Chemical composition by UPLC-ESI-MS analysis of Marrubium vulgare L. (Lamiaceae) and its phytogenic effects in newly weaned pigs

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Antibiotics are widely used in industrial pig farming as food additives to promote growth and control of pathogenic microorganisms that can harm the health of animals and consequently bring economic losses. According to recent research, the types of antibiotics most used in pig farms were amoxicillin, penicillin, enrofloxacin and kanamycin. Despite the benefits, there is a concern with the use of these substances, since their veterinary impact contributes to the resistance of pathogenic bacteria in humans, bringing risks to public health, in addition to being highly harmful to aquifers due to low absorption in the animal\'s intestine. Considering the threat of multidrug-resistant bacteria in humans and the aforementioned problem, it is necessary to look for alternatives that can replace specific antibiotics. An alternative is the introduction of edible plants that contain phytobiotic compounds. The plant under study in the present work, *Marrubium vulgare,* is already known in the literature for its anti-inflammatory, antimicrobial, antiparasitic and antioxidant properties, due to secondary metabolites present in species, such as flavonoids, diterpenes and phenolic acids. Extracts from this plant were used to evaluate its phytobiotic and biostimulant effects in the raising of recently weaned pigs. The samples were prepared by infusion in water and administered orally to animals, which were weekly weighed to monitor their growth. The experiment was carried out on a group of 30 animals, five groups of 6 animals that received saline solution, clenbuterol and doses of infusion extracts (1, 10 and 20% mL of extract/ animal kg) for 28 days. Blood was also collected for hematimetric and biochemical analyzes. the health of the animals was evaluated by biochemical parameters, including erythrocytes, hemoglobin, hematocrit, mean corpuscular volume, enzyme levels in the blood, among others. To evaluate plant active compounds and its degradation products in the animal\'s metabolism, the serum was separated from the blood and UPLC-ESI-MS analysis was performed. It was observed that MVI 1 group and doses of 10% (mL of extract/animal kg) led to greater weight gain than negative and positive controls, in addition to no significant changes in biochemical parameters and enzymatic levels in the blood. UPLC-ESI-MS data from animal serum showed the presence of a diterpene, a flavonoid and several cholic acid derivatives. The results obtained in these analyzes indicated *M. vulgare* as a potential food additive for livestock production. The aqueous infusion extracts were also subjected to UPLC-ESI-MS showing the presence of 33 secondary metabolites. Through chromatographic techniques, two known compounds from *Marrubium vulgare L.* were isolated and characterized by spectroscopic techniques as marrubiin and apigenin.

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