

Jennifer Bicker, Summary

In the course of this dissertation proanthocyanidins of *Rumex acetosa* L. and *Myrothamnus flabellifolia* Welw. were isolated and identified. Furthermore, extracts and proanthocyanidine-rich fractions of these plants were analysed concerning their effect in an anti-adhesion assay using uropathogenic *E.coli*.

Doctoral thesis, submitted in 2008

For the isolation of the proanthocyanidins column chromatography- and liquid chromatography techniques as well as preparative HPLC and preparative TLC were applied in various combinations. The structures of the compounds obtained were elucidated by 1D- and 2D NMR experiments of their peracetylated derivatives, partial acid-catalysed degradation with phloroglucinol, ESI-MS, optical rotation and CD spectra. From the herb of *Rumex acetosa* L. a variety of flavan-3-ols, A- and B-type procyanidins and propelargonidins were isolated and identified for the first time. In total, three flavan-3-ols, 15 dimeric, seven trimeric and two tetrameric proanthocyanidins as well as a phloroglucin-derivative could be isolated and characterized. From *Myrothamnus flabellifolia* Welw. four flavan-3-ols, ten dimeric and one trimeric proanthocyanidin were isolated and characterized. Seven of these natural compounds have not been described before.

Proanthocyanidin-rich extracts of *Vaccinium macrocarpon* Ait. and single proanthocyanidins are known to show an anti-adhesive action towards uropathogenic *E. coli* in *in vitro* tests. Therefore extracts of *Rumex acetosa* L. and *Myrothamnus flabellifolia* Welw. were analysed concerning their anti-adhesive effect towards these pathogens. For that purpose an *in vitro* model was developed and validated, in which the adhesion of the uropathogenic *E. coli* strains 2980 and J96 to human T24 bladder cells was tested. Furthermore, the influence of the incubation of the bacteria with testing substances on the gene expression of various virulence factors was evaluated using Real Time RT-PCR. The results demonstrated that incubating the bacteria with the test substances caused a significant increase of adhesion. The PCR results showed an elevated gene expression of the virulence factors and therefore confirm the results of the adhesion assay.

Based on these results it can be concluded that the proanthocyanidin-rich extracts of *Rumex acetosa* L. and *Myrothamnus flabellifolia* Welw. have no anti-adhesive effect towards the examined uropathogenic *E. coli* strains.