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Flower extracts of *Filipendula ulmaria* (L.) Maxim inhibit the proliferation of human tumor cell lines

M. João Lima[1], Diana Sousa[2], Raquel T. Lima[2,3], Ana Maria Carvalho[4], Isabel C.F.R. Ferreira[4], M. Helena Vasconcelos[1,2]

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Ethnobotanical surveys document wild plants that have been commonly used worldwide to prepare homemade remedies. *Filipendula ulmaria* (L.) Maxim (meadowsweet) is a good example of a popular medicinal species that can be found throughout most Europe and Asia. The plant is known for its rich antioxidants content, having compounds such as flavonoids and ascorbic acid [1]. Nonetheless, its tumor cell growth inhibitory activity has never been studied. Therefore, the aim of this project was to investigate if the flower extracts of *Filipendula ulmaria* (Fig. 1) have cell growth inhibitory activity in human tumor cell lines.

Fig. 1: Inflorescences of *Filipendula ulmaria* collected in Northeastern Portugal meadows.

The flower extracts were obtained by infusion, methanolic extraction, methanol:water (80:20, *v:v*) extraction or decoction. Such extracts were screened for tumor cell growth inhibitory activity in three human tumor cell lines: NCI-H460 (non-small cell lung cancer), A375-C5 (melanoma) and MCF-7 (breast adenocarcinoma). One of the most potent extracts from the flowers of *F. ulmaria* (obtained by decoction) was further studied in one of the most sensitive cell lines (NCI-H460), by investigating its effect in cellular proliferation, cell cycle profile and programmed cell death.

Results showed that all the extracts obtained from the flowers of meadowsweet inhibited the growth of the mentioned cell lines. The most potent extract was the one obtained by decoction (GI_{50} of 70.0 ± 8.6, 96.0 ± 12.4 and 63.3 ± 7.6 µg/mL in the NCI-H460, MCF-7 and A373-C5 cells, respectively). Additionally, further studies of this extract in the NCI-H460 cells (with the GI_{50} and twice the GI_{50} concentration) showed that the reduction in cell growth was due to a strong reduction in cellular proliferation, with a slight increase in the percentage of cells in the G1 phase of the cell cycle, but not to alterations in programmed cell death. Future work will confirm if this extract is non-toxic to human non-tumour cell lines.

References:

[1] Barros, L., Cabrita, L., Boas, M.V., Carvalho, A.M, Ferreira I. (2011), *Chemical, biochemical and electrochemical assays to evaluate phytochemicals and antioxidant activity of wild plants*, Food Chemistry, 127, 1600-1608.