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CHEMICAL COMPOSITION AND BIOLOGICAL ACTIVITY OF EXTRACTS FROM THE LEAVES OF COTINUS COGGYGRIA SCOP.

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Abstract

Cotinus coggygria Scop. (smoke tree) belongs to the Anacardiaceae Lindl. family. All its parts (aerial and ground) are used as antiseptic, anti-inflammatory and hepatoprotective remedies. The plant's extracts are known to be a rich source of antioxidants and anticancer agents. Our preliminary studies showed that leaves extracts of C. coggygria inhibit the post-proline specific peptidases (PPSPs) prolyl oligopeptidase (POP, EC 3.4.21.26) and fibroblast activation protein alpha (FAP, EC 3.4.21.B28) (Iliev et al., 2020; Iliev et al., 2021). Increased activities of those enzymes are found in different pathological disorders, including neurodegeneration (POP) and tumorigenesis (FAP and POP) (reviewed in Dunaevsky et al., 2020). The inhibitors of both POP and FAP have been shown to suppress tumor growth (Jackson et al., 2015; Busek at al., 2018).

In this study we present data about the chemical composition of the extract from C. coggygria leaves, obtained by ethyl acetate/water mixture, bioavailability of the main components and their inhibitory properties towards POP and FAP.

Main components of the extract were separated by HPLC and analysed using mas-spectrometry. Most of them were found to be galloyl glucosides with different numbers of gallic acid residues, as well as quercetin and myricetin glycosides (mainly rhamnosides). Bioavailabilities of quercetin and myricetin are very low, whereas gallic acid is readily absorbed in the gastrointestinal tract. All the three compounds have favourable effects, due to their anti-microbial, anti-inflammatory and anti-cancer properties. Galloyl glucosides are inhibitors predominantly of POP with IC_{50} decreasing with the increase of the number of gallic acid residues. Also, as more gallic residues in the molecule, as better the anticancer properties were found (Li et al., 2015).

Based on the above findings, we concluded that galloyl glucosides are inhibitors of POP with a very good selectivity toward FAP. Additionally, anti-cancer properties of those compounds make them promising candidates for developing of novel therapies.

References

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