

# Potential Combinations of Pasak Bumi (*Eurycoma longifolia* Jack), Docosahexaenoic Acid, and Seluang Fish (*Rasbora* spp.) to Improving Oxidative Stress of Rats (*Rattus norvegicus*) Brain Undernutrition

Didik Dwi Sanyoto<sup>1</sup> , Meitria Syahadatina Noor<sup>2\*</sup> , Triawanti<sup>3</sup>

<sup>1</sup> Department of Biomedical, Division of Anatomy, Faculty of Medicine, Universitas Lambung Mangkurat, Banjarmasin, Indonesia;

<sup>2</sup> Department of Public Health, Faculty of Medicine, Universitas Lambung Mangkurat, Banjarmasin, Indonesia;

<sup>3</sup> Department of Biochemistry and Biomolecular, Faculty of Medicine, Universitas Lambung Mangkurat, Banjarmasin, Indonesia

## Abstract

**BACKGROUND:** The brain is very susceptible to damage from oxidative stress due to undernutrition. Provision of nutrients and compounds that act as antioxidants is needed to improve oxidative stress in the brain.

**AIM:** This study was conducted with the aim of proving the potential of the combination of pasak bumi (*Eurycoma longifolia* Jack), DHA, and seluang fish (*Rasbora* Spp.) to improve oxidative stress in the brains of undernourished rats (*Rattus norvegicus*).

**METHODS:** Once the rats were undernourished, they were divided: positive control (KP) = undernourished rats + placebo + standard feed; (P1) = undernourished rats + 70% ethanol extract of pasak bumi root (EPB) 15 mg/kg BW + standard feed; (P2) = undernourished rats + DHA 1 mg/kgBW + standard feed; (P3) = undernourished rats + EPB 15 mg/kg BW + DHA 1 mg/kg BW + standard feed; (P4) = undernourished rats + seluang fish; (P5) = undernourished rats + EPB 15 mg/kg BW + seluang fish for 5 weeks; plus 1 negative control group (KN) that is healthy rats given placebo and standard feed. The parameters included superoxide dismutase (SOD) activity, catalase, peroxide (H<sub>2</sub>O<sub>2</sub>) and malondialdehyde (MDA) levels. Data analysis used the Kruskal-Wallis test followed by Mann Whitney with a significance level of 95%.

**RESULTS:** There were significant differences in the activity of SOD ( $p = 0.001$ ), catalase ( $p = 0.000$ ), peroxide levels ( $p = 0.000$ ), and MDA ( $p = 0.000$ ) between treatments. The group that was given a combination of EPB 15 mg/kg BW and DHA 1 mg/kg BW showed better SOD and catalase activity, and lower levels of peroxide and MDA than the other groups.

**CONCLUSION:** The combination of 70% ethanol extract of pasak bumi 15 mg/kg BW and DHA 1 mg/kg BW has the best potential to improve brain oxidative stress in undernourished rats compared to single administration of 15 mg/kg BW EPB, DHA, or seluang fish alone