CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITIES OF 
*Polygonum bistorta carneum*


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*Polygonum bistorta carneum* was collected from Rize-İkizdere Anzer plateau in June, 2004. Flowers, leaves and stems of the plant were dried, powdered and extracted with methanol and chloroform in a Soxhlet apparatus. The extracts were dried and redissolved in DMSO and DMSO-chloroform (9:1), respectively. Volatiles were collected in a Clevenger type hydro-distillation unit and the remaining aqueous solutions were tested as aqueous extracts. Chloroform extracts and essential oils were directly analyzed by GC-MS. Antioxidant and antimicrobial activities of the extracts were determined. DPPH and total phenolic content methods were used for antioxidant capacity determinations. Minimum inhibitory concentrations of the samples were determined against ten microorganisms.

The observed IC₅₀ values for the extracts were compared with the standard antioxidants catechine, BHT, Trolox®, and ascorbic acid. All the extracts showed good DPPH radical scavenging activity. In addition, a positive relationship was observed between DPPH scavenging activities and total phenolic contents of the samples tested with both methods. The antimicrobial activities of the samples were tested for the seven bacteria *E. coli*, *K. pneumoniae*, *Y. pseudotuberculosis*, *P. aeruginosa*, *E. faecalis*, *S. aureus*, and *B. cereus* and the three fungi *C. albicans*, *C. glabrata*, and *C. tropicalis*, and the minimum inhibitory concentration (MIC, μg/mL) values were determined. Chloroform extracts were active against all bacteria except *B. cereus* and the fungus *C. albicans*. Methanolic and aqueous extracts and essential oils were generally non-reactive against bacteria, and only the methanolic extracts showed some antifungal activity against *C. tropicalis*.

The phenolic components of the extracts were determined by LC with diode array detector and ion trap mass spectrometry. Reversed phase liquid chromatography (RP-LC) with diode array detector (DAD) provided multi-wavelength monitoring. Twelve phenolic standards were used for method development. In the UV analyses of standards, the wavelength was chosen as 370 nm for flavonols, 315 nm for cinnamic acid derivatives, and 280 nm for flavanols and benzoic acid derivatives. The optimized conditions were used for RP-LC-UV-MS analysis using negative electrospray ionization (ESI). In order to identify glycosidic structures, acid hydrolysis was used.

The major phenolics determined in the extracts were quercetin and kaempferol and their various glycosylated forms, rutin, gallic acid, protocatechuic acid, p-OH benzoic acid, catechin, chlorogenic acid, and epicatechin. The phenolic contents of the stems, leaves and flowers of *Polygonum bistorta carneum* differed both in terms of gallic acid, p-OH benzoic acid and catechin composition and in terms of the difference in sugar moieties attached to the phenolics.