

C.1. DESCRIPTION FOR THE GENERAL PUBLIC

Cardiovascular disease (CVD) is one of the most serious health issues of modern societies. According to the statistical data, it constitutes – next to the cancer – the main cause of preliminary death in most of the European countries. Despite the huge development in medical sciences, the efficacy of the CVD treatment remains unsatisfactory, thus, the heavy emphasis is put on the preventive health care and health education. It is generally recognised that the modification of life style, including eating habits, especially increased consumption of plant products, may considerably hinder the progress of CVD. Polyphenols present in plants (compounds with proven versatile activity profile, e.g. antioxidant, anti-inflammatory, antiplatelet) seems to have positive effects both in prophylaxis and in the auxiliary treatment of CVD. The results of epidemiological studies have confirmed a direct relationship between polyphenol-rich diet and decreased incidence of CVD, especially ischemic heart disease and heart attack. The activity of this group of compounds is further confirmed by centuries-old and successful use of polyphenol-rich plant materials in the treatment of CVD in traditional medicine. Furthermore, the therapeutic potential of some of them (e.g. hawthorn flower, grapevine leaves) has been confirmed in modern research, including clinical studies. In the light of the rising incidence of CVD and insufficient efficiency of the standard treatment, the noticeable in the last years increase of interest in medicinal plants as the source of bioactive substances seems understandable.

In an attempt to follow this scientific context, the presented project focuses on blackthorn flowers (*Pruni spinosae flos*), a valued traditional plant remedy from Central and Eastern Europe, ingredient of compound recipes, recommended, e.g. in cardiac complaints such as inflammation of the heart muscle, cardiac neurosis or atherosclerosis, the therapeutic potential of which, due to the scarcity of detailed bioactivity studies and lack of appropriate standardisation procedures, cannot be fully utilised. According to ethnopharmacological data, the blackthorn flower exhibit vasoprotective, anti-inflammatory, diuretic, detoxifying and spasmolytic activity. The studies carried out recently by the Principal Investigator, regarding qualitative and quantitative profile of *P. spinosa* flowers, its antioxidant activity in chemical tests and in the model of human plasma under oxidative stress conditions, as well as pro-inflammatory enzymes inhibition, seem to partly confirm the relevance of traditional indications, encouraging at the same time to carry out further, more detailed studies on the plant material and extracts thereof.

The aim of the presented project is the verification of the hypothesis of the value of the blackthorn flowers as sources of bioactive substances potentially influencing the circulatory system. As according to recommendations of modern phytotherapy, the dry extracts are to be preferred to the raw plant materials due to higher efficacy, the dry extracts from blackthorn flowers will be the material for the study. The project includes the following tasks:

- development of appropriate and effective HPLC standardisation procedure;
- *in vitro* evaluation of the antioxidant activity of the extracts, model polyphenolic compounds of *P. spinosa* flower (selected based on the extracts composition) and their potential *in vivo* metabolites towards oxidants operating in the cardiovascular system *in vivo*, i.e. superoxide anion, hydroxyl radical, nitric oxide, hydrogen peroxide, peroxyxynitrite and hypochlorous acid;
- *in vitro* evaluation of the antioxidant activity of the model compounds and metabolites in the protection of human plasma proteins and lipids under oxidative stress conditions (induced *in vitro*) in comparison to the standard plasma antioxidants;
- *in vitro* assessment of protective effects of the extracts/model compounds towards fibrinogen under oxidative stress conditions generated *in vitro*;
- *in vitro* evaluation of the influence of the extracts/model compounds on the plasma and platelet haemostasis;
- assessment of cellular safety of the extracts;
- analysis of chemical composition variability in commercially available samples of blackthorn flowers depending on the distributor and the year of collection.

The results of the project will allow for thorough assessment of the plant material as a source of bioactive compounds relevant for prophylaxis and treatment of CVD, what in further perspective (after necessary *in vivo* and clinical studies) may lead to development of new medicinal preparations of plant origin.