuses on biologically guided fractionation of the extract of *Salsola kali*, aiming to investigate its anti-inflammatory constituents. The total methanol together with petroleum ether, chloroform and ethyl acetate extracts were investigated for anti-inflammatory activity using rat paw edema test. Petroleum ether extract demonstrated the highest activity (60%) relative to the reference indomethacin. Accordingly, the petroleum ether extract was fractionated using different chromatographic techniques to afford finally 4 compounds identified as lupeol, β -sitosterol, ursolic acid and β -sitosterol-3-*O*-glucoside.

Keywords

Salsola kali

Anti-inflammatory

Rat paw edema

NMR

1. Introduction

The promising anti-inflammatory compounds isolated from natural sources belong to a variety of chemical classes including steroids, terpenoids, fatty acids, lipids, polyphenolics, alkaloids, in addition to various miscellaneous compounds (Gautam and Jachak, 2009; Benjamin et al., 2001). The incidence

of inflammatory diseases is becoming common in almost all the countries around the world. Despite of their well-known side effects, non-steroidal anti-inflammatory drugs remain the most commonly used to relieve inflammatory pain (Joseph et al., 2010). Natural products and traditional medicines as alternatives to these drugs offer a great hope in the development of efficient agents for treatment of inflammatory diseases (Reynolds et al., 1995). In the present work, the anti-inflammatory activity of a selected plant, *Salsola kali* will be studied. The fraction that will reveal promising effect will be

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investigated for the main active constituents.

2. Results and discussion

Biological evaluation indicated the ability of the petroleum ether fraction to reduce the thickness of the edema induced by carrageenan in rats. The results of anti-inflammatory activity revealed that a gradual decrease in the thickness of the induced edema was clearly detected over time. After 24 hr of dose administration, the petroleum ether fraction produced 60% of the effect reported by indomethacin. On the other hand, the chloroform, ethyl acetate and methanol extracts displayed 35.0 %, 20% and 40% respectively of change compared to indomethacin (Figure 1). Based on these results, the petroleum ether extract was selected to investigate its major components that may be responsible for this exerted effect. After being subjected to different chromatographic processes including column chromatography (packed with silica gel) and preparative thin layer chromatography, four pure compounds (1-4) were isolated. Compounds 1-3 were

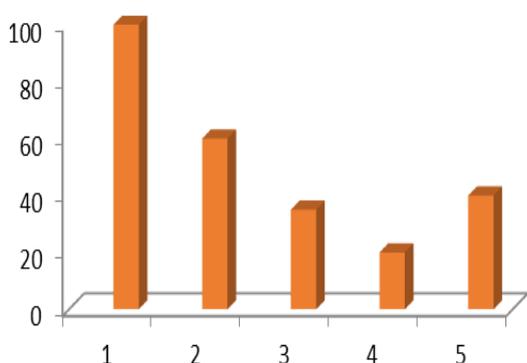


Figure 1: Anti-inflammatory activity of the *S. kali* extracts relative to indomethacin (1: indomethacin, 2: petroleum ether extract, 3: chloroform extract, 4: ethyl acetate extract, 5: methanol extract)

analyzed to obtain ^1H NMR and ^{13}C NMR data and

identified as lupeol, β -sitosterol and ursolic acid (Figure 2). Compound 4 was identified by TLC through comparison of the R_f value with a number of known sterols commonly reported from plants. This comparison proved the identity of compound 4 as β -sitosterol-3-*O*-glucoside. These findings can justify the anti-inflammatory activity of petroleum ether extract of the plant *Salsola kali*. This is due to the large number of previously published reports that confirmed the significant anti-inflammatory activities of the four isolated compounds (Garcia et al., 1999; Saleem, 2009). The significant anti-inflammatory activity produced by the petroleum ether fraction could then be attributed to its sterols' contents.

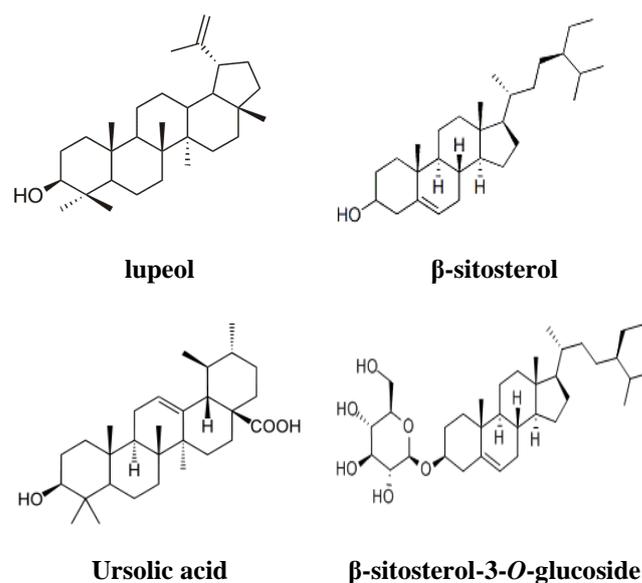


Figure 2: Structures of the isolated compounds

3. Conclusion

Petroleum ether extract of *Salsola kali* demonstrated a significant anti-inflammatory activity. A further study for this extract is recommended to evaluate its safety as well as ability for usage as anti-inflammatory drug.

4. Conflict of interest

The authors report no declaration of conflict of interest.

5. Acknowledgements

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6. References

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