

Effects of telmisartan and of a common dandelion (*Taraxacum officinale*) extract on the serum reproductive hormone levels of rats subjected to high-fat diet- and letrozole-induced experimental polycystic ovary syndrome

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Polycystic ovary syndrome (PCOS) is a common endocrine disorder of reproductive-age women, characterized by ovulatory dysfunction, hyperandrogenism, and polycystic ovarian morphology, and causing a range of reproductive, metabolic, dermatological, and psychological issues. The aetiology of PCOS involves a complex interplay of environmental, genetic, and lifestyle factors, where a family history can elevate the risk; although the complete pathophysiology remains unclear, hyperandrogenism, insulin resistance, inflammation, and oxidative stress are considered significant contributors. Our study's aim was to investigate the effects of telmisartan and of a *Taraxacum officinale* (common dandelion) extract on a rat model of PCOS, by measuring the serum levels of testosterone, luteinizing hormone (LH), and follicle-stimulating hormone (FSH). A total of 35 female Wistar rats were randomly divided into five groups (n=7 each): a control group, a PCOS group, a metformin-treated PCOS group, a telmisartan-treated PCOS group, and a *Taraxacum officinale* extract-treated PCOS group. PCOS was induced through high-fat diet (HFD) and letrozole administration. The HFD that was

used in this study was a commercial product obtained from Research Diets, Inc. (USA) with a total kcal value of 4.73 kcal/g, and it was coupled with letrozole (given orally, *via* gavage, at a dose of 1 mg/kg/day) in order to induce PCOS. After 30 days of stimulation, the PCOS rats were returned to a normal diet (like the one fed to the control group). Metformin was then administered at a dose of 300 mg/kg/day, telmisartan at a dose of 10 mg/kg/day, and the *Taraxacum officinale* extract at a dose of 500 mg/kg/day (*via* oral gavage) for 28 days. Vaginal swabs were obtained daily and throughout the induction period in order to determine the oestrous cycle irregularity and to confirm PCOS. Subsequently, cardiac puncture was used in rats anesthetized with diethyl ether in order to obtain blood samples, and serum hormone levels were measured with ELISA. The administration of HFD and letrozole significantly increased the serum testosterone and LH levels by 191.53% ($p=0.001$) and 85.2% ($p=0.021$), respectively, while significantly reducing the serum FSH levels by 50.1% ($p=0.001$) when compared to those of the control group. On the other hand, the metformin-treated PCOS

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group exhibited a reduction in its serum testosterone and in its LH levels by 50.85% ($p=0.012$) and 35.86% ($p=0.136$), respectively, and a 52.77% increase ($p=0.215$) in its serum FSH levels when compared to those of the PCOS group. The telmisartan-treated PCOS group exhibited a significant reduction in its serum testosterone levels by 61.72% ($p=0.001$), a reduction in its serum LH levels by 32.18% ($p=0.254$), and an increase in its serum FSH levels by 40.11% ($p=0.751$) as compared to those of the PCOS group. Finally, the *Taraxacum officinale* extract-treated PCOS group exhibited a reduction in its serum testosterone and LH levels by 13.1% ($p>0.05$) and 21.66% ($p>0.05$), respectively, while its serum FSH levels were found increased by 27.76% ($p>0.05$) when compared to those of the PCOS group. Overall, the administration of telmisartan and of the *Taraxacum officinale* extract reduced the serum LH and increased the FSH levels, thereby suggesting a potential regulation of the gonadotropin signalling; the same treatments also managed to reduce the serum testosterone levels, thereby suggesting an ability to modulate androgen synthesis.

Keywords

metformin; PCOS; reproductive hormones; *Taraxacum officinale*; telmisartan

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Conflicts of interest statement

None to declare.

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