Quaternary ammonium salts (QASs) are organic compounds widely distributed in nature, which contributes to a rich spectrum of their properties. Extensive studies on these chemicals over decades resulted in various essential discoveries that allowed to successfully apply them in many products, serving as medicinal agents, agrochemicals or biocides. Those which possess amphiphilic structure exhibit ability to lower surface tension of water and in consequence are classified as cationic surfactants. Interestingly, unique elements in the structure of QASs allow to use them effectively as antibacterial and antifungal disinfectants. The most common QASs present in disinfectants currently available on the market are alkyldimethylbenzylammonium chlorides (BACs), dialkyldimethylammonium chlorides (DDACs), and alkyltrimethylammonium chlorides (ATMACs). Their extensive use in industry leads to their presence in sewage and then to potential contamination of groundwaters and soil. In addition, another growing problem with disinfectants is the build-up of resistance to the organisms they target. Recent years, especially the pandemic, have drawn the attention of scientists and industry to the necessity of developing new, safe for the environment and people, as well as effective formulations that allow to fight harmful microorganisms. As part of the project titled " Esterquats based on naturally derived raw material - carnitine as promising alternative to fully synthetic biologically active quaternary ammonium salts" efficient methods for obtaining new QASs designed as environmentally friendly, multifunctional antimicrobial agents will be developed. The synthesis will be carried out in a way that allows for the introduction of commercially available compounds with antimicrobial activity (2-furoic acid, clioquinol, penicillin G, zinc phthalocyanine) as an anion (Path A) or as a fragment of the cation (Path B), attached through ester bonds and an appropriate alkyl chain. The key reagent will be carnitine, which occurs naturally in the environment and will be alkylated using suitable bromoalkanes (Path A) or functionalized alkylating agents (Path B) derived from the aforementioned antimicrobial agents. In the first stage, carnitine will undergo *O*-alkylation with the respective alkylating agent, introducing a specific function/property into the cation. Subsequently, the esterified forms of carnitine will undergo reactions in which the halogen anion will be exchanged for anions exhibiting antimicrobial activity. Based on literature reports describing the significant influence of carbon chain length in the QAS molecule on its biological activity, it is assumed that several compounds differing in the length of alkyl groups in both the cation and the anion will be synthesized. The structures of the obtained products will be confirmed using various techniques, including ultraviolet (UV) spectroscopy, infrared (IR) spectroscopy, and nuclear magnetic resonance (NMR). In the next stage, the fundamental physicochemical properties and solubility in selected common solvents with different polarities, measured on the Snyder scale, will be determined for the obtained compounds. Differential scanning calorimetry will be used to determine the temperatures of three phase transitions: glass transition, melting, and crystallization for the obtained products. Subsequently, the surface properties of the obtained compounds, such as critical micelle concentration (CMC) and surface tension at this concentration, which are basic parameters characterizing detergent-cleaning agents, will be investigated. To evaluate the antimicrobial activity, the biocidal properties of the tested compounds against two model bacteria causing nosocomial infections and two model fungi causing diseases in immunocompromised individuals will be examined. To assess the ecotoxicological profile of the obtained compounds, their toxicity to model crustaceans (Daphnia, Artemia) and green algae (Chlorella Vulgaris) as well as their biodegradability will be investigated. The obtained results will be compared with currently used commercial preparations. The experiments aim to confirm the maintenance of biological activity by the tested compounds and to identify systems with the highest efficacy, surpassing reference preparations. An important aspect of the project will be determining the impact of the new compounds on the environment through toxicity and biodegradation studies. Due to the fact that ionic liquids offer the possibility of adjusting properties by changing the chemical structure of both cations and anions, the final stage will involve establishing correlations between various physicochemical or biological properties and the chemical structure of the products obtained during the project. All these discoveries will significantly contribute to the knowledge in the field of QASs design. In summary, the designed salts containing esterified forms of carnitine are multifunctional biocides with potentially reduced impact on the natural environment.