

# Pengaruh hibiscus sabdariffa linn pada tikus yang diberi latihan fisik aerobik terhadap disfungsi endotel dan stres oksidatif akibat pertambahan usia = The effect of hibiscus sabdariffa linn and aerobic exercise on endothelial dysfunction and oxidative stress caused by increasing age in rats

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## Abstrak

Latar Belakang: Berdasarkan data dari WHO, penderita penyakit kardiovaskular diduga akan terus meningkat. Salah satu proses patologis yang mendasari penyakit kardiovaskular adalah aterosklerosis. Disfungsi endotel yang mengawali aterosklerosis dimulai sejak anak-anak. Stres oksidatif dapat disebabkan oleh pertambahan usia. Salah satu herba yang memiliki efek antioksidan kuat dan dapat mencegah stres oksidatif adalah Hibiscus sabdariffa Linn.

Metode: Penelitian eksperimental dilakukan pada 36 ekor tikus jantan galur Wistar usia 5 minggu selama 4 minggu, 8 minggu, dan 12 minggu. Hewan coba secara acak terbagi atas 12 kelompok, yaitu: kontrol (K4, K8, K12), latihan fisik aerobik (L4, L8, L12), pemberian H. sabdariffa Linn. 400 mg/kgBB/hari (H4, H8, H12) dan kombinasi latihan fisik aerobik dan pemberian H. sabdariffa Linn. 400 mg/kgBB/hari (HL4, HL8, HL12). Pengukuran kadar NO, ET-1, aktivitas spesifik SOD dan MDA menggunakan supernatan dari homogenat aorta abdominal.

Hasil: Pola kadar NO kelompok K dan L menurun sesuai peningkatan usia. Terdapat perbedaan bermakna antara kadar NO kelompok K dan L, K dan H, dan K dan HL. Kadar ET-1 pada semua kelompok tidak bermakna secara statistik. Terdapat peningkatan aktivitas spesifik SOD pada kelompok L, H, dan HL dibandingkan K. Terdapat perbedaan bermakna Kadar MDA antara K dan H, L dan HL. Terdapat korelasi sedang antara NO dan aktivitas spesifik SOD.

Kesimpulan: latihan fisik aerobik, pemberian H. sabdariffa Linn. 400 mg/kgBB/hari dan kombinasi latihan fisik aerobik dan pemberian H. sabdariffa Linn. 400 mg/kgBB/hari menurunkan kadar MDA dan ET-1, sebaliknya meningkatkan aktivitas spesifik SOD dan NO. Penurunan kadar MDA lebih jelas terlihat pada kelompok HL. Peningkatan aktivitas spesifik SOD meningkatkan produksi NO. Tidak terjadi disfungsi endotel dan stres oksidatif pada seluruh kelompok.

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Background: Based on data from WHO, patients with suspected cardiovascular disease will continue to rise. One of the pathological processes underlying cardiovascular disease is atherosclerosis. Endothelial dysfunction which is the first sign of atherosclerosis begins in childhood. Increasing age is one of the cause of oxidative stress. A herb that has strong antioxidant effects and can prevent oxidative stress is Hibiscus sabdariffa Linn.

Methods: Thirty six male Wistar rats aged 5 weeks were randomly divided into 12 groups consisting of

control group (K4, K8, K12), aerobic exercise group (L4, L8, L12), administration of *H. sabdariffa* L. 400 mg/kgBW/day group (H4, H8, H12) and combination of aerobic exercise and *H. sabdariffa* L. 400 mg/kgBW/day group (HL4, HL8, HL12). NO, ET-1, MDA level, and SOD activity was measured from abdominal aorta homogenate supernatant.

Results: NO level pattern in the K and L groups tend to decline with age. NO level in L, H and HL groups were higher than K. The difference of ET-1 level in all groups were not statistically significant. Specific activity of SOD in L, H and HL groups were higher than control. The concentration of MDA of group K is significantly lower compare to groups H, L and HL. There is a moderate correlation between specific activity of SOD and NO.

Conclusions: Aerobic exercie, administration of *H. sabdariffa* L. 400 mg/kgBW/day, and combination of both decreases MDA and ET-1 concentration. While, specific activity of SOD and NO are increased. The decrease at MDA concentration was more prominent in HL group. An increase in spesific activity of SOD, increases the NO level. No endothelial dysfunction nor oxidative stress were observed in all groups.