## DEVELOPMENT OF A GEL FORMULATION FOR THE TREATMENT OF RHEUMATOID ARTHRITIS *Puliaiev D.S., Rudenko Y.O.* National University of Pharmacy, Kharkiv, Ukraine

**Introduction.** Rheumatoid arthritis (RA) is a chronic inflammatory disorder that affects joints, leading to pain, swelling, and eventual joint deformity. Traditional treatments often involve systemic medications that can cause unwanted side effects. Herbal remedies have long been used in folk medicine to alleviate symptoms of RA and other joint diseases. One such remedy is the marsh cinquefoil (*Comarum palustre*), known for its anti-inflammatory and analgesic properties. This study aims to develop a topical gel formulation containing marsh cinquefoil extract for treating rheumatoid arthritis and other inflammatory joint conditions. Using a gel base allows localized application, targeting the affected area while minimizing systemic exposure.

The aim of the study. The primary goal of the research is to create an effective gel formulation using marsh cinquefoil extract for external use in the treatment of RA and similar inflammatory conditions of the joints. The study aims to evaluate the anti-inflammatory and analgesic effects of the extract when incorporated into a gel base, ensuring that the formulation offers maximum bioavailability upon topical application. Carbopol, a widely used gelling agent, has been selected as the gel-forming polymer due to its excellent ability to create stable gels with desirable consistency and spreadability.

The research will also focus on optimizing the concentration of the active ingredient and the gel base to achieve the best therapeutic outcome. Other parameters, such as pH stability, skin penetration, and patient comfort, will be assessed to ensure the final product is suitable for long-term use.

**Methods of research.** The study involved several stages of formulation development, including selecting the gel-forming agent, incorporating marsh cinquefoil extract, and evaluating the gel's rheological properties. Carbopol 974 was chosen as the gelling agent due to its ability to form a stable and smooth gel with desirable viscosity. Various concentrations of marsh cinquefoil extract were tested to determine the optimal dose for anti-inflammatory activity while maintaining the physical stability of the gel.

Physicochemical analyses such as pH determination, viscosity measurement, and spreadability tests were conducted to evaluate the quality of the gel. Additionally, stability testing was carried out to ensure the gel maintains its efficacy, consistency, and appearance over time under different storage conditions.

**Main results.** The formulation process led to a stable gel with excellent consistency and spreadability. Carbopol 974, at a concentration of 1%, provided an ideal gel matrix that allowed for smooth application and rapid absorption through the skin.

The gel maintained a pH level of 5.5–6.0, making it suitable for prolonged use on the skin without irritating.

**Conclusions.** Developing a gel with marsh cinquefoil extract for treating rheumatoid arthritis showed promising results. Carbopol 940 proved an effective gelator, providing the desired rheological properties while maintaining stability throughout the testing period.

Future research should focus on conducting clinical trials to evaluate the safety and efficacy of the gel in patients suffering from rheumatoid arthritis and other inflammatory joint diseases. In addition, further optimization of the formulation may include exploring the possibility of using natural preservatives and improving the penetration of the active ingredient into the skin. The gel is a natural and safe alternative to traditional treatments with minimal side effects, offering a new approach to treating symptoms associated with joint inflammation.