The consumption of meat has raised a lot of controversy in recent years. The report of the World Health Organization published in 2015 clearly emphasized the negative impact of eating meat and meat products on human health. Iron and substances such as polycyclic aromatic hydrocarbons (in smoked products) and nitrosamines are essential ingredients related to the risk of cancer. The presence of the latter is associated with the addition of nitrite salts, which are preservatives to the meat. In addition to their primary role, these salts shape the palatability and pink color of cooked meat products and slow down the oxidation processes. Nitrite, added in some necessary excess, reacts with the meat components, preventing the growth of microorganisms, and in particular limiting the possibility of the production of toxins by the botulinum toxin (Clostridium botulinum). All the functions of nitrites in processed meat make these compounds difficult to replace. The problem of the potential appearance of carcinogenic nitrosamines in cured products is complex. In order for them to arise, the meat must contain secondary amines and residual nitrite, which can react with amines, and the reaction takes place under certain conditions (low pH, high temperature). It is therefore essential to reduce or completely eliminate the residual nitrite. **The aim of the project** is to investigate the possibility of developing new meat curing strategies that allow the elimination of nitrites, resulting in the effects obtained by using traditional methods of curing meat, but safer for human health. In the planned research, an attempt will be made to use the enzyme nitric oxide (NO) synthase and two other groups, the so-called nitric oxide donors (three research paths). Changes occurring in myoglobin under the influence of the additives in relation to the color of the meat will be investigated. In addition, an analysis of the impact of the additives on the safety and oxidative stability of meat is planned. The most important aspect in terms of safety is related to the presence of nitrosamines. The action of nitrite is complex, one of the stages is the formation of nitric oxide, which attaches to the heme iron of myoglobin. After heat treatment it forms the color characteristic of cured meat - nitrosylhemichromogen. NO synthase is an enzyme found in living organisms, it can be present as: neural, endothelial and inducible. These enzymes are involved in multiple regulatory actions of the body, and they also appear as a result of stress or in response to inflammation. The substrate for NO synthase is arginine, from which the enzyme cleaves nitric oxide and citrulline. The nitric oxide can then be attached to the iron in a further step, as is the case with the use of nitrite. The use of NO synthase is poorly understood in food technology. Moreover, the use of enzymes in food production is positively assessed by consumers, which prompted attempts to introduce it as a possible replacement for nitrite salts. The second planned research route uses the action of nitrosothiols such as nitrosoglutathione, N-acetyl cysteine and N-acetyl cysteine ethyl ester. These compounds are believed to function, and act in living organisms as reservoirs of nitric oxide, which is very reactive. In addition, nitrosothiols are compounds that can be used as drugs in many diseases such as cystic fibrosis, cystitis and others. The third proposed research path is to investigate the possibility of using iron nitrogen complexes (DNICs), which need to be synthesized in situ. They are treated as nitric oxide donors and, like nitrosothiols, are considered nitric oxide carriers in living organisms. Their role has not yet been fully recognized. They gain more and more interest in pharmacology, it is believed, inter alia, that they have potential in the treatment of certain types of cancer. All proposed research paths are interrelated. Not only will the final effect in the form of a pink color of meat be analyzed, but also for cognitive reasons, changes in the main color of meat - myoglobin, under the influence of the additives and under certain conditions, will be investigated. The oxidative stability of lipids and proteins will be tested. In the event of a positive effect of the color of the meat, it will be subjected to activities that stimulate the possible appearance of nitrosamines (e.g. under the influence of high temperature, in an acidic environment). Then, the presence of nitrosamines in the meat samples will be analyzed. In addition, the effect of selected additives on the color stability as well as antioxidant and bacteriostatic properties during the storage period typical for meat products will be tested. The most important of the planned achievements will be: gaining knowledge on the conditions for obtaining a pink color of meat samples to which nitric oxide donors have been applied; knowledge of changes in myoglobin in relation to the color of meat under the influence of nitric oxide donors; knowledge about color stability, antioxidant and bacteriostatic activity in samples where an acceptable color has been obtained; obtaining information on the possible appearance of nitrosamines in samples treated with nitric oxide donors. This knowledge will form the basis for further research aimed at introducing selected additives for industrial use.