Description for the general public of the project: 'Modern photoprotection - identification of the effective and safe UV filters in the groups of arylidenehydantoin and cinnamic acid derivatives'.

The sun no matter whether we are in the mountains or by the seaside, gives us a lot of positive energy and with a short exposure (5-10 minutes) specifically stimulates the synthesis of vitamin D, but in excess constitutes a threat to our health. Ultraviolet (UV) radiation that reaches the Earth from the Sun is mostly taken up by the ozone layer in Earth's atmosphere. However, some types of the radiation reach the Earth's surface directly affecting our bodies. On the first days of the vacation, when thirsty of water and solar baths we forget about the importance of protection, it often happens that instead of beneficial effects we face punishment in the form of painful sunburn. Not only that our vacation is sometimes effectively broken but also we expose our bodies to many adverse actions. First of all, there is observed an increased production of reactive oxygen species, which damage the structure of the building and functional elements of the cells and furthermore they may cause damage to the genetic material (DNA), resulting in some cases the development of neoplasms.

Therefore, it is very important to remember about the use of cosmetics containing UV filters that protect the human body from the harmful effects of the Sun. Currently there are available on the market cosmetic formulations containing two types of UV filters: chemical filters that absorb UV radiation and convert it into heat energy and physical filters, of which small particles reflect radiation like a mirror. Cosmetic product containing UV filters provides information on its "potency", which is indicated by the SPF (Sun Protection Factor). The higher the SPF, the product more effectively protects the skin against UV radiation.

UV protection is absolutely necessary, but serious problems arose with scientific reports concerning adverse effects of currently used UV filters on the human body. Scientific papers have reported among others allergic reactions, influence on the endocrine system or cytotoxic activity. It is very important that some UV filters are used in a concentration of up to 10%, which means that 100 g of a cosmetic product contains as much as 10 g of a UV filter. Moreover, the creams are used on large surfaces of the bodies allowing more intense absorption of UV filters into the systemic circulation. There is also a lot of reports regarding environmental risks and very bad condition of natural ecosystems covering popular beaches especially during the holiday season. UV filters washed from the bodies of sunbathers pollute the environment, bioaccumulate in various aquatic organisms including plants, crustaceans, mollusks and fish. Thus it happens that people consume UV filters contained in marine fish or seafood.

Considering the above aspects, in recent years special attention is directed to the safety assessment of cosmetic ingredients both already known as well as innovative substances - the candidates for use in cosmetic formulations, to ensure proper safety of consumers and the environment.

Within the proposed project we plan to synthetize dozens of innovative organic compounds, which will possess the ability to absorb ultraviolet radiation. We will evaluate their potential use as UV filters by means of determination what types of radiation they absorb. We will find SPF for them. The most important part of the project will be a thorough evaluation of safety of the most promising compounds. For that purpose we will use the recommended and well established scientific procedures involving appropriate cell lines and reconstructed human epidermis model. All research tasks will be based on *in vitro* tests (from Latin: in glass), which is consistent with current legislation of European Union, which recommends replacement of tests conducting in animals with alternative methods.