

**SECTION 4. MEDICAL AND BIOLOGICAL SCIENCES:  
INNOVATIONS OF THE FUTURE**DOI <https://doi.org/10.30525/978-9934-26-486-3-14>**EFFECT OF VITAMIN D AND SAW PALMETTO FRUIT EXTRACT  
ON HORMONAL AND BIOCHEMICAL PARAMETERS IN MALE  
RATS WITH BENIGN PROSTATIC HYPERPLASIA****ВПЛИВ ВІТАМІНУ D ТА ЕКСТРАКТУ ПЛОДІВ ПАЛЬМИ  
САБАЛЬ НА ГОРМОНАЛЬНІ ТА БІОХІМІЧНІ ПОКАЗНИКИ  
У САМЦІВ ЩУРІВ ІЗ ДОБРОЯКІСНОЮ ГІПЕРПЛАЗІЄЮ  
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Benign prostatic hyperplasia (BPH) is a common disease of the male reproductive system that can lead to reproductive disorders and cause urological complications [1]. The prostate gland is a hormone-dependent organ, and alterations in hormonal balance play a significant role in the pathogenesis of benign prostatic hyperplasia. At the same time, vitamin-hormone D is currently recognized as an important factor influencing the reproductive system. It is necessary to ensure adequate testosterone production, the deficiency of which leads to impairment of male reproductive function [2]. In addition, men often prefer phytotherapeutic approaches [3]. Therefore, the treatment of BPH is an important social and medical problem, and the search for optimal therapy plans is one of the important areas for the correction of reproductive disorders.

**Purpose:** to determine the level of sex hormones and biochemical markers in the blood serum of male rats with experimental hyperplasia of the prostate under the conditions of correction with vitamin D and Saw Palmetto fruit extract.

**Materials and methods.** BPH was modeled by injecting male rats with a sulphiride solution at a dose of 40 mg/kg of body weight for 30 days.

To correct the pathological condition, rats were given vitamin D per os at a dose of 4000 IU for 21 days; Saw Palmetto fruit extract (*Serenoa repens*) at a dose of 35 mg/kg of body weight as a reference treatment; or vitamin D and Saw Palmetto fruit extract in the same doses, administered together. The control group consisted of intact male rats that were injected intramuscularly with a 0.9% sodium chloride solution. The levels of sex hormones: testosterone, estradiol, and their ratio (T/E2), concentrations of calcium, phosphorus, alkaline phosphatase activity, aspartate aminotransferase, and alanine aminotransferase were studied in the blood serum. The significance of differences in means was determined using the Student's t-test, with differences considered significant at  $P < 0.05$ .

**Results.** Examination of sex hormone levels showed that the introduction of sulphiride in animals with BPH caused a 1.66-fold decrease in total testosterone levels, which was reflected in a disrupted sex hormone ratio, 1.53 times lower in the BPH group compared to the control group.

Under correction conditions, in the group receiving Saw Palmetto fruit extract, the testosterone level increased by 40% compared to the BPH group. In rats receiving vitamin D together with the reference agent, the level of male sex hormone increased by 48%, and the Tc/E2 ratio increased by 49% compared to the BPH group, which was close to the level of the Control.

In rats with experimental prostatic pathology, as well as in animals receiving vitamin D and Saw Palmetto fruit extract, the levels of calcium

and phosphorus, and the activities of aspartate aminotransferase, alanine aminotransferase, and alkaline phosphatase remained unchanged.

Conclusions: Experimental sulpiride-induced benign prostatic hyperplasia in male rats leads to a decrease in testosterone levels and an androgen/estrogen imbalance in the blood serum. The administration of vitamin D combined with Saw Palmetto fruit extract contributes to the normalization of the levels and ratios of sex hormones in male rats and does not have a negative impact on the biochemical indicators that reflect bone status and liver function.

### **Bibliography:**

1. Awedew A. F., et al. The global, regional, and national burden of benign prostatic hyperplasia in 204 countries and territories from 2000 to 2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet Healthy Longevity*. 2022. Vol. 3, № 11. P. e754–e776.
2. Devlin C. M., Simms M. S., Maitland N. J. Benign prostatic hyperplasia – what do we know? *BJU international*. 2021. Vol. 127. №. 4. P. 389–399.
3. Pender G. C., Ombaka, J. H., Mwitari, P. G., Guyah, B. Common biological factors implicated in benign prostatic hyperplasia and prostate cancer, conventional and phytotherapeutic approaches employed in management: A review. *International Journal of Science and Research Archive*. 2024. Vol. 11. №. 2. P. 049–074.