Effect of Red Seaweed on Bone Properties of Male Rats Exposed to Chronic Coal Dust

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have demonstrated a substantial improvement in femoral and lumbar trabecular microstructure and BMD, especially at a dose of 100 mg/kg.

Acknowledgements: This work was partially supported by Agencia Galega de Innovación, Xunta de Galicia (10CSA004E).

P498

EFFECT OF ETHANOLIC EXTRACT OF CINNAMON ON BONE TURNOVER AND MINERAL ELEMENTS IN OSTEOPOROSIS RATS

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Objective: To investigate the effect of ethanolic extract of cinnamon in ovariectomized rats.

Material and Methods: A total of 36 Wistar female rats, we randomly divided into six groups including one control group, one ovariectomized group, and four ovariectomized groups who receiving ethanolic extract of cinnamon at dose 12.5; 25; 50; and 100 mg/kg body weight. The ovariectomized procedure was done in Pharmacology Laboratory, Medical Faculty, Brawijaya University of Malang. Expression of C-telopeptide collar type 1 (CTX) and osteocalcin (OC) was analyzed by ELISA in Biomedical Laboratory, Faculty of Medicine, University of Brawijaya, Malang. Bone mineral elements was analyzed using X-ray fluorescence in Central and Physics Laboratory, Malang State of University, Malang, East Java, Indonesia. ANOVA test was used to analyze the different level of bone turnover markers and bone mineral elements. This study was approved by Local Ethics Committee, Medical Faculty, University of Lambung Mangkurat, Banjarmasin.

Results: The level of CTX were significantly higher in ovariectomized rats compared to control group (p<0.05). The level of OC were significantly lower in ovariectomized rats compared to control group (p<0.05). Ethanolic extract of cinnamon increase CTX level significantly at dose 50 and 100 mg/kg body weight. Ethanolic extract of cinnamon in ovariectomized increase OC significantly in ovariectomized rats (p<0.05). There is no significant different of bone mineral elements in ovariectomized rats compared to control group (p>0.05).

Conclusion: We found a disorganization of bone turnover marker and bone mineral elements in ovariectomized rats. Ethanolic extract of cinnamon is not ideal antiosteoporosis herbal.

P499

EFFECT OF RED SEAWEED ON BONE PROPERTIES OF MALE RATS EXPOSED TO CHRONIC COAL DUST

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Objective: To investigate the effect of ethanolic extract of red seaweed (Euchema cottonii) in bone properties (turnover, microstructure, mineral elements) of rats exposed to chronic coal dust.

Material and Methods: A total of 40 Wistar male rats, were randomly divided into four groups including one control group, one group for chronic exposure of coal dust at concentration 25 mg/m3 on hour/day for 6 months, and two group chronic exposure of coal dust who receiving ethanolic extract of red seaweed (EERS) at dose 150 and 300 mg/kg body weight. The exposure to coal dust exposure was conducted using equipment that was designed and available from Pharmacology Laboratory, Medical Faculty, Brawijaya University of Malang. Expression of C-telopeptide collar type 1 (CTX) and osteocalcin (OC) was analyzed by ELISA technique. Bone microstructure was assayed using scanning electron microscope (SEM). Bone mineral elements were assayed by X-ray fluorescence. ANOVA test was used to analyze the different level of all parameter. This study was approved by Local Ethics Committee, Faculty of Medicine, University of Lambung Mangkurat, Banjarmasin.

Results: Chronic coal dust exposure increase bone turn over marker and phosphorus level, but decrease calcium level significantly compared to control group (p<0.05). SEM showed higher porosity of trabecular in chronic coal dust exposure compared to control group. Administration EERS decrease bone turn over marker to reach level in control group at all dose. Administration EERS increase calcium and decrease phosphorus level to reach level in control group at dose 300 mg/kg body weight. Administration of EERS decrease porosity of trabecular bone to reach level in control group.

Conclusion: Ethanolic extract of red seaweed (Euchema cottonii) at dose 300 mg/kg body weight improved bone properties in osteoporosis caused by chronic coal dust exposure.

Acknowledgements: Ministry of Research and Technology of Indonesia (Riset InSINAS 2012)
EFFECT OF RED SEAWEED ON BONE PROPERTIES OF MALE RATS EXPOSED TO CHRONIC COAL DUST

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Introduction

The mechanical strength of trabecular bones in both rats and humans is influenced by mechanical, hormonal, biological and/or toxic processes. (Bern et al., 2009; Gao et al., 2011)

- The rats exposed to subchronic levels of coal dust had a decreased number of osteoclasts and increased number of osteoblasts (Spencer et al., 2012).
- Sub-chronic inhalation of cigarette smoking and coal dust PM10 significantly increased bone levels in the femur of rats (Nag & Setiawan, 2013).
- Toluene fuming is a cause of red sea weed (Eucheuma cottonii) cultivation in Palabora, South Kalimantan, Indonesia.

Previous studies showed that Eucheuma cottonii acts as wound healing (Ford et al., 2011), antioxidant (Mohranur et al., 2010) and antifungal (Murali et al., 2008), and anticancer (Park et al., 2012).

To date, there is no study that explores the effect of ethanolic extract of red seaweed (BRS) in osteoporotic rats induced by chronic coal dust exposure.

Objective

- To investigate the effect of ethanolic extract of red seaweed (Eucheuma cottonii) in bone properties turn over, microstructure, mineral elements of rats exposed to chronic coal dust.

Methods

- 30 male rats, 3 months old, active and healthy condition.
- Eucheuma cottonii leaves were dried, powdered and then extracted with methanol.
- The ethanol extract was then chromatographed and purified using a silica gel column to obtain the active fraction.
- The active fraction was then subjected to HPLC analysis to identify the active compounds.

Coal dust exposure chamber

We put weighted coal dust in bottom hole (red arrow) of lock pipe then the coal dust will circulated (white arrow) and entering the chamber (green arrow) up upper tube (yellow arrow). This system will introduced rats in plastic chamber to avoid dust from chamber space by external oxygen and carbon dioxide concentration (Nag & Setiawan, 2013).

Scanning electron microscope

Particulate mat shown in magnification (2000x) is larger than aggregate particle.

Bone turn over

Bone turn over is significantly increased bone turnover marker compared to control group. Administration of BRS decrease marker bone turnover to reach level in control group.

Bone minerals

Calcium (%) and Phosphorus (%) are significantly increased in bone mineral levels.

Discussion

Ethanolic extract of red seaweed (Eucheuma cottonii) of dose 300 mg/kg body weight improved bone properties in osteoporosis caused by chronic coal dust exposure.

Conclusion

Acknowledgment

References

Presented at European Congress on Osteoporosis and Osteoarthritis 17-20 April 2013 Rome, Italy 2013.
CERTIFICATE OF ATTENDANCE

We, Professors John A. Kanis & Jean-Yves Reginster, Co-Presidents, certify that:

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European Congress on Osteoporosis and Osteoarthritis
APRIL 17-20, 2013 | ROME CAVALIERI | ROME, ITALY

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