

ANALYSIS OF BIOACTIVE SUBSTANCES IN THE SEEDS OF *Aesculus hippocastanum* L. AND STUDY OF THEIR REGENERATIVE PROPERTIES

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Horse chestnut (*Aesculus hippocastanum* L.) is widely used in pharmaceutical practice due to its pronounced venotonic, anti-edema, and capillary-protective effects. The main active complex of the seeds is aescin — a mixture of triterpene saponins, as well as flavonoids (quercetin, kaempferol) and tannins. In recent years, special attention has been drawn to studying the potential of bioactive compounds from *A. hippocastanum* L. in accelerating tissue regeneration and wound healing. The aim of this study was to analyze the bioactive substances in *A. hippocastanum* L. seeds and evaluate their regenerative activity in vitro and in vivo.

Plant raw materials were collected and standardized. The extraction of bioactive substances was carried out using alcohol-water mixtures. Qualitative and quantitative analysis of active components was performed using high-performance liquid chromatography (HPLC) and spectrophotometry methods. Regenerative activity was evaluated in vitro on fibroblast cultures by determining their viability and the level of synthesis of extracellular matrix components (type I collagen and hyaluronic acid). In vivo studies were conducted on laboratory rats with a model of full-thickness skin excision wounds; the rate of epithelialization and the tensile strength of scar tissue (tensiometry) were assessed.

Chromatographic analysis of the *A. hippocastanum* L. seed extract confirmed a high content of total aescin (not less than 8.5%), as well as flavonoid glycosides. In vitro research results demonstrated that the extract in working concentrations does not cause transformation of fibroblasts into myofibroblasts, yet significantly stimulates the production of extracellular matrix elements. In vivo conditions showed that the animal group receiving topical applications of standardized *A. hippocastanum* L. extract exhibited a reduction in the time required for the full hydration phase and an acceleration of marginal epithelialization by 25–30% compared to the control group. Tensiometric indicators of healed wounds in the experimental group demonstrated a significant increase in tensile strength, driven by active maturation and organized structuring of collagen fibers.

Thus, the bioactive complex of *Aesculus hippocastanum* L. seeds possesses a pronounced stimulating effect on the synthesis of the extracellular matrix and accelerates the regeneration of damaged tissues, increasing the mechanical strength of the skin scar. The obtained data justify the prospects of developing new soft dosage forms based on *A. hippocastanum* L. extract for topical therapy of wounds and dermatological pathologies.