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Characterization of anti-inflammatory triterpene acids from rose hip powder (*Rosa canina* L.)

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Introduction

The standardized rose hip powder LitoMove® (*Rosa canina* L.) is a widely used herbal remedy. Clinical trials have revealed that consumption of rose hip powder can reduce pain in patients suffering from osteoarthritis. Synovial inflammation mainly mediated by macrophages has been reported to be involved in the pathology of osteoarthritis. The aim of the present study was to investigate the immunomodulatory effect of rose hip extracts and to isolate and characterize active principles.

Methods

Cells of the monocytic cell line Mono Mac 6 ($2x10^6$ cells/ml) was stimulated with lipopolysaccharide (LPS, 50 pg/ml) and incubated with test samples dissolved in 1 % DMSO (tested concentrations appear from figures) or 1 % DMSO (control) for 24 hours. Total volume of each well was 500 µl. Release of interleukin 6 (IL-6) was measured through a sandwich immunoassay and cell viability was assessed with the MTT [3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide] assay.

Results

The inhibitory effect of the dichloromethane extract on the IL-6 release from Mono Mac 6 cells (Fig. 1) was correlated to a mixture of three triterpene acids; oleanolic, betulinic and ursolic acid (IC_{50} 21 ± 6 µM) (Fig. 2).
Investigation of the anti-inflammatory activity of each of the three triterpene acids revealed that oleanolic and ursolic acid was able to inhibit the LPS induced release of IL-6, in contrast to betulinic acid (Fig. 3). Interestingly, combination of either oleanolic or ursolic acid with betulinic acid enhanced the anti-inflammatory effect of both oleanolic and ursolic acid (Fig. 4).

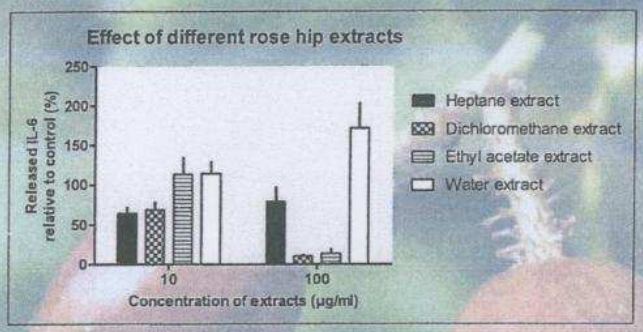

Figure 1. Effect of different rose hip extracts on the IL-6 release from Mono Mac 6 cells shown as the percentage effect (mean + SEM) of each concentration relative to control (standardized to 100 %), n=3.

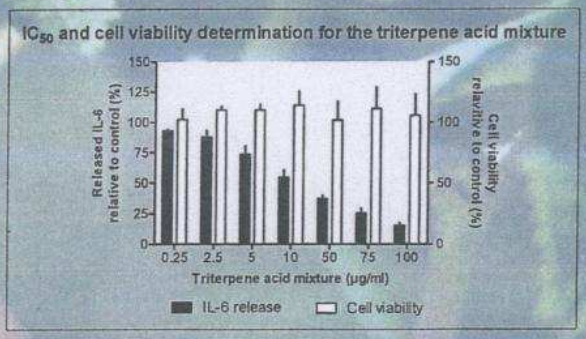

Figure 2. Effect of different concentrations of the triterpene acid mixture on the IL-6 release from and cell viability of Mono Mac 6 cells. Results shown as the percentage effect (mean + SEM) of each concentration relative to control (standardized to 100 %), n=3.

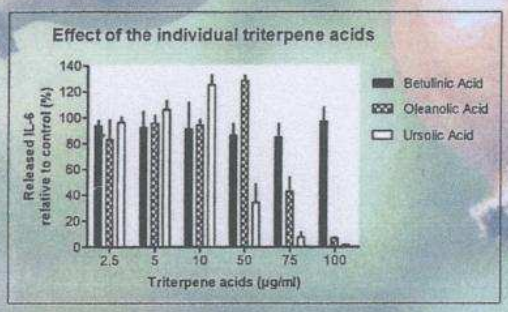

Figure 3. Effect of various concentrations of oleanolic acid, betulinic acid and ursolic acid as the percentage effect (mean + SEM) of each concentration relative to control (standardized to 100 %), n=3.

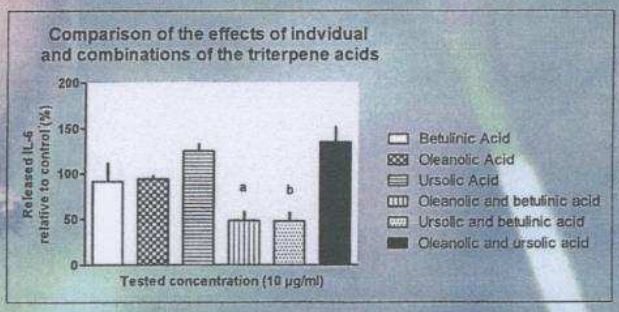

Figure 4. Comparison of the effect on the IL-6 release of individual and 1:1 combinations of the three triterpene acids. , Results shown as the percentage effect (mean + SEM) of each concentration relative to control (standardized to 100 %), n=3. [a]Significantly lower than the effect of 10 mg/mL oleanolic acid ($p < 0.02$), [b]significantly lower than the effect of 10 mg/mL ursolic acid ($p < 0.004$).

Acknowledgements

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