

SUMMARY

One of the fastest growing diseases caused by modern civilization and, consequently, posing the biggest threat to life and health of whole population is diabetes.

In recent years, it is observed the resurgence of interest in the raw materials of herbal origin, as an alternative to synthetic medicinal products that can supplement or help with conventional pharmacotherapy. Specimen of white mulberry, present on the Polish pharmaceutical market in the form of readily available, cheap products, offer a promising prospect of adjunctive therapy that would normalize the blood glucose level in different groups of society. However, the insufficient number of reliable information and studies prevents their effective evaluation.

The reason to undertake of a task of writing the dissertation on white mulberry topic is a desire to extend the current knowledge on chemical composition of the infusions obtained from the leaves of *Morus alba* L., and, in particular, the content of selected flavonoid and 1-deoxynojirimycin, largely responsible for the action of hypoglycemic infusions and of verifying their microbial purity and antioxidant activity. In addition, the work analyses the effect of water extracts from mulberry leaves on the transport of ions in colon epithelium of New Zealand white breed rabbit.

The studies included 14 products of herbal origin containing leaves of white mulberry, of which 11 (7- single-ingredient and 4-multi-ingredient) were purchased in pharmacies and herbal stores, and the remaining 3 specimen came from the natural collection.

The analysis of microbiological quality of herbal medicinal products containing leaves of white mulberry carried out in the first part of the work, proved their high microbiological purity. It has been shown that all analysed preparations have met pharmacopoeia (FP X, Ph. EUR. 8.0) acceptance criteria for the microbiological quality of non-sterile products, belonging to the category IIIA. Studies have confirmed the safe use of the raw material as a component of water extract.

The insightful analysis of the phytochemical plant extracts carried out in the second part of the work is a significant step in cognition and expansion of the existing knowledge about the content of selected secondary metabolites *Morus alba* and their properties, with particular emphasis on antioxidant activity. Based on the results of personal research it has been shown that, the infusions prepared from specimen coming from natural collection present a more valuable source of L-ascorbic acid, the flavonoid and polyphenolic compounds

compared to infusions from commercial preparations. The total concentration of rutin, isoquercetin and astragalgin in the infusions originating from natural collection is 21,13% of the total flavonoids content and 16,26% of total polyphenols, and surpasses more than tripled the concentration of the marked ingredients in commercial preparations. The existence of linear relationship between the total content of phenolic compounds and antioxidant activity against DPPH[•] radicals ($r=-0,814$, $p<0,001$) and ABTS^{•+} ($r=0,869$, $p<0,001$) clearly indicates and confirms that the mechanism of antioxidant activity of the above compounds present in the plant herbal extract is based on the process of neutralization of free radicals. Infusions from the single-ingredient preparations are richer source of 1-DNJ compared to extracts prepared from multi-ingredient commercial products (by 50,50%) and obtained from the natural area (by 26,50%). Based on the results of my own research and other authors, it was noted that the daily dose of moranoline present in the infusions obtained from the leaves of *Morus alba* L. allows to achieve effective hypoglycaemic activity.

Tests carried out in the third and final stage of the work explain one of the unknown so far mechanism of action of white mulberry leaves infusions on transport of ions in the epithelium of the colon of the rabbit. Based on the analysis of electrophysiological parameters of isolated colon epithelium of rabbit, it was found that the infusion of the leaves of the white mulberry has contributed to the local, reversible change in the difference of transepithelial electric potential. It must be concluded that the change is solely dependent on the transport of sodium ions, while there has been an absence of transport of chloride ions.

Personal research results presented above constitute the latest contribution to the state of knowledge on preparations containing leaves of white mulberry available on Polish pharmaceutical market.

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