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Differences in chemical composition of the essential oils of peppermint (*Mentha x piperita* L.) and spearmint (*Mentha spicata* L.) and their anthelmintic properties

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Plants of the genus *Mentha* are well-known for their various medicinal properties including anti-inflammatory, antiemetic, antispasmodic, analgesic and antiparasitic effects, which are used for the treatment of various gastrointestinal and respiratory diseases. The aim of this study was to determine the chemical composition of the essential oils (EOs) of two *Mentha* species, peppermint (*M. piperita*) and spearmint (*M. spicata*), and to evaluate their anthelmintic activity against gastrointestinal nematodes, parasites that have a significantly negative impact on modern sheep farming. The main compounds of peppermint EO, determined by GC-MS analyses, were menthol (32.6%), menthone (22.0%) and isomenthone (9.39%), and those of spearmint were carvone (64.4%), trans-4-caranone (8.67%) and limonene (4.37%). Their anthelmintic effects, assesed using the egg hatch test conducted at eight different concentrations (50, 12.5, 3.125, 0.781, 0.195, 0.049, 0.025 and 0.0125 mg/ml), were 20.0-90.3% and 13.0-93.7%, respectively. Although both tested samples showed high and dose-dependent (R^2 = 0.93 and 0.96, respectively) anthelmintic potential, their effect was significantly different at five concentrations ($p<0.05$). The obtained results suggest the high influence of differences in chemical composition of EOs on their pharmacological properties, although the samples were extracted from similar plant species. These should not be neglected during the preparation of formulation, which is important for finding alternatives to combat resistance in nematode.

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