Flavonoid compounds are widespread secondary metabolites of plants, constituting essential components of the everyday human diet and exhibiting numerous biological activities such as anti-inflammatory, antimicrobial, anti-diabetic, and neuroprotective. Among many subgroups of flavonoid compounds, we can distinguish, among others, chalcones, flavanones, flavones, flavonols, and flavanonols. All these compounds, despite their structural differences, may have the same substituents attached, such as a chlorine atom, a hydroxyl group or a methyl group. In nature, flavonoids are usually found in the form of more stable and bioavailable glycosides, in which to the flavonoid molecule, the so-called flavonoid aglycone, one or more sugar molecules, most often glucose, are attached. In recent years, interest in this group of compounds has been growing rapidly, especially in understanding the way they affect the human body, including the assignment of a biological activity to the specific flavonoid compounds. Among flavonoids, derivatives with a chlorine atom (or atoms) remain rarely found in nature and little understood. One example of such a compound is chloroflavonin with strong antimicrobial activity, which is produced by filamentous fungi of species such as *Mucor irregularis* and *Aspergillus candidus*. Chlorinated flavonoids can also be formed during the inflammatory process, in which flavonoid compounds neutralize the excess of chloric acid produced by the cells of the immune system and undergo mono- and dichlorination. *In vitro* studies have shown that obtained in this way chlorinated flavonoids retained or even enhanced their antioxidant potential. Therefore, undertaking the studies on the preparation of new, yet unknown flavonoid compounds with a chlorine atom and the assessment of their antimicrobial activity seems to be justified, and in a long-term perspective may lead to the discovery of new therapeutic agents for the treatment of fungal and bacterial infections, especially in the context of the increasing drug resistance of such microorganisms as *Staphylococcus aureus*, *Escherichia coli*, and *Candida albicans*.

Within the project, we intend to assess systematically the relationship between the structure of the flavonoid compound along with the position of chlorine atom substitution and its antimicrobial activity. For this purpose, in a first step, we plan to carry out synthesis of flavonoid compounds belonging to three groups: chalcones, flavanones and flavones with a chlorine atom located at various positions of their structures. In the second stage, we will perform microbial glycosylation of the flavonoid aglycones using selected strains of entomopathogenic filamentous fungi (*Beauveria bassiana* KCH J1.5 and *Isaria fumosorosea* KCH J2) with a unique enzymatic system. The use of them is an environmentally friendly alternative to chemical synthesis ineffective in this process. The result is expected to be a collection of many flavonoid compounds not available commercially, usually previously unknown. The last stage of the planned studies will be a bioassay of antimicrobial activity against, among others, *Escherichia coli* 10536, *Staphylococcus aureus* DSM 799, *Candida albicans* DSM 1386, *Streptococcus thermophilus* KBM - 1, and *Lactobacillus rhamnosus* PCM 489, which will be carried out using an automatic microorganism growth system. The two last of the mentioned microorganisms, are probiotic bacteria that have a beneficial effect on the human digestive system, so determining the activity of the tested compounds on their growth will allow to assess whether they are safe. The combination of chemical and biotechnological methods in obtaining new chlorine flavonoid derivatives is an innovative method, limiting the use of chemical reagents and allowing to obtain compounds with potential biological activity with satisfying efficiency.