

## INTISARI

**Latar belakang:** Obesitas merupakan akumulasi lemak berlebih disebabkan oleh ketidakseimbangan energi dan mengarah pada risiko penyakit kardiovaskular, dislipidemia, hipertensi, diabetes tipe 2, *sleep apnea* obstruktif dan beberapa jenis kanker serta memengaruhi kesuburan pria. Berbagai faktor terkait obesitas yakni merokok, gangguan tidur, penggunaan obat-obatan tertentu dan faktor lingkungan. Obesitas dan sindrom metabolik meningkatkan inflamasi pada saluran reproduksi, peningkatan stress oksidatif dan berakibat pada kualitas spermatozoa. Jelatang liar (*Urtica dioica*) memiliki kandungan bioaktif yang berfungsi sebagai antiinflamasi, antioksidan serta antiapoptosis.

**Tujuan:** Penelitian ini mengkaji pengaruh pemberian ekstrak jelatang liar terhadap kadar MDA dan ekspresi mRNA p53 epididimis serta profil sperma berupa konsentrasi, motilitas, viabilitas dan abnormalitas morfologi spermatozoa pada tikus jantan obesitas.

**Metode:** Dua puluh lima tikus *Sprague Dawley* jantan (usia 7-8 minggu, berat badan 170-200 gram) dibagi secara acak menjadi 5 kelompok (n=5): K1 (kontrol negatif), K2 (kontrol positif), D1 (obesitas+ekstrak jelatang 125 mg/KgBB), D2 (obesitas+ekstrak jelatang 250 mg/KgBB) dan D3 (obesitas+ekstrak jelatang 500 mg/KgBB). Obesitas diinduksi menggunakan *High Fat and Fructose Diet* (HFFD) selama 6 minggu. Ekstrak diberikan melalui sonde selama 4 minggu. Tikus diterminasi dan diambil jaringan epididimis untuk diisolasi RNA-nya. Kadar MDA diukur dengan metode TBARs, ekspresi mRNA p53 dinilai dengan metode PCR, profil sperma dinilai dengan metode perhitungan WHO. Uji statistik menggunakan *one-way ANOVA/Kruskall-Wallis* dilanjutkan *post-hoc LSD/Mann-Whitney*. Nilai  $p < 0,05$  dianggap signifikan secara statistik.

**Hasil:** Pemberian HFFD mampu menginduksi obesitas yang ditunjukkan dengan kenaikan berat badan dan indeks Lee  $> 300$  secara signifikan pada kelompok K2, D1, D2 dan D3 dibandingkan dengan kelompok kontrol K1 ( $p < 0,001$ ). Pemberian ekstrak jelatang liar dosis 500 mg/kg BB (D3) menunjukkan kadar MDA ( $1,45 \pm 0,20$  nmol/gr) lebih rendah secara signifikan ( $p < 0,001$ ) dibandingkan K2 ( $10,54 \pm 0,23$  nmol/gr), ekspresi mRNA p53 ( $1,33 \pm 0,26$ ) lebih tinggi secara signifikan ( $p < 0,001$ ) dibanding K2 ( $0,81 \pm 0,10$ ), konsentrasi spermatozoa ( $60,64 \pm 10,57$  juta/ml) lebih tinggi secara signifikan ( $p = 0,001$ ) dibanding K2 ( $34,26 \pm 10,25$  juta/ml), motilitas spermatozoa ( $90,00 \pm 0,00\%$ ) lebih tinggi secara signifikan ( $p = 0,001$ ) dibanding K2 ( $50,00 \pm 14,14\%$ ), viabilitas spermatozoa ( $98,24 \pm 0,27\%$ ) lebih tinggi secara signifikan ( $p = 0,009$ ) dibanding K2 ( $93,26 \pm 1,77\%$ ) dan abnormalitas morfologi ( $2,80 \pm 1,11\%$ ) lebih rendah secara signifikan ( $p = 0,036$ ) dibanding K2 ( $4,66 \pm 1,08\%$ ).

**Kesimpulan:** Pemberian ekstrak jelatang liar pada dosis 500 mg/kgBB dapat menurunkan kadar MDA, meningkatkan ekspresi mRNA p53 pada epididimis serta memperbaiki profil sperma meliputi peningkatan konsentrasi, motilitas dan viabilitas serta penurunan abnormalitas morfologi spermatozoa pada tikus jantan obesitas.

**Kata Kunci:** jelatang, obesitas, MDA, p53, profil spermatozoa

## ABSTRACT

**Background:** Obesity is excess fat accumulation caused by energy imbalance and leads to the risk of cardiovascular disease, dyslipidemia, hypertension, type 2 diabetes, obstructive sleep apnea and several types of cancer and affects male fertility. Various factors related to obesity, namely smoking, sleep disorders, use of certain drugs and environmental factors. Obesity and metabolic syndrome increase inflammation in the reproductive tract, increase oxidative stress and affect the quality of spermatozoa. Wild nettle (*Urtica dioica*) has a bioactive content that functions as an anti-inflammatory, antioxidant and anti-apoptotic

**Objective:** This study examined the effect of wild nettle extract on MDA levels and expression of epididymal p53 mRNA and sperm profiles in the form of concentration, motility, viability and morphological abnormalities of spermatozoa in obese male rats.

**Methods:** Twenty-five male Sprague Dawley rats (7-8 weeks old, 170-200 gram body weight) were randomly divided into 5 groups (n=5): K1 (negative control), K2 (positive control), D1 (obese + extract nettle 125 mg/KgBB), D2 (obesity+nettle extract 250 mg/KgBB) and D3 (obesity+nettle extract 500 mg/KgBB). Obesity was induced using the High Fat and Fructose Diet (HFFD) for 6 weeks. The extract was given through a sonde for 4 weeks. The mice were terminated and the epididymis tissue was isolated. MDA levels were measured by the TBARs method, p53 mRNA expression was assessed by the PCR method, sperm profile was assessed by the WHO calculation method. The statistical test used the Paired T-Test, one-way ANOVA/Kruskall-Wallis followed by post-hoc LSD/Mann-Whitney. The value of  $p < 0.05$  was considered statistically significant

**Results:** The administration of HFFD is able to induce obesity, as indicated by a significant increase in body weight and Lee index  $>300$  in groups K2, D1, D2, and D3 compared to the control group K1 ( $p < 0.001$ ). Administration of wild nettle extract at a dose of 500 mg/kg BW (D3) showed significantly lower levels of MDA ( $1.45 \pm 0.20$  nmol/g) compared to K2 ( $10.54 \pm 0.23$  nmol/g) ( $p < 0.001$ ), higher mRNA p53 expression ( $1.33 \pm 0.26$ ) compared to K2 ( $0.81 \pm 0.10$ ) ( $p < 0.001$ ), higher sperm concentration ( $60.64 \pm 10.57$  million/ml) compared to K2 ( $34.26 \pm 10.25$  million/ml) ( $p = 0.001$ ), higher sperm motility ( $90.00 \pm 0.00\%$ ) compared to K2 ( $50.00 \pm 14.14\%$ ) ( $p = 0.001$ ), higher sperm viability ( $98.24 \pm 0.27\%$ ) compared to K2 ( $93.26 \pm 1.77\%$ ) ( $p = 0.009$ ), and significantly lower morphological abnormalities ( $2.80 \pm 1.11\%$ ) compared to K2 ( $4.66 \pm 1.08\%$ ) ( $p = 0.036$ ).

**Conclusions:** Administration of wild nettle extract at a dose of 500 mg/kg BW can reduce MDA levels, increase p53 mRNA expression in the epididymis, and improve sperm profile, including increasing concentration, motility, and viability, as well as reducing morphological abnormalities of spermatozoa in obese male rats.

**Keywords:** nettle, obesity, MDA, p53, spermatozoa profile