

Brawijaya Malang. Pada penelitian pendahuluan dengan menggunakan *Rattus norvegicus* hari ke-4 induksi l-tiroksin (1 mg/kg BB per oral) terjadi hipermetabolisme. Pada penelitian digunakan 25 ekor *Rattus norvegicus* galur *Wistar* yang dibagi dalam 5 kelompok dan setiap kelompok 5 ekor tikus. Kelompok I adalah kelompok kontrol pretest dan kelompok II adalah kelompok kontrol posttest. Kelompok III diberikan l-tiroksin (1 mg/kg BB) per oral perhari selama 14 hari bersama pemberian vitamin C (20 mg/kg BB) dan E (400 mg/kg BB) per oral per hari yang dimulai sejak hari ke-1 dan kelompok IV diberikan sama seperti kelompok III, namun pemberian vitamin C dan E sejak hari ke-4. Kelompok V hanya diberikan l-tiroksin (1 mg/kg BB) per oral perhari selama 14 hari. Aktivitas SOD eritrosit diukur menggunakan protokol Wong. Kadar MDA eritrosit diukur menggunakan metode *thiobarbituric acid* (TBA) dari Uchiyama dan Mihara. Data dianalisis menggunakan statistik deskriptif dan *Anova* ( $\alpha = 0,05$ ).

Hasil penelitian menunjukkan rata-rata perubahan kadar MDA eritrosit pada kelompok V (0,0648  $\mu\text{g/ml}$ ) lebih tinggi dibandingkan kelompok III (-0,006  $\mu\text{g/ml}$ ) atau IV (-0,043  $\mu\text{g/ml}$ ). Rata-rata perubahan aktivitas SOD eritrosit pada kelompok V (-1,784 unit/ml) lebih rendah daripada kelompok III (-1,9576 unit/ml) dan lebih tinggi daripada kelompok IV (-1,6312 unit/ml) namun tidak ada perbedaan yang bermakna.

Kesimpulan penelitian ini adalah :

1. Pada *Rattus norvegicus* galur *Wistar* yang diinduksi l-tiroksin selama 14 hari pemberian kombinasi vitamin C dan E sejak hari ke-1 dapat menghambat peningkatan kadar MDA eritrosit.
2. Pada *Rattus norvegicus* galur *Wistar* yang diinduksi l-tiroksin selama 14 hari pemberian kombinasi vitamin C dan E sejak hari ke-4 dapat menghambat peningkatan kadar MDA eritrosit.
3. Pada *Rattus norvegicus* galur *Wistar* yang diinduksi l-tiroksin selama 14 hari pemberian kombinasi vitamin C dan E sejak hari ke-1 tidak terbukti menghambat penurunan aktivitas SOD eritrosit.
4. Pada *Rattus norvegicus* galur *Wistar* yang diinduksi l-tiroksin selama 14 hari pemberian kombinasi vitamin C dan E sejak hari ke-4 tidak terbukti menghambat penurunan aktivitas SOD eritrosit.

## ABSTRACT

### THE EFFECT OF COMBINED VITAMIN C AND E SUPPLEMENTATION ON SUPEROXIDE DISMUTASE (SOD) ACTIVITIES AND MALONDIALDEHYDE (MDA) LEVELS OF THE *Wistar Rattus norvegicus* ERYTHROCYTES IN L-THYROXINE ADMINISTRATION

Vitamin C and E are antioxidants act cellullarly to defend against the damaging effect of free radicals and reactive oxygen species (ROS). It is expected when they are given together they will demonstrare an optimum effectiveness in reducing free radicals and ROS toxicities.

This research aimed to study the effect of combined vitamin C and E supplementation on SOD activities and MDA levels of rat erythrocytes in hypermetabolic state induced by l-thyroxine administration. This research was done in Laboratory of Biochemistry, Faculty of Medicine, Airlangga University, Surabaya and Biomedical Laboratory, Faculty of Medicine, Brawijaya University, Malang. In the experimental design we used 25 rats (the *Wistar Rattus norvegicus*) divided in 5 groups, 5 rats each. The first group was the control pretest group and the second group was the control posttest group. The rats in the third group were given l-thyroxine (1 mg/kg bw) per oral daily for 14 days together with vitamin C (20 mg/kg bw) and E (400 mg/kg bw) supplementation per oral daily starting at the 1<sup>st</sup> day, while the rats in the fourth group were treated in the same way except that the vitamin C and E supplementatio were started at the 4<sup>th</sup> day. The fifth group were given l-thyroxine (1 mg/kg bw) per oral daily for 14 days without vitamin C and E. SOD activitites of erythrocytes were assayed using Wong's protocols, while MDA levels of erythrocytes were assayed using thiobarbituric acid (TBA) metode (Uchiyama and Mihara). Data were analyzed using descriptive statistic and Anova ( $\alpha = 0,05$ ).

Results of the research showed the mean increased in MDA levels of the fifth group (0,0648  $\mu\text{g/ml}$ ) was higher than the thirth (-0,006  $\mu\text{g/ml}$ ) or fourth group (-0,043  $\mu\text{g/ml}$ ). The mean increased in SOD activities of the fifth group (-1,784 unit/ml) was less than the thirth group (-1,9576 unit/ml) and higher than than fourth group (-1,6312 unit/ml), but the differences were not significant.

The conclusion of the study is that combined vitamin C and E supplementation has benefit in preventing increasing MDA levels in l-thyroxine induced rats, but it is not proved to increase SOD activities in red blood cells.

**Key words : *free radicals, ROS, MDA, SOD, vitamin C, vitamin E, hypermetabolic***