Biochar is produced from biomass or other feedstock rich in organic matter in the temperature range of 400-700^{o}C with limited oxygen access (so-called pyrolysis). Biochar is considered to be one of the best solutions in climate protection, and when produced from waste organic materials also as an effective method of their utilization. The role of biochar in climate protection is based on the fact that plants absorb CO_2 and, as a result of photosynthesis, convert it into various compounds needed to build their organs (biomass). However, as a result of the decomposition of plant biomass, CO^2 is emitted to the atmosphere. Therefore, it would be beneficial if the CO_2 absorbed by plants and converted into biomass have been kept in the form of C, thus reducing CO^2 emissions. The pyrolysis of biomass leads to this, and this process is called CO_2 sequestration, because the obtained biochar is very persistent in the environment and only slightly undergo the degradation processes (with CO^2 release). Thus, the application of biochar to soil means that CO_2 captured by plants from the atmosphere is accumulated in it in the form of elemental C for hundreds of years. Apart from this use of biochar, it can also be used as a fertilizer. On the one hand, due to the content of nutrients in biochar, it improves the growth and development of plants, on the other hand, thanks to its high affinity for various gases, it also reduces the emission of other greenhouse gases, such as N_2O and CH_4. Biochar is also used to remove pollutants from waters and soils, as a construction material (as an insulator of buildings and a humidity regulator), in animal husbandry (as an additive to fodder and silage), electronics (in batteries), metallurgy, cosmetics (as a component of soaps, care creams, etc.), in the pharmaceutical industry (as a carrier of active pharmaceutical ingredients), products of the textile industry (functional clothing). Such a wide range of applications of biochar increases its use, and thus its presence in the environment as well. Biochar is not a homogeneous material and contains particles of various sizes, from macro-scale (visible to the naked eye) to even nanometer-scale. While the environmental impact of biochar as a whole (as a group of all particles) has been thoroughly studied, almost nothing is known about the presence and impact of nano-biochar (nBC) on the environment. It is estimated that contribution of nBC in BC can be 5% of the biochar mass. Despite the fact that biochar is characterized by high persistence, it becomes fragmented when it enters the environment, which probably also leads to an increase in the proportion of nanometric forms in it. Nanoparticles can have a direct harmful impact on the environment and human health, and indirectly as a carrier of many pollutants that facilitate penetration into the body. Hence, the main challenge and at the same time the aim of the planned research is to thoroughly understand the conditions and factors influencing the formation of nBC during pyrolysis and artificial aging, and then - to understand the nBC circulation in the environment (mineralization, accumulation, migration) and the impact of nBC on a number of environmental parameters, both from the point of view of geochemistry (circulation of elements, availability of nutrients) and environmental protection (interactions with pollutants, ecotoxicology). The research will be carried out using unique research methods, and the acquired knowledge will allow, on the one hand, to learn about the possible risks associated with the use of biochar, and, on the other hand, through the detailed characteristics of the nBC of potential new applications of this type of materials.