THE EFFECTS OF EUCHEUMA COTTONII ON THE OPG/RANKL SYSTEM OF MALE RAT FED HIGH-FAT DIET EXPOSED TO COAL DUST

B. Setiawan¹, N. Kania², R. Leonas³, Z. Noor⁴
gamma correlation and Spearman correlation. The study was based on GCP principles.

**Results:** The serum level of IL-1, IL-4 was similar in the examined groups. Increased levels of IL-6 (4.67±7.17 vs. 5.55±5.27 p=0.0005), IL-8 (29.0±33.3 vs. 31.74±40.9 p=0.0000), TNF-α (3.11±3.35 vs. 3.32±3.15 p=0.008), IL-10 (7.25±12.52 vs. 9.9±17.42 p=0.01), OPG (37.0±23.5 vs. 50.7±38.6 p=0.016) were observed in women with comorbid disorders. Low levels of ILsR II (4050.3±1186.9 vs. 3625.2±1483.7 p=0.00001) and sTNFr (0.129±0.101 vs. 0.103±0.114 p=0.00006) was found in group 2. Increased levels of central diastolic pressure C_DP (78.7±9.5 75.4±10.4 p=0.01), pulse pressure C_PP (48.5±20.1 45.5±15.5 p=0.0000), mean pressure C_MP (96.9±15.4 93.7±12.7 p=0.0008) were determined in patients with combination of osteoporosis and IHD. The level of central systolic blood pressure C_SP was similar in the examined groups. Pulse wave velocity (PWV) for carotid-femoral segment in the first group was higher than in the control group (9.7±2.3 9.0 ±±2.1 p=0.0000). Augmentation index (Alx) (24.9±9.1 25.8±8.8 p=0.0000) increase was found out in women with a combination of osteoporosis and IHD, significant differences of augmentation pressure (AP) were not found out between the examined groups (15.9±9.5 14.9±8.0 p=0.1). A direct correlation between the presence of fractures, coronary atherosclerosis and the level of IL-10 and TNF-α was determined, as well as an inverse relationship between the presence of fractures, IHD and IL-8, the presence of IHD and levels of OPG. Serum IL-6 was correlated with C_SP (r=−0.24 p=0.02), C_MP (r=−0.3 p=0.004), AP (r=0.21 p=0.04), Alx (r=0.26 p=0.01). The concentration of IL-6 was correlated with C_PP (r=0.37 p=0.02). sTNF concentration was correlated with C_PP (r=0.36 p=0.02) and PWV (r=0.36 p=0.003).

**Conclusions:** An increased level of IL-6, IL-8, IL-10, TNF-α, OPG and decreased the concentration of ILsR II and sTNFr was observed in women with comorbid pathology. Increased levels of PWV, C_DP, C_PP were determined in patients with combination of osteoporosis and IHD. Correlations between levels of cytokines and some parameters of arterial stiffness and the presence of fractures and coronary atherosclerosis are evident.

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**Aims:** This study aimed to elucidate whether Eucheuma cottonii treatment will modify the OPG/RANKL system in male rats fed a high-fat diet exposed to particulate matter 10 (PM10) coal dust.

**Methods:** 36 male Wistar rats were randomly divided into six groups. Rats were fed a normal diet (nonexposed group), a Faculty Lambung Mangkurat University, Banjarmasin, Indonesia
high-cholesterol diet for 12 weeks (HF control group), a high-cholesterol diet followed by exposure to 12.5 mg/m³ of PM₁₀ coal dust an hour daily in the last 4 weeks (HFD) weeks, the HFD group received the ethanolic extract of *Eucalyptus cossutii* at doses 150 mg/kg BW (HFDA); 300 mg/kg BW (HFB); and 600 mg/kg BW (HFDC). The levels of OPG, RANKL, and OPG/RANKL ratio were analyzed by ELISA technique. This study was approved by the Local Ethics Committee, Medical Faculty, Lambung Mangkurat University, Banjarmasin.

**Results:** The level of OPG was not significantly different between groups (P>0.05). The receptor activator of NF-κB ligand levels was not significantly different between groups (P>0.05). In addition, the levels of OPG/RANKL ratio was not significantly different between groups (P>0.05).

**Conclusions:** There is no effect of ethanolic extract of *Eucalyptus cossutii* on the OPG/RANKL system of atherosclerosis rats exposed to coal dust.


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**P106**

**THE EFFECTS OF CHRONIC INHALATION COMBINED CIGARETTE SMOKE AND PARTICULATE MATTER 10 (PM10) OF COAL DUST ON THE OPG/RANKL SYSTEM IN MALE RATS**

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**Aims:** This study aimed to elucidate whether chronic inhalation combined cigarette smoke and particulate matter 10 (PM10) of coal dust will affect the OPG/RANKL system in male rats.

**Methods:** Twenty-four male Wistar rats were randomly divided into four groups; one noninhaled group (control group) and three combined cigarette smoke and coal dust exposed groups (concentration 6.25, 12.5, and 25 mg/m³/h/day for 6 months). The levels of OPG, RANKL, and OPG/RANKL ratio were analyzed by ELISA technique. Analysis of variance test was used to analyze the difference levels of OPG, RANKL, and OPG/RANKL ratio. This study was approved by Local Ethics Committee, Medical Faculty, Lambung Mangkurat University, Banjarmasin.

**Results:** The level of OPG was not significantly different between groups (P>0.05). The receptor activator of NF-κB ligand levels was not significantly different between groups (P>0.05). In addition, the levels of OPG/RANKL ratio was not significantly different between groups (P>0.05).
The effects of Eucheuma cottonii on the OPG/RANKL system of male rat fed high-fat diet exposed to coal dust

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Introduction

- Obesity induced by a high-fat diet decreases cancellous bone mass but has no effect on cortical bone mass in the tibia in mice (Can et al., 2009).
- The rats exposed to subchronic levels of coal dust had a decreased number of osteoblasts and increased number of osteoclasts (Akbare et al., 2012).
- Teluk Tamiang is a central of red seaweed (Eucheuma cottonii) cultivation in Kotabaru, South Kalimantan, Indonesia.
- Previous studies showed that Eucheuma cottonii act as anti-hyperlipidemic (Matarum et al., 2010) and antioxidant (Matarum et al., 2008).

Objective

- This study aimed to elucidate whether Eucheuma cottonii treatment will modify the oestrogen response to the receptor activator of NF-κappa B ligand (OPG/RANKL) system in male rats fed a high-fat diet exposed to particulate matter 10 (PM10) coal dust.

Methods

36 male Wistar rats, 3 months old, active and healthy condition.

<table>
<thead>
<tr>
<th>Control</th>
<th>High fat diet (HF) 12 weeks</th>
<th>HF+ coal dust</th>
<th>HF+ coal dust + E. cottonii</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 mg/kg</td>
<td>12 mg/kg</td>
<td>12 mg/kg</td>
<td>12 mg/kg</td>
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</table>

- Serum osteoprotegerin (OPG) were analyzed by ELISA technique.
- Serum receptor activator of NF-κappa B ligand (RANKL) were analyzed by ELISA technique.
- This study was approved by Local Ethics Committee, Medical Faculty, Lampung Mangkurai University, Banjarmasin, Indonesia

Coal dust exposure chamber

We put weighed coal dust in bottom hole (red arrow) of black pipe then the coal dust will circulated (white arrow) and entering the chamber again via upper hole (yellow arrow). This system will inhaled by rats in plastic chamber. To avoid discomnt, this chamber also supply by external oxygen and place in air conditioned room (Noor & Setiawan, 2015).

Micro-nanoparticle of coal dust

Eucheuma cottonii

AMINO ACID ANALYSIS
- L-aspartic acid (0.257%)
- L-serine (0.178%)
- L-glutamic acid (0.273%)
- L-histidine (0.032%)
- L-arginine (0.182%)
- L-threonine (0.159%)
- L-alanine (0.213%)
- L-proline (0.087%)
- L-cystine (0.000%)
- L-lysine (0.035%)
- L-leucine (0.159%)
- L-methionine (0.043%)
- L-lysine (0.017%)
- L-isoleucine (0.133%)
- L-leucine (0.211%)
- L-phenylalanine (0.144%)

MINERAL ANALYSIS
- Sulphur (27.3±5.1%)
- Phosphorus (0.27±0.05%)
- Potassium (0.27±0.05%)
- Calcium (11.4±0.5%)
- Iron (0.54±0.09%)
- Nickel (0.30±0.01%)
- Copper (0.17±0.007%)
- Bromine (0.52±0.02%)
- Molybdenum (13±8%)

Results

- The levels of osteoprotegerin was not significantly different between groups (P > 0.05).
- The receptor activator of NF-κappa B ligand levels was not significantly different between groups (P > 0.05).
- In addition, the levels of OPG/RANKL ratio was not significantly different between groups (P > 0.05).

Discussion

- There is no effects of ethanolic extract of Eucheuma cottonii on the OPG/RANKL system of atherosclerosis rats exposed to coal dust.

Conclusion

References


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