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Inhibition of advanced glycation end-products (AGEs) by polyphenols from *Achillea* species

Mehran Miroliaei, Mahvash Afshari and Mehdi Rahimmalek
University of Isfahan, Iran

A comparative study was carried out on the methanolic extracts from six *Achillea* species (*A. millefolium*, *A. pachycephala*, *A. nobilis*, *A. filipendulina*, *A. santolina* and *A. aucheri*) and the examined polyphenols from these plants on the formation of advanced glycation end-products (AGE) *in vitro*. *A. pachycephala* which is richer in flavonoids (15 mg quercetin/g W) and phenols (111.10 mg tannic acid/g DW) with substantial antioxidant activity ($IC_{50} = 365.5 \mu\text{g/ml}$) presented strong anti-AGE properties. Chlorogenic acid, luteolin, quercetin and caffeic acid were identified as the major polyphenols in the extracts by HPLC. In general, polyphenolic content follows the order *A. pachycephala* > *A. nobilis* > *A. filipendulina* > *A. santolina* > *A. aucheri* > *A. millefolium*. Most extracts exhibited marked anti-AGE ability in the bovine serum albumin (BSA)/methylglyoxal (MG) system, though *A. pachycephala* showed the highest potential. The formation of AGEs was assessed by monitoring the fluorescent products (λ_{em} 440 nm, λ_{ex} 370 nm) and Circular dichroism (CD) spectroscopy. Diminution in free radical production (assessed by 2,2-diphenyl-1-picrylhydrazyl (DPPH) assays) is discussed as potential mechanism for delay or reduced AGE. Furthermore, antimicrobial action of *Achillea* species evaluated by the agar dilution method may reflect effects in line with polyphenolic contents. The results demonstrate the anti-glycative, antioxidant and antimicrobial potential of *Achillea* species which can be attribute to polyphenols content and the effectiveness on generation of AGEs, thus *Achillea* gives an opportunity as a convenient platform for slowing down glycation related diseases.

Biography

Mehran Miroliaei has completed his PhD in Biochemistry from Institute of Biochemistry and Biophysics (IBB), University of Tehran. Presently he is lecturer in the University of Isfahan. He has published more than 35 papers in reputed journals and has been serving as an editorial board member of repute.

mmiroliaei@yahoo.com

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