Abstract

Plant secondary metabolites (SM) are widely used by humans in many ways (pharmacy, biotechnology etc.). For making their use even more effective, it is important to know the seasonality of these chemicals in plants and what affect those changes.

Three *Artemisia* species (*Artemisia annua, A. absinthium, A. vulgaris*) were cultivated during one vegetation season (from April to September 2016). Plant growth parameters and the beginning of their generative stages were observed, and leaf samples were collected regularly. Samples of some plants were collected repeatedly. A generalist herbivore (migratory locust), was used as a proxy for studying changes in plant secondary metabolism during the vegetation season.

The results proved presence of defence secondary metabolites in plants except *A. vulgaris* species where the role of SM in defence was not shown. Levels of SM changed nonlinearly during the vegetational season and were time-dependent. Plant size did not influence the levels of SM in plants. Levels of SM were low at the beginning of the experiment followed by rapid increase and remaining on maximal levels. The plants which lost their biomass repetitively grew slowly and bloomed later than the plants which were clipped only once. A delay trend showing seasonality of the plant SM was not proved.

In conclusion, good timing of studied medical plants harvest is more important than their size. Maximal levels of SM were found at the end of June and the beginning of July when summer solstice and Midsummer night are celebrated using ‘magic’ plants. Collecting these plants during this time was scientifically proven to be the most beneficial.