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RESEARCH ARTICLE

Etlingera elatior (Jack) R.M, Sm Containing Diet Normalizes Some Metabolic Syndrome Markers due to High-fat High-fructose Diet in Wistar Rats

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Abstract: ***Background*:** *Etlingera elatior* (*Ee*) contains phytochemical compounds that are rich in antioxidants, which may reduce several biochemical markers of metabolic syndrome (MetS).

***Objective*:** We aimed to study the effect of fresh *Etlingera elatior* (FEe) and steamed *Etlingera elatior* (SEe) as a part of rat diet on body weight, serum lipid, and malondialdehyde (MDA) level in Wistar rats with MetS induced by a high-fat, high-fructose diet.

***Methods*:** Our research was a true experimental randomized control group design with pre- and post-test. A total of 24 male Wistar rats were divided randomly into the following four groups: 1) Control, fed standard rat diet during the whole duration of the study, 2) HFFr-Sd, fed high-fat high--fructose (HFFr) diet for 29 days, followed by 29 days of the standard diet, 3) HFFr-FEe, fed HFFr diet for 29 days, followed by 29 days of a standard diet containing 33.3% FEe, and 4) HFFr-SEe, fed HFFr diet for 29 days, followed by 29 days of a standard diet containing 33.3% SEe. The HFFr diet was given at 15 g/day along with fructose drink (20% pure fructose) at 100 ml/day. The diets in each group after the MetS induction period are referred to as intervention diets. Data at the end of HFFr (pre) and intervention diets (post) were analyzed by paired t-test. The data among groups were analyzed by one-way analysis of variance followed by post hoc test.

***Results*:** HFFr diet for 29 days induced MetS in Wistar rats fulfilling the criteria of obesity (Lee Index), hypertriglyceridemia, and decreased high-density lipoprotein cholesterol (HDL-C). Also, there was a significant increase in serum total cholesterol, low-density lipoprotein cholesterol (LDL-C), and MDA level ($p < 0.05$). Feeding a diet containing FEe or SEe can significantly reduce body weight, serum triglyceride, total cholesterol, LDL-C, and MDA, and increase HDL-C levels ($p < 0.05$). The effect of FEe was more pronounced in ameliorating body weight and lipid profile than SEe.

***Conclusion*:** Fresh *Ee* and Steamed *Ee* can ameliorate obesity, dyslipidemia, and oxidative stress in MetS Wistar rats induced by a high-fat, high-fructose diet. It suggests that dietary *Ee* accounting for one-third of daily standard diet can assist in normalizing some MetS markers in rats.

Keywords: Bunga kecombrang, my plate, piringku, dyslipidemia, obesity, phytonutrients, vegetables.

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1. INTRODUCTION

Metabolic syndrome (MetS) is a group of interconnected metabolic disorders characterized by conditions of obesity, dyslipidemia, disorders of blood glucose, insulin resistance, and hypertension [1]. Obesity is caused by a high intake of trans and saturated fats and can lead to postprandial metabolic disorders, including dyslipidemia, inflammation, and oxidative stress [2]. Oxidative stress condition is characterized by a high level of malondialdehyde (MDA) that is related to the incidence of MetS and is positively associated with elevated low-density lipoprotein cholesterol (LDL-C) and low levels of high-density lipoprotein cholesterol (HDL-C) [3, 4].

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Epidemiological evidence supports the inverse association between fruit and vegetable consumption and the prevalence of MetS. Fruits and vegetables contain phytochemical compounds that are rich in antioxidants, such as anthocyanins, flavonoids, and polyphenols, and are effective in reducing MetS components and delaying or preventing the pathologies related to MetS [5, 6]. Polyphenolic compounds and anthocyanin in fruits and vegetables can decrease MetS biomarkers and ameliorate metabolic risk factors, such as obesity, dyslipidemia, oxidative stress, hyperinsulinemia, and hyperglycemia [5, 7].

Torch ginger inflorescence (*Etlingera elatior* (Jack) R.M, Sm) is a native plant species of Indonesia and is known as "*bunga kecombrang*"; it contains phenolic compounds, flavonoids, and high anthocyanin levels compared with other vegetables [8, 9]. *Etlingera elatior* (*Ee*) has long been recognized and utilized by the Indonesian people and is easily found in various places, such as home yards, fields, or forests in Java and Sumatra islands. *Ee* is consumed as vegetables, spices, medicinal, and ornamental plants [10]. In traditional cuisine, *Ee* is used as a food ingredient due to its attractive bright red color, distinctive taste, and smell that enhances the taste of the food [11].

Etlingera elatior (*Ee*) is also known to have a high nutritional value as it contains unsaturated fatty acids, protein, non-essential amino acids, and phytochemical compounds (anthocyanins, flavonoids, phenols, saponins, terpenoids, tannins, steroids, and glycosides) with antioxidant properties that can reduce inflammation and the levels of serum total cholesterol, LDL cholesterol, and triglycerides [10, 11]. *Ee* has strong antioxidant effects against oxidative stress and can ward off free radicals by increasing the number of antioxidant enzymes in serum and repairing lipid hydroperoxide [12]. Thus, the nutrient components and phytochemical compounds in *Ee* may reduce the biomarkers of MetS and/or prevent incidences. The antioxidant content in vegetables can be strongly influenced by various processing temperatures [13]. Steaming is a common method for cooking vegetables and it can increase their antioxidant activity. Steaming can affect the plant cellular matrix by breaking down and freeing the antioxidant compounds [14]. This study aimed to reduce MetS biomarkers by studying the effect of *Ee, i.e.*, fresh *Ee* (FEe) or steamed *Ee* (SEe), which was incorporated in the standard rat diet.

2. MATERIALS AND METHODS

2.1. Ethical Approval of the Study Protocol

The protocol for animal studies was approved by the Health Research Ethics Commission of the Faculty of Medicine, Diponegoro University Semarang (No. 139/EC/H/KEPK/FK-UNDIP/XI/2019).

2.2. Plant Materials and a Standard Diet Containing *Ee*

Ee was obtained from a traditional market (Ciamis Manis) located in Ciamis, West Java, Indonesia. The *Ee* part used in this study is the red flower (Fig. **1**). This study used two forms of *Ee, i.e.*, fresh *Ee* (FEe) and steamed *Ee* (SEe), without extracting it. Steamed *Ee* was steamed for 5 min and cooled directly by placing in ice water [14]. FEe and SEe were homogenized separately with a blender and then each form of *Ee* was mixed with a standard rodent diet (69.03% carbohydrate, 13.65% protein, 2.01% fat, and 317.59 kcal energy/100 g) and mixed thoroughly. The diet containing FEe was prepared by mixing 33.3% FEe and 66.7% a standard rodent diet and formed into pellets. The diet containing SEe followed the same procedure as FEe. This composition idea was based on "my plate" guide ("Isi Piringku") issued by the Ministry of Health Republic (Indonesia) to supply vegetables (all kinds) in one meal to provide a healthy diet [15]. In this study, we purposely used one single type of vegetable, *i.e.*, *Ee*, in the standard rat diet to determine its effect in reducing some of MetS markers in experimental rats due to feeding of high-fat high-fructose diet.

2.3. High-fat, High-fructose (HFFr) and Standard Rat Diet

The HFFr diet was composed by mixing a standard rodent diet (69.03% carbohydrate, 13.65% protein, 2.01% fat, and 317.59 kcal energy/100 g with code S00202001078) with beef tallow, egg yolk powder, high-fructose corn syrup, and water to obtain a homogeneous mixture. The mixture was formed into pellets, which were air-dried at 25°C. The HFFr diet contained 31.46% fat, 41.95% carbohydrate, 11.93% protein, and 473.96 kcal energy/100 g diet. For MetS induction, the HFFr diet was accompanied by 20% pure fructose corn syrup in drinking water (100 ml/day) [16-18].

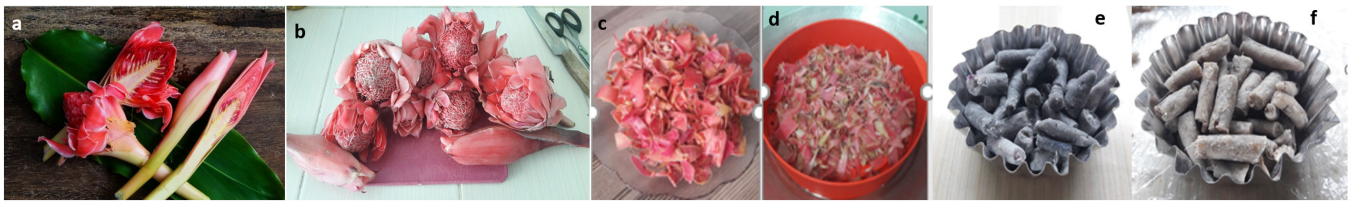

Fig. (1). Whole *E. elatior* (*Ee*) flowers (**a**), fresh edible portion of the flower (**b**), fresh and chopped (**c**), steamed and chopped (**d**), fresh *Ee* incorporated in the standard diet (**e**), steamed *Ee* incorporated in the standard diet (**f**), in pellet form. (*A higher resolution / colour version of this figure is available in the electronic copy of the article*).

2.4. Proximate Analysis

Proximate analysis was performed on FEe, standard, and HFFr diets. Protein content was determined by Kjeldahl method (18-8-31/MU/SMM-SIG), total fat by Weibull method (18-8-5/MU/SMM-SIG), carbohydrate content by difference (18-8-9/MU/SMM SIG), crude fiber by gravimetric method (18-11-111/MU/SMM SIG), moisture content by oven method (SNI 01-2891-1992, point 5.1), ash content by Standard National Indonesia (SNI 01-2891-1992, 6.1), and total calories by calculation.

2.5. *In Vivo* Experimental Design

Twenty-four male Wistar rats were placed in individual cages at room temperature (25°C) and 12 h lighting cycle (06:00 to 18:00). All rats were provided with food (15 g/day) and water (100 ml/day) during the study. The rats were acclimatized for 7 days and fed with a standard diet. After the acclimatization period, the animals were divided randomly into four treatment groups with 6 rats in each group, *i.e.*, 1) Control, fed standard rat diet during the whole duration of the study, 2) HFFr-Sd, fed high-fat high-fructose (HFFr) diet for 29 days, followed by 29 days of standard diet, 3) HFFr-FEe, fed HFFr diet for 29 days, followed by 29 days of a standard diet containing 33.3% FEe, and 4) HFFr-SEe, fed HFFr diet for 29 days, followed by 29 days of a standard diet containing 33.3% SEe. The HFFr diet was given at 15 g/day along with fructose drink (20% pure fructose) at 100 ml/day. The diets in each group after the MetS induction period are referred to as intervention diets.

MetS induction was verified at the end of 29 days of HFFr diet by taking fasting blood samples *via* retro orbital-plexuses to obtain pre-test data. The pre-test data was used to diagnose MetS in rats by fulfilling the presence of at least three out of the five MetS components, *i.e.*, obesity (Lee index value > 300 [19]), serum lipid profile (total cholesterol > 129.52 mg/dL, HDL-C < 35 mg/dL, triglycerides > 108.11 mg/dL, and LDL-C > 81.55 mg/dL) [20], and fasting blood glucose (FBG) levels > 111.7 mg/dL [21]. At the end of the intervention diet for group 2, 3, and 4, fasting blood samples were taken from all groups, and serum was frozen until analysis (post-test data). Food and drink intakes were recorded daily during the study by measuring the residual feed and drink. Bodyweight was measured four times during the study (day 0, 7^{th}, 36^{th}, and 65^{th}). Fig. (**2**) shows the procedures of this study.

2.6. Determination of Antioxidant Activity and Phytochemical Compounds

α, α-diphenyl-β-picrylhydrazyl (DPPH) method was used to determine the antioxidant activity using a spectrophotometer (UV-1800 Shimadzu) at 517 nm (method number IKU/5.4/TF-UV-01). Total phenolic content (TPC) was determined using the Folin-Ciocalteau assay using a spectrophotometer at 750 nm (method number IKU/5.4/UV-08). Gallic acid was used to generate a standard curve. Total polyphenol was expressed as grams of Gallic acid equivalent per 100 g dry weight. Total flavonoid was determined using spectrophotometer method at 435 nm (method number IKU/5.4/TF-UV-03). Anthocyanin content was determined by the pH differential method and using a spectrophotometer at 535 nm. All analyses were done by a certified laboratory.

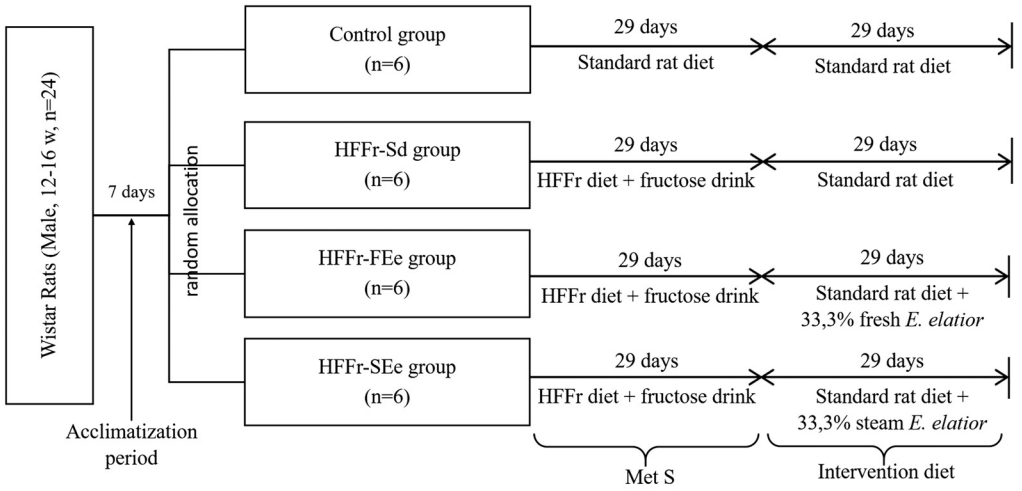

Fig. (2). Diagram of *in vivo* experimental design. A standard rat diet that contains 317.59 kcal/100 g, 13.65% protein, 2.01% fat, and 68.98% carbohydrate (S00202001078) was given to 24 male Wistar rats for 7 days (acclimatization period). A high-fat high-fructose (HFFr) diet (473.96 kcal/100 g, 11.93% protein, 31.46% fat, and 41.95% carbohydrates) and fructose drinking water (20% pure fructose, 56.2 kcal/100ml) were given to HFFr-Sd, HFFr-FEe, and HFFr-SEe groups for 29 days to induce MetS. After 29 days of MetS induction, HFFr-Sd, HFFr-FEe, and HFFr-SEe groups were fed with the standard diet, a standard diet containing 33.3% fresh *E. elatior* (FEe), a standard diet containing 33.3% steamed *E. elatior* (SEe), respectively, for 29 days. Control group was fed with the standard diet during the whole duration of the study. Blood samples were taken at the end of MetS induction and intervention diets from all groups. HFFr = high-fat high-fructose; SEe = steamed *E. elatior*; FEe= fresh *E. elatior*.

2.7. Determination of Metabolic Syndrome Components

2.7.1. Obesity

The body weight of rats was measured four times, namely, on days 0, 7th, 35th, and 65th using a digital scale. Measurement of rat body length (from the nose tip to the rectum) was performed to calculate the status of obesity based on the Lee Index score. The rat was obese if the Lee index value was >300 [13]. Lee Index = [Body weight $(g)^{1/3}$/Nose-to-anal length (cm)] $\times 10^3$

2.7.2. Fasting Blood Glucose (FBG), Lipid Profile, and MDA Determination

The glycerol phosphate peroxidase amino antipyrine (GOD-PAP) method (DiaSys) was used for FBG measurement. The serum lipid profile consists of triglycerides, total cholesterol, HDL-C, and LDL-C. Triglycerides were measured using the GOD-PAP method (DiaSys). Total cholesterol and HDL-C were measured using the cholesterol oxidase phenol 4-amino antipyrine peroxidase (CHOD-PAP) method (DiaSys). LDL-C was measured using the CHOD-PAP method and LDL precipitant. MDA levels were measured using the 2-thiobarbituric acid (TBA) reactive substance (TBARS) method. All parameters were determined according to methods in the instruction sheets by a certified laboratory.

2.8. Statistical Analysis

The normality of data was tested using the Shapiro-Wilk test. A paired t-test was used to analyze the difference between pre- and post-test when the data were normally distributed. When data were not normally distributed, the non-parametric Wilcoxon test was used. One-way analysis of variance was used to analyze the effect of intervention among groups, and post hoc Bonferroni was used when the data variants were the same ($p > 0.05$). Tamhane's post hoc test was used when the data variant was different ($p < 0.05$). Kruskal-Wallis followed by Mann-Whitney test was used when the data was not normally distributed. Statistical analysis was carried out using SPSS Statistics 16.0 from Windows.

3. RESULTS

3.1. Proximate Analysis of *Ee*

Table **1** presents the proximate composition of *Ee*. Moisture is the largest component of fresh *Ee,* comprising 81.29±0.785% per 100 g fresh weight. Ash is the smallest component of fresh *Ee*, comprising 1.94±0.014% per 100 g fresh weight.

3.2. Antioxidant and Phytochemical Content

Table **2** presents the antioxidant activity and phytochemical compounds of fresh (FEe) and steamed (SEe) *Ee*. Steamed *Ee* contains higher moisture and total flavonoids than FEe. However, SEe contains less antioxidant activity, total phenolic, and anthocyanins than FEe. The water content of FEe (81.29%) and SEe (90.13%) was high and significantly different ($p < 0.05$).

3.3. Food, Drink, and Energy Intake

During MetS induction with the HFFr diet, the average food intake in HFFr-Sd, HFFr-FEe, and HFFr-SEe groups was significantly lower ($p < 0.05$) than the control group Table **3**. On the contrary, the average drinking and calorie intake in these groups were significantly higher ($p < 0.05$) when compared to the control group. After the intervention period, no significant difference was observed in food and drink intake among all groups ($p > 0.05$). However, there was a significant reduction in calorie intake in HFFr-Sd, HFFr-FEe, and HFFr-SEe groups after intervention ($p < 0.05$).

3.4. MetS Induction in Rats by Feeding HFFr Diet

After 29 days of MetS induction, the HFFr-Sd, HFFr-FEe, and HFFr-SEe groups displayed three MetS criteria, namely obesity (Lee Index), hypertriglyceridemia, and decreased HDL-C levels ($p < 0.05$). Although the serum total cholesterol and LDL-C were not included in the MetS criteria, their levels were significantly higher ($p < 0.05$) than the control group Table **4**.

A standard rat diet that contains 317.59 kcal/100 g, 13.65% protein, 2.01% fat, and 68.98% carbohydrate was given to 24 male Wistar rats for 7 days (acclimatization period), after which rats were randomly divided into four

Table 1. Proximate analysis of fresh *E. elatior* (100 g).

Proximate Components	Fresh*
Energy (Kcal/100 g)	78.60±3.055
Protein (%)	2.40±0.028
Total fat (%)	2.30±0.028
Carbohydrates (%)	12.08±0.856
Crude fiber (%)	2.12±0.028
Ash (%)	1.94±0.014
Moisture (%)	81.29±0.785

*average value of two measurements

Table 2. Antioxidant activity and phytochemical compounds of fresh and steamed *E. elatior*.

Analysis	*Etlingera elatior*		
	Fresh	Steamed	P-values
Antioxidant activity, DPPH (%)*	66.97±0.424	58.03±0.636	0.004
Total Phenolic (mg equivalent of gallic acid /100 g)*	197.14±0.651	123.93±0.163	0.000
Total Flavonoid Quercetin Equivalent (% w/w)	0.57	0.85	4x10-5
Anthocyanins (mg/100g)*	25.8±0.113	23.42±0.134	0.003
Moisture (%)*	81.29±0.785[a]	90.13±0.064[b]	0.004

*average value of two measurements.
>P = independent t-test, significant at P<0.05.

Table 3. Food, drink, and energy intake pre- and post-induction of MetS by feeding the rats with a high-fat high-fructose (HFFr) diet.

Variables	Period	Control	HFFr-Sd	HFFr-FEe	HFFr-SEe	p-values
Food Intake (g/d)	**Acclimatization**	12.67±1.60				
	HFFr diet to induce MetS	10.67±2.16[a]	5.17±1.16[b]	6.83±1.16[b]	7.42±2.00[b]	$1x10^{-4}$*
	Intervention	11.67±1.86	12.50±1.04	9.83±1.94	10.83±1.47	0.056
Drink Intake (ml/d)	**Acclimatization**	27,38±15,15				
	HFFr diet to induce MetS	31.33±15.18[a]	64.17±3.60[b]	65.50±4.76[b]	57.00±5.40[b]	$2x10^{-6}$*
	Intervention	25.83±6.85	24.50±7.39	21.00±6.48	22.00±2.75	0.517
Calories Intake (kcal/day)	**Acclimatization**	40,68±5,98				
	HFFr diet to induce MetS	33.83±6.37[a]	61.03±6.45[b]	69.02±5.89[b]	65.31±9.10[b]	$1x10^{-7}$*
	Intervention	36.33±6.02[a]	39.10±3.45[a]	23.34±4.94[b]	25.19±3.43[b]	$5x10^{-6}$*

Values are mean ± standard deviation (n=6). p= One-way ANOVA if data were normally distributed and Kruskal-Wallis if not normally distributed. Means within a row with different superscripts are significant at $p < 0.05$. *= significant.
A standard rat diet that contains 317.59 kcal/100 g, 13.65% protein, 2.01% fat, and 68.98% carbohydrate (S00202001078) was given to 24 male Wistar rats for 7 days (acclimatization period). A high-fat high-fructose (HFFr) diet (473.96 kcal/100 g, 11.93% protein, 31.46% fat, and 41.95% carbohydrates) and fructose drinking water (20% pure fructose, 56.2 kcal/100ml)) were given to HFFr-Sd, HFFr-FEe, and HFFr-SEe groups for 29 days to induce MetS. After 29 days of MetS induction HFFr-Sd, HFFr-FEe, and HFFr-SEe groups were fed with standard diet, standard diet containing fresh *E. elatior*, standard diet containing steamed *E. elatior* respectively for 29 days. Control group was fed with standard diet during the duration of the study. Blood samples were taken at the end of MetS induction and intervention diets from all groups. HFFr = high-fat, high-fructose; SEe = steamed *E. elatior*; FEe= fresh *E. elatior*. MetS = Metabolic Syndrome.

Table 4. MetS criteria after 29 days of MetS induction by feeding high-fat high fructose (HFFr) diet.

Metabolic Syndrome Markers	Groups				p-values
	Control	HFFr-Sd	HFFr-FEe	HFFr-SEe	
Lee Index (Rat Obesity)	287.35±11.66[a]	318.77±10.66[b]	313.94±4.66[b]	311.07±3.98[b]	1x10-5*
Fasting Blood Glucose (mg/dL)	135.76±22.79	147.35±34.07	153.01±13.27	143.90±23.90	0.677
TG (mg/dL)	69.53±2.81[a]	184.99±3.89[b]	181.79±2.16[b]	181.68±2.98[b]	4x10-25*
Total Cholesterol (mg/dL)	73.26±5.26[a]	121.55±2.36[b]	121.79±1.82[b]	119.55±1.86[b]	2x10-17*
LDL-C (mg/dL)	23.06±1.83[a]	69.78±1.97[b]	69.66±1.88[b]	70.12±1.78[b]	1x10-21*
HDL-C (mg/dL)	83.10±2.55[a]	33.67±2.22[b]	32.31±1.65[b]	32.31±1.27[b]	9x10-22*
MDA (nmol/ml)	1.29±0.22[a]	9.12±0.24[b]	9.13±0.21[b]	9.18±0.18[b]	7x10-25*

Values are mean ± standard deviation (n=6). p= One-way ANOVA if data were normally distributed and Kruskal-Wallis test if not normally distributed. Means within a row with different superscripts are significant at $p < 0.05$. *= significant.
A standard rat diet that contains 317.59 kcal/100 g, 13.65% protein, 2.01% fat, and 68.98% carbohydrate (S00202001078) was given to 24 male Wistar rats for 7 days (acclimatization period) after which rats were randomly divided into four groups. A high-fat high-fructose (HFFr) diet (473.96 kcal/100 g, 11.93% protein, 31.46% fat, and 41.95% carbohydrates) and fructose drinking water (20% pure fructose, 56.2 kcal/100ml) were given to HFFr-Sd, HFFr-FEe, and HFFr-SEe groups for 29 days to induce MetS. Control group was fed with the standard diet during the duration of the study. Blood were sampled at the end of MetS induction from all groups. MetS = metabolic syndrome, HFFr = high- fat, high--fructose; SEe = steamed *E. elatior*; FEe= fresh *E. elatior*, TG= Triglyceride, LDL-C= low density lipoprotein cholesterol; HDL-C= high density lipoprotein cholesterol; MDA= malondialdehyde.

groups. A high-fat high-fructose (HFFr) diet (473.96 kcal/100 g, 11.93% protein, 31.46% fat, and 41.95% carbohydrates) and fructose drinking water (20% pure fructose, 56.2 kcal/100ml) were given to HFFr-Sd, HFFr- FEe, and HFFr-SEe groups for 29 days to induce MetS. The control group was fed with the standard diet during the duration of the study. Blood was sampled at the end of MetS induction from all groups. MetS= metabolic syndrome, HFFr = high-fat, high-fructose; SEe = steamed *E. elatior*; FEe= fresh *E. elatior*, TG= Triglyceride, LDL-C= low density lipoprotein cholesterol; HDL-C= high density lipoprotein cholesterol; MDA= malondialdehyde.

3.5. Effect of Intervention (After MetS Induction Period) by Feeding a Standard Diet or a Standard Diet Containing *Ee* on Body Weight, Serum Lipid Profile, and MDA

At the end of the intervention, a significant bodyweight gain was observed in the control and HFFr-Sd groups (similar). Meanwhile, the HFFr-FEe and HFFr-SEe groups experienced weight loss, and the greatest weight loss was observed in the HFFr-FEe group Table **5**. In the HFFr-Sd group that previously had MetS markers, the intervention with only a normal diet did not decrease serum TG, total cholesterol, LDL-C, and MDA levels compared to the control group.

On the contrary, in HFFr-FEe and HFFr-SEe groups that previously had MetS markers, the intervention with a standard diet containing one-third FEe or SEe can significantly ($p < 0.05$) decrease serum triglycerides, total cholesterol, and LDL-C and increase HDL-C. Moreover, FEe in the diet was more effective in improving the serum lipid profile compared to SEe. The intervention with a standard diet containing FEe or SEe also reduced serum MDA significantly ($p < 0.05$). A higher reduction in MDA levels was also observed in the FEe group compared to the SEe group Table **5**.

Pre = before intervention, *i.e.*, rats were fed a high-fat high-fructose (HFHFr) diet accompanied by 20% fructose drink for 29 days to induce metabolic syndrome (MetS). Post = after intervention *i.e.*, rats were fed a standard normal diet in Control and HFFr-Sd, fresh or boiled *E.elatior*-containing standard diet in HFFr-FEe, and HFFr-SEe groups, respectively, for 29 days. Overnight fasting blood samples were taken at the end of MetS induction (pre) and intervention diets (post) from all groups. HFFr = high-fat, high-fructose; SEe = steamed *E. elatior*; FEe= fresh *E. elatior*, TG, Triglyceride; LDL-C, low density lipoprotein cholesterol; HDL-C, high density lipoprotein cholesterol; MDA, malondialdehyde.

Table 5. Body weight, serum lipid, and MDA pre- and post-intervention.

Variables		Control	HFFr-Sd	HFFr-FEe	HFFr-SEe	p-values
Body Weight (g)	**Pre**	189.17±24.44	191.67±23.80	207.17±21.04	198.83±20.95	0.526
	Post	208.83±32.17^{ab}	219.00±29.54^{a}	169.50±23.26^{ab}	180.67±19.41^{ab}	0.013*
	Δ	19.66±10.67^{a}	27.33±10.83f^{a}	-37.66±24.75^{b}	-18.16±8.28^{b}	5x10-7*
	P-values	0.006*	0.002*	0.014*	0.003*	-
TG (mg/dL)	**Pre**	69.53±2.81^{a}	184.99±3.89^{b}	181.79±2.16^{b}	181.68±2.98^{b}	4x10-25*
	Post	72.08±1.67^{a}	187.36±3.99^{b}	118.41±3.82^{c}	128.16±1.97^{d}	1x10-23*
	Δ	2.54±1.68^{a}	2.37±2.51^{a}	-63.37±4.68^{b}	-52.51±3.38^{c}	2x10-20*
	P-values	0.014*	0.069	5x10-7*	2x10-7*	-
Total Cholesterol (mg/dL)	**Pre**	73.26±5.26^{a}	121.55±2.36^{b}	121.79±1.82^{b}	119.55±1.86^{b}	2x10-17*
	Post	75.29±4.95^{a}	123.53±2.96^{b}	92.94±2.41^{c}	100.26±4.01^{d}	2x10-14*
	Δ	2.03±1.14^{a}	1.97±0.93^{a}	-28.84±3.47^{b}	-19.29±3.73^{c}	3x10-15*
	P-values	0.007*	0.003*	5x10-6*	5x10-5*	-
LDL-C (mg/dL)	**Pre**	23.06±1.83^{a}	69.78±1.97^{b}	69.66±1.88^{b}	70.12±1.78^{b}	1x10-21*
	Post	26.58±2.68^{a}	71.39±2.25^{b}	33.87±1.87^{c}	40.48±2.10^{d}	1x10-18*
	Δ	3.51±1.76^{a}	1.61±1.05^{a}	-35.79±3.41^{b}	-29.63±3.10^{c}	5x10-18*
	P-values	0.005*	0.013*	2x10-6*	3x10-6*	-
HDL-C (mg/dL)	**Pre**	83.10±2.55^{a}	33.67±2.22^{b}	32.31±1.65^{b}	32.31±1.27^{b}	9x10-22*
	Post	82.06±2.84^{a}	31.42±2.91^{b}	76.71±1.85^{c}	65.26±2.84^{d}	2x10-18*
	Δ	-1.04±0.46^{a}	-2.24±1.22^{a}	44.40±2.04^{b}	32.95±2.19^{c}	6x10-23*
	P-values	0.003*	0.006*	4x10-8*	3x10-7*	-
MDA (nmol/ml)	**Pre**	1.29±0.22^{a}	9.12±0.24^{b}	9.13±0.20^{b}	9.18±0.18^{b}	7x10-25*
	Post	1.49±0.19^{a}	9.51±0.16^{b}	2.76±0.38^{c}	3.21±0.18^{c}	6x10-23*
	Δ	0,19±0,08^{a}	0,38±0,10^{b}	-6,37±0,50^{c}	-5,96±0,27^{c}	8x10-22*
	P-values	0.002*	2x10-4*	6x10-7*	5x10-8*	-

Values are mean ± standard deviation (n=6).
p = One-way ANOVA if data were normally distributed and Kruskal-Wallis test if not normally distributed.
P = Paired t-test if data were normally distributed and Wilcoxon if not normally distributed.
* = significant at p<0.05 or P<0.05.
Pre = before intervention *i.e.* rats were fed high-fat high-fructose (HFHFr) diet accompanied by 20% fructose drink for 29 days to induce metabolic syndrome (MetS).
Post = after intervention *i.e.* rats were fed standard normal diet in Control and HFFr-Sd, fresh or boiled *E.elatior*-containing standard diet in HFFr-FEe, and HFFr-SEe groups respectively for 29 days.
Overnight fasting blood samples were taken at the end of MetS induction (pre) and intervention diets (post) from all groups. HFFr = high-fat, high-fructose; SEe = steamed *E. elatior*; FEe= fresh *E. elatior*. TG, Triglyceride; LDL-C, low density lipoprotein cholesterol; HDL-C, high density lipoprotein cholesterol; MDA, malondialdehyde.

4. DISCUSSION

Our results show that rats fed with an HFFr diet accompanied by 20% fructose drink for 29 days can induce three MetS markers, showing a significant increase in obesity (Lee index), hypertriglyceridemia, and a decrease in HDL-C. A study of an HFFr diet for 8 days in rats can increase body fat, blood glucose, and triglyceride levels and decrease the HDL-C levels; however, no increase occurred in the total cholesterol and LDL-C levels [22]. The combination of high fat and sugar in the diet and drink is related to the development of type 2 diabetes, which is a long-term effect of metabolic disorders, such as hyperglycemia, pre- and postprandial hyperinsulinemia, insulin resistance, and dyslipidemia (hypertriglyceridemia and hypercholesterolemia) [23]. During the MetS induction, the food intake in groups fed with HFFr was lower, whereas the drink intake was higher compared to control. Lower food intake but higher drink intake could be due to the influence of fructose drinking water in increasing satiety, thereby decreasing feed intake. Similar to our results, another study also showed that fructose administration resulted in an increase in drinking water intake during the study, leading to a decrease in food intake [24]. Fructose has a sweet taste twice that of glucose; thus, the reduced food intake was possibly due to an increase in drinking intake and, hence, sensory satiety [16]. Sensory satiety is defined as the decrease in pleasure and interest in sensory attributes to eating certain foods [25]. Feeding HFFr diet concomitantly with 20% pure fructose drink led to the development of MetS markers in HFFr-Sd, HFFr-FEe, and HFFr-SEe groups. During this period, their calorie intake was significantly higher than the control group, demonstrating the effect of dietary HFFr on the development of MetS. Although MDA is not considered as one of MetS markers, feeding the HFFr diet significantly increased serum MDA in the HFFr-fed groups, indicating an increase in oxidative stress.

During the intervention period, there was no difference in food and drink intake between control and HFFr-Sd groups. However, the energy intake of HFFr-FEe and HFFr-SEe groups was lower when compared to the first two groups. Feeding a standard diet or a standard diet that contained the vegetables *Ee* have proven to normalize the food and drink intake in HFFr-Sd, HFFr-Fee, and HFFr-SEe groups, similar to the control group. Furthermore, fresh or steamed *Ee* in the standard diet have markedly reduced energy intake in HFFr-FEe and HFFr-SEe groups when compared to control and HFFr-Sd groups, demonstrating *Ee* effect. Vegetables are generally high in moisture content and can reduce the energy density of food that contains them [26] as they can add weight without adding calories. Higher moisture content in food lowers its energy density. Foods with low energy density can reduce energy intake by promoting satiety and full state through psychological and physiological mechanisms [27]. High moisture content in *Ee* can produce satiety and, thus, can decrease food and drink intake in rats. Similar results of a recent study showed that consuming whole watermelons can reduce hunger in the subjects up to 2 h compared with the consumption of low-fat cookies, which reduced hunger for 20 min. This condition was due to the greater volume of watermelon with its higher moisture content compared to low-fat cookies [28]. In our study, such mechanism was most likely to be the underlying basis that a standard diet containing *Ee* reduced the food, drink, and energy intake in HFFr-FEe and HFFr-SEe groups compared to control and HFFr-Sd groups.

Etlingera elatior contains anthocyanins, flavonoids, and polyphenol, and their antioxidant activities can ameliorate lipid profiles, weight loss, and MDA reduction (as one of the oxidative stress biomarkers). Our results showed that FEe exhibits higher antioxidant activity, total phenolic and anthocyanin levels, whereas SEe has a higher amount of total flavonoids. Unlike some other types of vegetables, the steaming process on *Ee* does not increase antioxidant activity. This is due to possible phytochemical destruction, release, and transformation. Based on the observation that the red color of SEe is faded more than FEe, the anthocyanin compounds that give *Ee* a red color could be partly damaged during the steaming process. Thus, the DPPH test resulted in lower antioxidant activity in SEe than FEe. These results are similar to those of studies that showed the antioxidant activity, total phenolic, and anthocyanin levels in fresh red cabbage were higher than steamed red cabbage [29]. On the other hand, steaming can increase the flavonoid content of certain vegetables, which may be related to the efficient release of flavonoids within the food matrix [30].

A significant difference in the six variables pre- and post-intervention in each and among groups was undoubtedly due to the presence of *Ee* in the diet (HFFr-FEe and HFFr-SEe). In the HFFr-Sd group, intervention by feeding only standard rat diet cannot reduce biomarkers of MetS and have no change in the oxidative stress marker, *i.e.*, serum MDA. This demonstrates that *Ee* incorporation in the standard diet can improve body weight, serum lipid profile, and MDA levels in Wistar rats with MetS markers. The weight loss (Δ) in the HFFr-FEe and HFFr-SEe groups was probably due to the anthocyanin content of *Ee*. Several *in vivo* studies on experimental animals have shown the protective and therapeutic effects of anthocyanin in metabolic diseases and suggested that anthocyanin can reduce body weight in MetS mice [31]. However, its mechanism is yet unknown.

Antioxidants from various phytochemical compounds generally function to overcome oxidative stress [7, 31-33]. The reduction in lipid profiles of the HFFr-FEe and HFFr-SEe groups was most possibly due to the antioxidant content of *Ee*, which can counteract the oxidative stress induced by HFFr diet. This finding is similar to a study of the administration of *Ficus carica* fruit extract, which contains polyphenols, on dyslipidemia rats. In the study, the administration of a high-fat high-cholesterol diet produced oxidative stress, as indicated by a high serum MDA and inflammatory cytokine TNFα, leading to dyslipidemia; the administration of *F. carica* fruit extract could reverse the high serum lipid profile to a normal level. The mechanism of reduction in serum lipid was mediated by antioxidants (polyphenol) that prevented oxidative stress, as indicated by a decrease in serum MDA and TNFα [7]. Another study on the consump-

tion of fresh blueberry for 75 days confers protection against oxidative stress and free radicals in red blood cells due to the content of anthocyanins that act as antioxidants [31]. Fruit, berries, cranberry, strawberries, and aronia that are rich in anthocyanins can reduce lipid oxidation as characterized by low levels of MDA, oxidized LDL, or TBARS [32, 33].

Foods that are rich in flavonoids can reduce triglycerides, total cholesterol, LDL-C, and HDL-C levels in experimental animals and individuals with MetS. Flavonoids can reduce lipid absorption in the gastrointestinal tract and play a role in the inhibition of cholesterol synthesis, lipogenesis, and increased β oxidation [34]. The total flavonoid, which is expressed as quercetin equivalents the compounds contained in *Ee* that can modulate enzymes or antioxidants to enhance antioxidant properties that can halt disease progression. Quercetin (belong to flavonoid) protection against acute inflammation is mediated by the inhibitory effect on p38 mitogen-activated protein kinase/inducible nitric-oxide synthase signaling pathways, reduced MDA levels, and upregulation of superoxide dismutase activity to increase antioxidant activity [35].

My-plate guide ("Isi Piringku") issued by the Ministry of Health of the Republic of Indonesia recommends that one-third of the plate must consist of vegetables for a healthy-balance diet. The amount of *Ee* incorporated into the standard diet followed the recommendation and was then formulated for laboratory-Wistar rats. Our study showed that intervention with a standard rat diet containing 33.3% (one-third) FEe or SEe could normalize the high serum lipid profile and MDA. The bodyweight of MetS rats demonstrating the consumption of one-third of single vegetables, *i.e.*, *Ee*, in diets can normalize some MetS markers in rats. This study adds important evidence that one-third of a single vegetable, *i.e.*, *Ee*, can normalize MetS markers in rats. This result cannot be extrapolated to humans, but a variety of vegetable intake has been widely recommended. However, our study demonstrates that *Ee* can normalize some MetS markers induced by the HFFr diet in Wistar rats. The limitations of this study are that not all MetS biomarkers can be fulfilled due to the duration or length of induction that needs to be longer. The intervention period may then also need to be extended than what has been done in this study so that it can completely reverse the biomarkers reaching similar values to the control group.

CONCLUSION

Etlingera elatior has antioxidant properties due to its anthocyanins, phenolic, and flavonoid contents. Intake of *Ee* as part of the standard diet (one-third of the daily diet) for 29 days can reduce the body weight, MDA levels, and ameliorate the high lipid profile in MetS Wistar rats. Fresh *Ee* intake has more profound effects to ameliorate MetS biomarkers than steamed *Ee*.

LIST OF ABBREVIATIONS

CHOD-PAP	=	Cholesterol Oxidase Peroxidase Amino Antipyrine
DPPH	=	α,α-diphenyl-β-picrylhydrazyl
Ee	=	*Etlingera elatior*
FBG	=	Fasting Blood Glucose
FEe	=	Fresh *Etlingera elatior*
GOD-PAP	=	Glycerol Phosphate Peroxidase Amino Antipyrine
HDL-C	=	High-density Lipoprotein Cholesterol
HFFr	=	High-fat, High-fructose Diet
HFFr-FEe	=	High-fat, High-fructose Diet Followed by a Standard Diet Containing Fresh *Etlingera elatior*
HFFr-SEe	=	High-fat, High-fructose Diet Followed by a Standard Diet Containing Steam *Etlingera elatior* Group
HFFr-Sd	=	High-fat, high-fructose Diet Followed by a Standard Diet
LDL-C	=	Low-density Lipoprotein Cholesterol
MDA	=	Malondialdehyde
MetS	=	Metabolic Syndrome
SD	=	Standard Diet
SEe	=	Steam *Etlingera elatior*
TBA	=	Thiobarbituric Acid
TBARS	=	Thiobarbituric Acid Reactive Substances

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This protocol for the animal studies was approved by the Health Research Ethics Commission of the Faculty of Medicine, Diponegoro University Semarang, Indonesia, with No. 139/EC/H/KEPK/FK-UNDIP/XI/2019.

HUMAN AND ANIMAL RIGHTS

No humans were used in this study. All animal research procedures were followed in accordance with the standards set forth in the eighth edition of Guide for the Care and Use of Laboratory Animals (published by the National Academy of Sciences, The National Academies Press, Washington, D.C.).

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

The authors confirm that the data supporting the findings of this research are available within the article.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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REFERENCES

[1] Mittal S. The Metabolic syndrome in clinical practice. London: Springer-Verlag 2008. http://dx.doi.org/10.1007/978-1-84628-911-8

[2] Mirmiran P, Bahadoran Z, Delshad H, Azizi F. Effects of energy-dense nutrient-poor snacks on the incidence of metabolic syndrome: a prospective approach in Tehran Lipid and Glucose Study. Nutrition 2014; 30(5): 538-43. http://dx.doi.org/10.1016/j.nut.2013.09.014 PMID: 24508464

[3] Singh ZD, Karthigesu IP, Singh P, Kaur R. Use of Malondialdehyde as a biomarker for assessing oxidative stress in different disease pathologies: A review. Iran J Public Health 2014; 43(3): 7-16.

[4] Rani V, Deep G, Singh RK, Palle K, Yadav UC. Oxidative stress and metabolic disorders: Pathogenesis and therapeutic strategies. Life Sci 2016; 148: 183-93. http://dx.doi.org/10.1016/j.lfs.2016.02.002 PMID: 26851532

[5] Ayoub HM, McDonald MR, Sullivan JA, *et al.* The effect of anthocyanin-rich purple vegetable diets on metabolic syndrome in obese Zucker rats. J Med Food 2017; 20(12): 1240-9. http://dx.doi.org/10.1089/jmf.2017.0025 PMID: 28956702

[6] Bhaswant M, Shafie SR, Mathai ML, Mouatt P, Brown L. Anthocyanins in chokeberry and purple maize attenuate diet-induced metabolic syndrome in rats. Nutrition 2017; 41: 24-31. http://dx.doi.org/10.1016/j.nut.2016.12.009 PMID: 28760424

[7] Sukowati YK, Johan A, Murwani R. Ethanol extracts of *ficus carica* fruit and leaf normalize high serum lipid profile, TNF-α, and MDA due to high fat diet in Sprague Dawley rat. Curr Res Nutr Food Sci J 2019; 7(3): 772-82. http://dx.doi.org/10.12944/CRNFSJ.7.3.16

[8] Syarif RA, Firdha S, Aktsar RA. Rimpang kecombrang *(Etlingera elator jack.)* sebagai sumber fenolik. J Fitofarm Indonesia 2016; 2(2): 102-6. http://dx.doi.org/10.33096/jffi.v2i2.178

[9] Kurniasih D. Kajian kandungan senyawa karotenoid, antosianin dan asam askorbat pada sayuran indigenous Jawa Barat. Thesis Bogor: Institut Pertanian Bogor 2010.

[10] Silalahi Marina. Senyawa Metabolit Sekunder Pada Etlingera elatior (Jack) R. M. Smith. Seminar Nasional Pendidikan Biologi dan Saintek II 2017; 41-7.

[11] Juwita T, Melyani Puspitasari I, Levita J. Torch ginger *(Etlingera elatior)* : A review on its botanical aspects, phytoconstituents and pharmacological activities. Pak J Biol Sci 2018; 21(4): 151-65. http://dx.doi.org/10.3923/pjbs.2018.151.165 PMID: 30311471

[12] Jackie T, Haleagrahara N, Chakravarthi S. Antioxidant effects of *Etlingera elatior* flower extract against lead acetate - induced perturbations in free radical scavenging enzymes and lipid peroxidation in rats. BMC Res Notes 2011; 4: 67. http://dx.doi.org/10.1186/1756-0500-4-67 PMID: 21414212

[13] Al-Juhaimi F, Ghafoor K, Özcan MM, *et al.* Effect of various food processing and handling methods on preservation of natural antioxidants in fruits and vegetables. J Food Sci Technol 2018; 55(10): 3872-80. http://dx.doi.org/10.1007/s13197-018-3370-0 PMID: 30228385

[14] Saikia S, Mahanta C. Effect of steaming, boiling and microwave cooking on the total phenolics, flavonoids and antioxidant properties of different vegetables of Assam, India. Int J Food Nutr Sci 2013; 2: 47-53.

[15] KEMENKES RI Direktorat Promisi Kesehatan dan Pemberdayaan Masyarakat. Leaflet: Informasi Isi Piringku http://promkes.kemkes.go.id/paket-informasi-isi-piringku

[16] Moreno-Fernández S, Garcés-Rimón M, Vera G, Astier J, Landrier JF, Miguel M. High fat/high glucose diet induces metabolic syndrome in an experimental rat model. Nutrients 2018; 10(10): 1502. http://dx.doi.org/10.3390/nu10101502 PMID: 30322196

[17] Wong SK, Chin KY, Suhaimi FH, Fairus A, Ima-Nirwana S. Animal models of metabolic syndrome: a review. Nutr Metab (Lond) 2016; 13: 65. http://dx.doi.org/10.1186/s12986-016-0123-9 PMID: 27708685

[18] Mamikutty N, Thent ZC, Sapri SR, Sahruddin NN, Mohd Yusof MR, Haji Suhaimi F. The establishment of metabolic syndrome model by induction of fructose drinking water in male Wistar rats. BioMed Res Int 2014; 2014: 263897. http://dx.doi.org/10.1155/2014/263897 PMID: 25045660

[19] Lee SI, Kim JW, Lee YK, Yang SH, Lee IA, Suh JW, *et al.* Anti-obesity effect of *Monascus pilosus Mycelial* extract in high fat diet-induced obese rats. J Appl Biol Chem 2011; 54(3): 197-205. http://dx.doi.org/10.3839/jabc.2011.033

[20] Ihedioha JI, Noel-Uneke OA, Ihedioha TE. Reference values for the serum lipid profile of albino rats *(Rattus norvegicus)* of varied ages and sexes. Comp Clin Pathol 2013; 22(1): 93-9. http://dx.doi.org/10.1007/s00580-011-1372-7

[21] Wang Z, Yang Y, Xiang X, Zhu Y, Men J, He M. [Estimation of the normal range of blood glucose in rats]. Wei Sheng Yan Jiu 2010; 39(2): 133-137, 142. PMID: 20459020

[22] Vidal E, Lalarme E, Maire MA, *et al.* Early impairments in the retina of rats fed with high fructose/high fat diet are associated with glucose metabolism deregulation but not dyslipidaemia. Sci Rep 2019; 9(1): 5997. http://dx.doi.org/10.1038/s41598-019-42528-9 PMID: 30979946

[23] Lozano I, Van der Werf R, Bietiger W, *et al.* High-fructose and high-fat diet-induced disorders in rats: impact on diabetes risk, hepatic and vascular complications. Nutr Metab (Lond) 2016; 13: 15. http://dx.doi.org/10.1186/s12986-016-0074-1 PMID: 26918024

[24] Miranda CA, Schönholzer TE, Klöppel E, *et al.* Repercussions of low fructose-drinking water in male rats. An Acad Bras Cienc 2019; 91(1): e20170705. http://dx.doi.org/10.1590/0001-3765201920170705 PMID: 30785495

[25] Myers KP. Sensory-specific satiety is intact in rats made obese on a high-fat high-sugar choice diet. Appetite 2017; 112: 196-200. http://dx.doi.org/10.1016/j.appet.2017.01.013 PMID: 28089926

[26] Chang UJ, Hong YH, Suh HJ, Jung EY. Lowering the energy density of parboiled rice by adding water-rich vegetables can decrease total energy intake in a parboiled rice-based diet without reducing satiety on healthy women. Appetite 2010; 55(2): 338-42. http://dx.doi.org/10.1016/j.appet.2010.07.007 PMID: 20654665

[27] Smethers AD, Rolls BJ. Dietary management of obesity: Cornerstones of healthy eating patterns. Med Clin North Am 2018; 102(1): 107-24. http://dx.doi.org/10.1016/j.mcna.2017.08.009 PMID: 29156179

[28] Lum T, Connolly M, Marx A, *et al.* Effects of fresh watermelon consumption on the acute satiety response and cardiometabolic risk factors in overweight and obese adults. Nutrients 2019; 11(3): E595. http://dx.doi.org/10.3390/nu11030595 PMID: 30870970

[29] Xu F, Zheng Y, Yang Z, Cao S, Shao X, Wang H. Domestic cooking methods affect the nutritional quality of red cabbage. Food

Chem 2014; 161: 162-7.
http://dx.doi.org/10.1016/j.foodchem.2014.04.025 PMID: 24837935

[30] Gunathilake KDPP, Ranaweera KKDS, Rupasinghe HPV. effect of different cooking methods on polyphenols, carotenoids and antioxidant activities of selected edible leaves. Antioxidants 2018; 7(9): 117.
http://dx.doi.org/10.3390/antiox7090117 PMID: 30200223

[31] Naseri R, Farzaei F, Haratipour P, *et al.* Anthocyanins in the management of metabolic syndrome: a pharmacological and biopharmaceutical review. Front Pharmacol 2018; 9: 1310.
http://dx.doi.org/10.3389/fphar.2018.01310 PMID: 30564116

[32] Amiot MJ, Riva C, Vinet A. Effects of dietary polyphenols on metabolic syndrome features in humans: a systematic review. Obes Rev 2016; 17(7): 573-86.
http://dx.doi.org/10.1111/obr.12409 PMID: 27079631

[33] Basu A. Role of Berry Bioactive compounds on lipids and lipoproteins in diabetes and metabolic syndrome. Nutrients 2019; 11(9): E1983.
http://dx.doi.org/10.3390/nu11091983 PMID: 31443489

[34] Galleano M, Calabro V, Prince PD, *et al.* Flavonoids and metabolic syndrome. Ann N Y Acad Sci 2012; 1259: 87-94.
http://dx.doi.org/10.1111/j.1749-6632.2012.06511.x PMID: 22758640

[35] Xu D, Hu MJ, Wang YQ, Cui YL. Antioxidant activities of quercetin and its complexes for medicinal application. Molecules 2019; 24(6): E1123.
http://dx.doi.org/10.3390/molecules24061123 PMID: 30901869

BUKTI KORESPONDENSI

Etlingera elatior (Jack) R.M, Sm Normalizes Body Weight, Lipid Profile, and Malondialdehyde in Metabolic Syndrome Rats

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Referee A:
This study aimed to investigate the effect of fresh Etlingera elatior (FEe) and steamed Etlingera elatior (SEe) as part of diet on the body weight, lipid profile, and malondialdehyde (MDA) level in Wistar rats with MetS. The authors introduced Torch ginger inflorescence (Etlingera elatior (Jack) R.M, Sm), a native plant species of Indonesia, that contains phenolic compounds, flavonoids, and high anthocyanin levels compared with other vegetables. The study showed positive results of the plant on the biochemical parameters of metabolic syndrome; however, there are some concerns about the study.

Specific points

1. More information about Etlingera elatior should be provided in the introduction section.
2. In the introduction (paragraph 3 line 4), The authors stated that the nutrient components and phytochemical compounds in Etlingera elatior may reduce the biomarkers of metabolic syndrome and/or prevent the metabolic syndrome incidence. The authors should clarify what nutrients in the plant that can exert such effects. The information on this point was not mentioned anywhere in the manuscript.
3. In introduction, more explanation how steaming can increase the antioxidant activity of vegetables should be included.
4. What part of the plant was used in the study? This was not mentioned in the materials and method section.
5. The principles of the assays described could be explained briefly in the materials and method section.
6. The amount of antioxidant contents in the plant may vary in each batch of the experiments. How did the authors control the amount of these active ingredients between batches? How many samples were used in each antioxidant activity test?
7. Did the fresh and steamed Etlingera elatior came from the same source? And how was the plant extracted?
8. The recommendation on vegetable intake (my plate guide) is for consumption of variety of vegetables. However, Etlingera elatior was the only vegetable consumed in this study. Does this mean that the effect of Etlingera elatior can be clearly found only when consuming at this amount? And can this amount (33.3% in one meal) of Etlingera elatior be consumed regularly in the human diet?
9. Did the proximate analysis of Fresh Etlingera elatior differ from that of steamed Etlingera elatior? At least the moisture should be different. The authors should show the proximate analysis of both fresh and steamed Etlingera elatior.
10. In 3.3 Food and drink intake, the content indicated that during the MetS induction the average drinking in take in HFF-Sd, HFFr-Fee and HFFr-SEe groups were lower. However, this was not consistent with the results shown in Table 3.
11. There is an error at the number of the topic “Food and drink intake and body weight”. This should not be 3.1. In this section, according to the sentences “During MetS induction with HFFr diet, the average food intake in the HFFr and C rats was obtained ($p > 0.05$)”, what does the p-value indicate? No result on body weight was presented under this section.
12. During the MetS induction with the HFFr diet, the results showed that the average food intake in HFFr-SD, HFFr-Fee and HFFr-SEe groups were lower than that in the C group. With lower food intake, how can the animals in these groups develop metabolic syndrome? Did they still get higher calories, fat and carbohydrate than the C group?
13. Would it be possible that the effect of HFFr-FEe and HFFr-SEe on metabolic syndrome is due to decreased intake caused by high moisture content in foods, not by the antioxidant activity of the plant? How do the authors explain about this issue?
14. The section with future studies and limitations should be added.

Minor points

1. For the p-value, “ p ” should be intalicized.
2. In 2.11, “FBF” measurement should be “FBG” measurement.
3. In Tables 3-5, describe what the letters a and b indicate, and use P-value < 0.001 instead of 0.000.

Referee B:
1. The aim of the present study should be stated clearly in introduction section.
2. The authors have stated that "Steaming is a suitable method for cooking vegetables and can increase the antioxidant activity in several types of vegetables." in introduction section. However, the results obtained from DPPH assay is not consistent with the above statement. Please explain it

3. The significant figures in all tables should be confirmed and corrected.
4. In all tables, the comma (,) in all detected values should be corrected into point (.).
5. In table 2, the results should be conducted in triplicate separately and expressed as mean ± SD. In addition, the suitable statistical method should be carried out.
6. In table 2, the content of total phenolic in SEe is lower than FEe obviously. Please discuss it.
7. A combined Results and Discussion section is appropriate.
8. In results section of 3.1 and 3.2, the description should be rewritten because of no scientific sounds.
9. The footnote in table 3 should be corrected. There is no information about HFFrD and MetS group.
10. In table 4 and results section of 3.4, the fasting blood glucose exhibited no significant difference among the four groups; therefore, high fat in combination with high fructose diet did not induce hyperglycemia. Please delete hyperglycemia in results section of 3.4 and discuss it.
11. In table 5, please explain that no significant difference existed between C and HFFr-Sd groups in postintervention.
12. More discussion is needed about the results section of 3.4~3.6.
13. Could the doses of FEe and SEe used in rats be achieved in human? Please translate and discuss it.
14. In conclusion, the most important issue should be summarized.

Referee C:

This is an interesting work carried out with laboratory rats grouped into four experimental groups: a control group and three groups that consume a hypercaloric diet to induce metabolic alterations typical of what in humans is known as the metabolic syndrome (MS). The effect of the change to an intervention diet containing 33% Etlingera elatior is then evaluated, finding a positive effect on all metabolic parameters of the MS model groups.

Title:

1. Is it correct to talk about "Rats with metabolic syndrome? As far as I understand, the term "metabolic syndrome" is a concept defined for humans, not for animals. Please clarify this as the overall manuscript may require adjustments in this regard, including the title.

Abstract:

2. "…The C received standard rat diet during the whole in vivo study…". For clarity, it is suggested that the term "Control" be used instead of "C" to denote the control group. In fact, the authors use this term in Table 4.

MATERIALS AND METHOD.

3. In page 3, Section 2.5:

a. "...animals were divided randomly into four treatment groups with 6 rats/group: control group (C), HFFr-Sd, HFFr-Sd containing FEe (HFFr-Fee), and HFFr-Sd containing SEe (HFFr-SEe) groups…"
Please correct the abbreviation used to refer the third group (HFFr-Fee).

RESULTS.

4. Page 6. There are two sections 3.1 on results. Please clarify.

a. "3.1. Proximate analysis of Etlingera elatior"

b. "3.1. Food and drink intake and body weight" (Después de la sección 3.3).

5. Page 6, Section "3.3. Food and drink intake":

a. No table or figure are mentioned in this section, despite presenting results.

b. What do you mean with HFFr-Fee in:
"…the average food intake in HFFr-Sd, HFFr-Fee, and HFFr-SEe…"

c. "…In addition, the average drinking intake in these groups were lower…"
If you look at Table 3, you will see the opposite: higher intake than the control (57-65 vs 31 ml/d, respectively).

d. What is the relationship between this section 3-3 and the next section of the document (3-1)? (see commentary 7.b).

6. Tabla 2:

a. What is the meaning of the asterisks? It should be indicated as a footnote.

b. A P-value = 0.000? The actual P-value should be shown, for example: 2x10-8. This criticism is valid for all tables shown.

7. Table 3: Please think of some way to simplify this table. Every table should be self-explanatory. This table is not, and is not understood, for several reasons:

a. Similar names for experimental groups, interventions and/or diets. Confusing.

b. The footnote is too cumbersome, and leads to more confusion. Even some names mentioned there do not match those in the table (e.g. "...HFFr-St, MetS group...").

c. What do the superscripts "a" and "b" used in the table mean? Not stated.

d. What variables or groups were compared to have the "P-values" shown? It is impossible to know this from the information provided in the table.

e. What does a P=0.000 represent? They should provide the actual calculated P-value. This criticism is valid for all the tables in the document.
It is suggested that an effort be made to present the data more clearly in this table, perhaps by using the same nomenclature as in Table 5 (Pre and Post)?
8. Table 4.
a. Unlike other tables where the control group is called "C", here it is referred to as "Control". See comment 2.
b. What do the superscripts "a" and "b" in the table mean? This should be indicated.
c. Place the actual P values obtained.
9. Table 5:
a. What do the P-values in the column and in the rows mean? This should be indicated at the bottom of the table.
b. Why the MDA results are included in a separate section (section 3-6) when they correspond to one of the six variables studied in the same table?
c. If we compare Pre- vs. Post-intervention only for the control group, we can see that there are significant differences in all six variables. This result is not mentioned or discussed. How do you explain such differences? How could this affect the validity of the conclusions obtained in this study? It would be interesting to have this discussed in the paper.

Editorial Requirements:

Short Running Title

Authors must provide a short 'running title' of their manuscript.

Structured Abstract: (in research article only)
It is a mandatory requirement that the abstract must be provided in structured format. Ideally, each abstract should include the following sub-headings, but these may vary according to requirements of the article.

- Background
- Objective
- Methods
- Results
- Conclusion

Keywords:
Minimum 6 keywords should be provided with the article.
Availability of Data and Materials: (in research article only)
The source of data and materials should be mentioned in the manuscript, in support of the findings. If the data source is not revealed, the authors need to clearly state the reasons. Authors who do not wish to share their data should clearly state that the data will not be shared, and give the reasons.
The statement relating to the data should be presented in the following format under a separate 'Availability of Data and Materials' section in the manuscript:

"The data supporting the findings of the article is available in the [repository name] at [URL], reference number [reference number]".

Graphical Abstract:

A graphic should be included when possible with each manuscript for use in the Table of Contents (TOC) with **caption**.

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Reminder for Revised Submission | BMS-CNF-2020-98

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Reference#: BMS-CNF-2020-98

Submission Title: Etlingera elatior (Jack) R.M, Sm Normalizes Body Weight, Lipid Profile, and Malondialdehyde in Metabolic Syndrome Rats

Dear Dr. Retno Murwani,

Just a gentle reminder for revised submission for your submission, for Current Nutrition and Food Sciences.

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Dear Dr. Murwani,

Thank you very much for submitting your revised manuscript, BMS-CNF-2020-98. We hope to successfully collaborate with you in the future as well. Please do let us know if you face any issues.

Regards,

Ms.Nida Badar
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Tables of Revisions

	Reviewer notes	Revision (in blue in the text)
	Referee A:	
1	More information about Etlingera elatior should be provided in the introduction section.	It has been added in the introduction section : *Etlingera elatior* has long been recognized and utilized by the Indonesian people and it is easily found in various places such as home yards, fields, or forests in Java and Sumatra islands. *Etlingera elatior* is consumed as vegetables, spices, medicinal and ornamental plants [10]. In traditional cuisine, kecombrang flowers are used as a food ingredient due to their attractive bright red colour, distinctive taste and smell that can enhance the taste of the food [11].
2	In the introduction (paragraph 3 line 4), The authors stated that the nutrient components and phytochemical compounds in Etlingera elatior may reduce the biomarkers of metabolic syndrome and/or prevent the metabolic syndrome incidence. The authors should clarify what nutrients in the plant that can exert such effects. The information on this point was not mentioned anywhere in the manuscript.	It has been added in the paragraph 4 first line : *Etlingera elatior* (*Ee*) is also known to have a high nutritional value such as unsaturated fatty acids, protein, non-essential amino acids and phytochemical compounds (anthocyanins, flavonoids, phenols, saponins, terpenoids, tannins, steroids, and glycosides) with antioxidant properties which can play a role in reducing inflammation and the levels of serum total cholesterol, LDL cholesterol, and triglycerides. [10,11].
3	In introduction, more explanation how steaming can increase the antioxidant activity of vegetables should be included.	It has been added in the paragraph 4 line 9 : Steaming can affect the plant cellular matrix by breaking down and freeing the antioxidant compounds [14].
4	What part of the plant was used in the study? This was not mentioned in the materials and method section.	It has been added in Materials and Method, in 2.2. The *Ee* part used in this study is the red flower (Figure 1). This study used two forms of *Ee*, i.e., fresh (FEe) or steamed (SEe). Steamed Ee was steamed for 5 min and cooled directly by placing in ice-cold water [14].
5	The principles of the assays described could be explained briefly in the materials and method section.	The principles of all methods have been described in materials and method section.
6	The amount of antioxidant contents in the plant may vary in each batch of the experiments. How did the authors control the amount of these active ingredients between batches? How many samples were used in each antioxidant activity test?	Controlling the amount of active ingredient for the whole experiment was done by calculating the total amount of feed (rat diet) needed for 29 days of E.elatior intervention (15 g complete diet/tail/day) and adding extra amount to anticipate loss during feeding; and then based on the total amount of the feed we calculated the total amount of *E.elatior* in the Ee groups. E. elatior was then prepared in one batches, mix homogenously after chopped, and mix into the standard diet. The dry ready to eat pellet containing Ee was then stored in a cool and dry place ready to be given for every day feeding. This detail technique is in the expertise of the corresponding author who has done many feeding experiments on monogastric animals using up to 300-500 Kg feed.
7	Did the fresh and steamed Etlingera elatior came from the same source? And how was the plant extracted?	Yes, it has been explained in Materials and Methods *Etlingera elatior* was obtained from a traditional market (Ciamis Manis) located in Ciamis, West Java, Indonesia. This study used two forms of *Ee*, i.e., fresh (FEe) or steamed (SEe). Steamed Ee was steamed for 5 min and cooled directly by placing in ice-cold water. **No extraction was carried out on** the flowery

		vegetable, because as dietary vegetables, they are not extracted.
8	The recommendation on vegetable intake (my plate guide) is for consumption of variety of vegetables. However, Etlingera elatior was the only vegetable consumed in this study. Does this mean that the effect of Etlingera elatior can be clearly found only when consuming at this amount? And can this amount (33.3% in one meal) of Etlingera elatior be consumed regularly in the human diet?	It has been explained in Materials and Method i.e. 2.2 and answered in number 6 and 7 questions. We added : In this study we purposely use one single type of vegetable i.e. Ee into standard rat diet to determine its effect to reduce some of MetS markers in experimental rats due to feeding of high-fat high-fructose diet. In Discussion, at the last sencences we added : This study adds important evidence that one-third of a single vegetable i.e. Ee can normalize MetS markers in rats. This result cannot be extrapolated to human as it is uncommon to consume a single type of vegetable and a variety of vegetables intake has been widely recommended. However, our study demonstrates that Ee can normalize some MetS markers induce by HFFr diet in Wistar rats.
9	Did the proximate analysis of Fresh Etlingera elatior differ from that of steamed Etlingera elatior? At least the moisture should be different. The authors should show the proximate analysis of both fresh and steamed Etlingera elatior.	It has been included in Table 1. The moisture content between fresh and steamed Ee have been added in Table 2 at the bottom. The water content of FEe (81.29%) and SEe (90.13%) was both high and steamed Ee was higher ($p<0.05$). This has been discussed in Discussion section in blue color.
10	In 3.3 Food and drink intake, the content indicated that during the MetS induction the average drinking in take in HFF-Sd, HFFr-Fee and HFFr-SEe groups were lower. However, this was not consistent with the results shown in Table 3.	3.3 Food drink, and energy intake has been revised and Table 3 has been added with energy intake. We have made revision on the Discussion as well : During MetS induction by feeding HFFr diet, the average food intake in HFFr-Sd, HFFr-FEe, and HFFr-SEe groups was significantly lower ($p<0.05$) than the control group (Table 3). On the contrary, the average drinking and calorie intake in these groups were significantly higher ($p<0.05$) compared to control group. After the intervention period, no significant difference was observed in food and drink intake among all groups ($p>0.05$). However, there was a significant reduction in calorie intake in HFFr-Sd, HFFr-FEe, and HFFr-SEe groups after intervention ($p<0.05$).
11	There is an error at the number of the topic "Food and drink intake and body weight". This should not be 3.1. In this section, according to the sentences "During MetS induction with HFFr diet, the average food intake in the HFFr and C rats was obtained ($p > 0.05$)", what does the p-value indicate? No result on body weight was presented under this section.	Although during MetS induction by feeding HFFr diet, the food intake in HFFr-Sd, HFFr-FEe and HFFr-SEe was lower, their fructose drinking intake was higher. Administration of fructose drink can affect in the development of metabolic syndrome. This has also been addressed in the discussion. This is presented in **Table 3. Food, drink, and energy intake. It has been explained in discussion:** Feeding HFFr diet concomitantly with 20% pure fructose drink had led to the development of MetS markers in the HFFr-Sd, HFFr-FEe, and HFFr-SEe groups. During this period, their calorie intake was significantly higher ($p<0.05$) than the control group, demonstrating the effect of dietary HFFr on the development of MetS. Although MDA is not considered as one of MetS

		marker, feeding HFFr diet increased significantly ($p<0.05$) serum MDA in the HFFr fed groups indicating an increase in oxidative stress.
12	During the MetS induction with the HFFr diet, the results showed that the average food intake in HFFr-SD, HFFr-Fee and HFFr-SEe groups were lower than that in the C group. With lower food intake, how can the animals in these groups develop metabolic syndrome? Did they still get higher calories, fat and carbohydrate than the C group?	It has been explained in Discussion paragraph 1 line 7: During the MetS induction, the food intake in groups fed HFFr was lower, whereas the drink intake was higher compared to Control. Lower food intake but higher drink intake could be due to the influence of fructose drinking water in increasing satiety, thereby decreasing feed intake. Similar to our results, another study also showed that the fructose administration resulted in an increase in drinking water intake during the study, leading to a decrease in food intake [24]. Fructose has a sweet taste twice that of glucose; thus, the reduced food intake was possibly due to an increase in drinking intake and hence sensory satiety [25]. Sensory satiety is defined as the decrease in pleasure and interest in sensory attributes to eating certain foods [26]. Feeding HFFr diet concomitantly with 20% pure fructose drink had led to the development of MetS markers in the HFFr-Sd, HFFr-FEe, and HFFr-SEe groups. During this period, their calorie intake was significantly higher ($p<0.05$) than the control group, demonstrating the effect of dietary HFFr on the development of MetS. Although MDA is not considered as one of MetS marker, feeding HFFr diet increased significantly ($p<0.05$) serum MDA in the HFFr fed groups indicating an increase in oxidative stress.
13	Would it be possible that the effect of HFFr-FEe and HFFr-SEe on metabolic syndrome is due to decreased intake caused by high moisture content in foods, not by the antioxidant activity of the plant? How do the authors explain about this issue?	There was no difference in feed intake in the intervening period between groups (Table 3). Thus, the high moisture content in FEe and SEe does not affect the decrease in food intake. Antioxidant activity on FEe and SEe is playing a role in the repairmen of biomarkers of metabolic syndrome.
14	The section with future studies and limitations should be added.	Further research is needed regarding the administration of *E.elatior* to each component of metabolic syndrome to achieve normal values, especially lipid profile components and MDA, namely by extending the intervention period of E.elatior administration.
	Minor points	
1	For the p-value, " p " should be intalicized.	p-value writing has been corrected to "*p*" italicized.
2	In 2.11, "FBF" measurement should be "FBG" measurement.	It has been corrected to "2.7.2. Fasting blood glucose (FBG), lipid profile, and MDA determination"
3	In Tables 3-5, describe what the letters a and b indicate, and use P-value < 0.001 instead of 0.000.	a dan b ; Means within a row with unlike superscripts differ, $P < 0.05$. The actual P value has been shown in the table.
	Referee B:	
1	The aim of the present study should be stated clearly in introduction section.	It has been explained in introduction section: This study aimed to reduce MetS biomarkers by studying the effect of *Ee*, i.e., fresh (FEe) or steamed *Ee* (SEe) incorporated in the standard rat diet.
2	The authors have stated that "Steaming is a suitable method for cooking vegetables and can increase the antioxidant activity in several types of vegetables." in introduction section.	The reason has been explained in discussion section paragraph 3 line 4:

	However, the results obtained from DPPH assay is not consistent with the above statement. Please explain it	Unlike some other types of vegetables, the steaming process on *Ee* does not increase antioxidant activity. This is due to possible phytochemical destruction, release, and transformation. Based on the observation that the red color of SEe is faded more than FEe, the anthocyanin compounds that give *Ee* a red color could be partly damaged during the steaming process. Thus, the DPPH test resulted in lower antioxidant activity in SEe than FEe. These results are similar to those of studies that showed the antioxidant activity, total phenolic, and anthocyanin levels in fresh red cabbage were higher than steamed red cabbage [30]. On the other hand, steaming can increase the flavonoid content of certain vegetable, which may be related to the efficient release of flavonoids within the food matrix.
3	The significant figures in all tables should be confirmed and corrected.	The significant figures in all tables have been confirmed and corrected.
4	In all tables, the comma (,) in all detected values should be corrected into point (.).	all p-value writes have been corrected in the entire table.
5	In table 2, the results should be conducted in triplicate separately and expressed as mean ± SD. In addition, the suitable statistical method should be carried out.	In table 2 already equipped mean ± SD and has been statistical tests.
6	In table 2, the content of total phenolic in SEe is lower than FEe obviously. Please discuss it.	It has been explained in discussion paragraph 3: *Etlingera elatior* contains anthocyanins, flavonoids, and polyphenol, and their antioxidant activities are related to the ameliorate of lipid profiles, weight loss, and MDA reduction (as one of the oxidative stress biomarkers). Our results showed that FEe exhibits higher antioxidant activity, total phenolic, and anthocyanin levels, whereas SEe has a higher amount of total flavonoids. Unlike some other types of vegetables, the steaming process on *Ee* does not increase antioxidant activity. This is due to possible phytochemical destruction, release, and transformation. Based on the observation that the red color of SEe is faded more than FEe, the anthocyanin compounds that give *Ee* a red color could be partly damaged during the steaming process. Thus, the DPPH test resulted in lower antioxidant activity in SEe than FEe. These results are similar to those of studies that showed the antioxidant activity, total phenolic, and anthocyanin levels in fresh red cabbage were higher than steamed red cabbage [30]. On the other hand, steaming can increase the flavonoid content of certain vegetable, which may be related to the efficient release of flavonoids within the food matrix [31].
7	A combined Results and Discussion section is appropriate.	Yes.
8	In results section of 3.1 and 3.2, the description should be rewritten because of no scientific sounds.	It has been corrected in results section of 3.1 and 3.2: 3.1 Proximate analysis of *Ee*. Table **1** presents the proximate composition of *Ee*. Moisture is the largest component of fresh *Ee*, comprising 81.29±0.785% per 100 g fresh weight. Ash is the smallest component of fresh *Ee*, comprising 1.94±0.014% per 100 g fresh weight.

		3.2 Antioxidant and phytochemical content. Table **2** presents antioxidant activity and phytochemical compounds of fresh (FEe) and steamed (SEe) *Ee*. Steamed Ee contains higher moisture and total flavonoids than FEe. However, SEe were lower in antioxidant activity, total phenolic and anthocyanins than FEe. The water content of FEe (81.29%) and SEe (90.13%) was high and significantly different ($p<0.05$).
9	The footnote in table 3 should be corrected. There is no information about HFFrD and MetS group.	It has been corrected: HFFrD : high fat and high fructose diet (473.96 kcal/100 g; 11.93% protein; 31.46% fat) MetS group: The group was given a high fat and high fructose diet (473.96 kcal/100 g; 11.93% protein; 31.46% fat) during HFFrD periode.
10	In table 4 and results section of 3.4, the fasting blood glucose exhibited no significant difference among the four groups; therefore, high fat in combination with high fructose diet did not induce hyperglycemia. Please delete hyperglycemia in results section of 3.4 and discuss it.	It has been corrected, hyperglycemia in the resulting part 3.4 is removed. because it is no different from the control group who had fasting blood glucose levels above the normal FBG value.
11	In table 5, please explain that no significant difference existed between C and HFFr-Sd groups in postintervention.	It has been added in the part Results, part Effect of intervention (after MetS induction period) by feeding a standard or a standard diet that contains *Ee* on body weight, serum lipid profile, and MDA: At the end of the intervention, a significant bodyweight gain was observed in the control and HFFr-Sd group (similar). Meanwhile, the HFFr-FEe and HFFr-SEe groups experienced weight loss, and the greatest weight loss was observed in the HFFr-FEe group (Table **5**). In the HFFr-Sd group that previously had MetS markers, the intervention with normal diet only cannot decrease serum TG, total cholesterol, LDL-C, and MDA level compared to the control group.
12	More discussion is needed about the results section of 3.4~3.6.	It has been explained in discussion paragraph 1-4.
13	Could the doses of FEe and SEe used in rats be achieved in human? Please translate and discuss it.	Yes. The doses of FEe and SEe administered in rats were tried to be taken based on the recommended portion of vegetable consumption per day for humans which was then converted into a dose for rats. So that the dose is by the portion of vegetables so that it can be achieved by humans. It has been explained in discussion paragraph 7: My-plate guide ("Isi Piringku") issued by the Ministry of Health Republic Indonesia recommends that one-third of the plate must consist of vegetables (a variety) for a healthy-balance diet and productive life of a human. The amount of *Ee* incorporated into the standard diet (one-third) in this study followed the recommendation which was then formulated for laboratory Wistar rats as experimental animals.
14	In conclusion, the most important issue should be summarized.	*Etlingera elatior* has antioxidant properties due to its anthocyanins, phenolic, and flavonoid contents. Intake of *Ee* as part of standard diet (one-third of the daily diet) for 29 days can reduce the body weight, MDA levels, and ameliorate high lipid profile in MetS Wistar rats. Fresh Ee

		intake has more profound effects to ameliorate MetS biomarkers than steamed Ee.
	Referee C: This is an interesting work carried out with laboratory rats grouped into four experimental groups: a control group and three groups that consume a hypercaloric diet to induce metabolic alterations typical of what in humans is known as the metabolic syndrome (MS). The effect of the change to an intervention diet containing 33% Etlingera elatior is then evaluated, finding a positive effect on all metabolic parameters of the MS model groups.	
	Title:	
1	Is it correct to talk about "Rats with metabolic syndrome? As far as I understand, the term "metabolic syndrome" is a concept defined for humans, not for animals. Please clarify this as the overall manuscript may require adjustments in this regard, including the title.	It has been corrected: Etlingera elatior (Jack) R.M, Sm in a Diet Normalizes some Metabolic Syndrome Markers due to High-Fat High-Fructose Diet in Wistar Rats
	Abstract:	
2	"…The C received standard rat diet during the whole in vivo study…". For clarity, it is suggested that the term "Control" be used instead of "C" to denote the control group. In fact, the authors use this term in Table 4. MATERIALS AND METHOD.	It has been corrected to "Control": "...A total of 24 male Wistar rats were divided randomly into the following four groups: 1) Control, fed standard rat diet during the whole duration of the study,…"
	In page 3, Section 2.5:	
3	"...animals were divided randomly into four treatment groups with 6 rats/group: control group (C), HFFr-Sd, HFFr-Sd containing FEe (HFFr-Fee), and HFFr-Sd containing SEe (HFFr-SEe) groups…" Please correct the abbreviation used to refer the third group (HFFr-Fee).	It has been corrected to "HFFr-FEe" : The animals were divided randomly into four treatment groups with 6 rats in each group i.e. : 1) Control, fed standard rat diet during the whole duration of the study, 2) HFFr-Sd, fed high-fat high-fructose (HFFr) diet for 29 days followed by 29 days of the standard diet, 3) HFFr-FEe, fed HFFr diet for 29 days followed by 29 days of a standard diet that contains 33.3% FEe, and 4) HFFr-SEe, fed HFFr diet for 29 days followed by 29 days of a standard diet that contains 33.3% SEe.
	RESULTS.	
4	Page 6. There are two sections 3.1 on results. Please clarify.	It has been corrected to "3.1 Proximate analysis of *Ee"* and "3.3 Food, drink, and energy intake"
a	"3.1. Proximate analysis of Etlingera elatior"	
b	"3.1. Food and drink intake and body weight" (Después de la sección 3.3).	
5	Page 6, Section "3.3. Food and drink intake":	
a	No table or figure are mentioned in this section, despite presenting results.	It has been mentioned in this section: During MetS induction with HFFr diet, the average food intake in HFFr-Sd, HFFr-FEe, and HFFr-SEe groups was significantly lower ($p<0.05$) than the control group (Table **3**).
b	What do you mean with HFFr-Fee in: "…the average food intake in HFFr-Sd, HFFr-Fee, and HFFr-SEe…"	It has been corrected to "…he average food intake in HFFr-Sd, HFFr-FEe,.."
c	"…In addition, the average drinking intake in these groups were lower…" If you look at Table 3, you will see the opposite: higher intake than the control (57-65 vs 31 ml/d, respectively).	It has been corrected to "…the average drinking and calorie intake in these groups were significantly higher ($p<0.05$)…"
d	What is the relationship between this section 3-3 and the next section of the document (3-1)? (see commentary 7.b).	It has been corrected to "3.1 Proximate analysis of *Ee"* and "3.3 Food, drink, and energy intake"
6	Table 2:	

a	What is the meaning of the asterisks? It should be indicated as a footnote.	It is mean * *average value of the two measurements*
b	A P-value = 0.000? The actual P-value should be shown, for example: 2x10-8. This criticism is valid for all tables shown.	It has been corrected to the actual P-value for all tables shown.
7	Table 3: Please think of some way to simplify this table. Every table should be self-explanatory. This table is not, and is not understood, for several reasons:	It has been corrected.
a	Similar names for experimental groups, interventions and/or diets. Confusing.	
b	The footnote is too cumbersome, and leads to more confusion. Even some names mentioned there do not match those in the table (e.g. "...HFFr-St, MetS group...").	It has been corrected to "…HFFr-Sd, MetS group .."
c	What do the superscripts "a" and "b" used in the table mean? Not stated.	There are similarities or differences. It has been add in footnote: Means within a row with unlike superscripts differ, P < 0.05.
d	What variables or groups were compared to have the "P-values" shown? It is impossible to know this from the information provided in the table.	It has been add in footnote: P-values are average of five replicates ± SD. * : Significant at P < 0.05.P : One-way ANOVA, LSD if data were normally distributed, Kruskal–Wallis and Mann–Whitney if not.
e	What does a P=0.000 represent? They should provide the actual calculated P-value. This criticism is valid for all the tables in the document. It is suggested that an effort be made to present the data more clearly in this table, perhaps by using the same nomenclature as in Table 5 (Pre and Post)?	It has been corrected and present the actual P-value for all tables.
8	Table 4.	
a	Unlike other tables where the control group is called "C", here it is referred to as "Control". See comment 2.	It has been corrected to "Control".
b	What do the superscripts "a" and "b" in the table mean? This should be indicated.	It has been add in footnote: a and b; Means within a row with unlike superscripts differ, *P* < 0.05
c	Place the actual P values obtained.	It has been present the actual P-value.
9	Table 5:	
a	What do the P-values in the column and in the rows mean? This should be indicated at the bottom of the table.	It has been add in footnote: *p*-value: One-way ANOVA if data were normally distributed and Kruskal–Wallis test if not normally distributed *P*-value: Paired t-test if data were normally distributed and Wilcoxon if not normally distributed *: significant
b	Why the MDA results are included in a separate section (section 3-6) when they correspond to one of the six variables studied in the same table?	It has been corrected, no part 3.6

c	If we compare Pre- vs. Post-intervention only for the control group, we can see that there are significant differences in all six variables. This result is not mentioned or discussed. How do you explain such differences? How could this affect the validity of the conclusions obtained in this study? It would be interesting to have this discussed in the paper.	It has been added in the discussion paragraph 4: A significant difference in the six variables pre- and post-intervention in each and among groups (Table 5) was undoubtedly due to the presence of *Ee* in the diet (HFFr-FEe and HFFr-SEe). In HFFr-Sd group, intervention by feeding only standard rat diet cannot reduce biomarkers of MetS and have no change in the oxidative stress marker i.e. serum MDA. This demonstrates that *Ee* incorporation in the standard diet can improve body weight, serum lipid profile, and MDA levels in Wistar rats with MetS markers.

Our resubmission has new reference number

Inbox

Retno Murwani <rmurwani.undip@gmail.com> Mon, Sep 14, 9:17 PM (3 days ago)

to complaint

Dear Sir,

Thank you for the information.

I am wondering, our submission is not a new submission, it is a revised version of the manuscript that has been reviewed.

Why do I have the same reply as a new submission?

Our first submission is:

BMS-CNF-2020-98	2020-05-16	Etlingera elatior (Jack) R.M, Sm Normalizes Body Weight, Lipid Profile, and Malondialdehyde in Metabolic Syndrome Rats

After the revision, following reviewer comments and suggestions we changed the title of the manuscript and resubmitted. However, the reference number has been changed to:

BMS-CNF-2020-182	2020-09-04	Etlingera elatior (Jack) R.M, Sm in a Diet Normalizes Some Metabolic Syndrome Markers Due to High-Fat High-Fructose Diet in Wistar Rat

Please, can you assist me regarding this? I am confused.

Corresponding author

Prof. Retno Murwani, PhD

Current Nutrition and Food Sciences CNF Wed, Sep 16, 2:25 PM (1 day ago)

to Mahmood, Ambreen, MSCG, me

Dear Dr. Murwani,

Thank you very much for your email of September 14, 2020. As per your confirmation in the email below, we will remove your submission "BMS-CNF-2020-182" and will proceed the revised manuscript "BMS-CNF-2020-98" further.

Please stay in touch for any query.

Regards,

Nida Badar
Senior Manager (Publications)

Note:

Please reply to this email at cnf@benthamscience.net otherwise your email will not reach me.

Retno Murwani <rmurwani.undip@gmail.com> 1:41 PM (2 hours ago)

to Current, Mahmood, Ambreen, MSCG

Thank you for your confirmation reply.

Best

Corresponding Author

On Wed, Sep 16, 2020 at 2:25 PM Current Nutrition and Food Sciences CNF <cnf@benthamscience.net> wrote:

Dear Dr. Murwani,

Thank you very much for your email of September 14, 2020. As per your confirmation in the email below, we will remove your submission "BMS-CNF-2020-182" and will proceed the revised manuscript "BMS-CNF-2020-98" further.

Please stay in touch for any query.

Regards,

Nida Badar
Senior Manager (Publications)

Note:

Please reply to this email at cnf@benthamscience.net otherwise your email will not reach me.

---------- Forwarded message ---------
From: **Retno Murwani** <rmurwani.undip@gmail.com>
Date: Mon, 14 Sep 2020, 19:17
Subject: Our resubmission has new reference number
To: <complaint@benthamscience.net>

Retno Murwani <rmurwani.undip@gmail.com> Aug 23, 2020, 9:34 PM (21 hours ago)

to nurislamidinih, zulfa_juniarto, elvina.devi

Dear all,
berikut hasil review artikel Dini.
Ibu kirimkan versi terakhir perbaikan yang waktu submit belum diperbaiki. Perbaikan2 terus dilakukan setelah submitted.
Yang jelas graphical abstract terakhir sudah disetujui. Nanti waktu kita kirim lagi revisinya, kita pakai graphical abstract versi terakhir.

Perbaikan yang penting yaitu di Tabel dan diskusi. Judul bila berubah, misal krn metabolic syndrome tidak tepat untuk tikus bisa diganti high fat high fructose diet.

Silahkan diperbaiki sebisanya. Kemudian akan ibu perbaiki lebih lanjut dan kirim lagi untuk proof reading profesional di Benthamnya.

Best
Pembimbing-1
Prof Retno Murwani
Universitas Diponegoro Semarang

3 Attachments

Retno Murwani <rmurwani.undip@gmail.com> Fri, Oct 9, 2020, 11:27 AM Reply

to Current

Ms Badar,

At the moment we are revising for the second time. Can you open the author page so I can upload our second revision.

Corresponding author

Current Nutrition and Food Sciences CNF <cnf@benthamscience.net> Fri, Oct 9, 2020, 11:52 AM Reply

to me

Dear Dr. Murwani,

Thank you very much for your email. Kindly submit your article via email attachment.

Please stay in touch for any query.

Regards,

Nida Badar
Senior Manager (Publications)

Retno Murwani <rmurwani.undip@gmail.com> Oct 26, 2020, 8:46 AM Reply

to Current

Dear Ms Nina,

As corresponding author I need information regarding what file should we send by email.

We have been asked by the illustration department since our first submission regarding graphical abstract and it has been revised several times and finally it has been approved and met the requirements.

So what files should we send you by this email?

Corresponding author
Retno Murwani, PhD
Universitas Diponegoro Semarang, Indonesia

Retno Murwani <rmurwani.undip@gmail.com> Oct 26, 2020, 8:51 AM Reply

to Current

Miss NIna,
In addition, we can not meet the 2 weeks revision dateline, as professional proofreading service taking time.
We are also confused by reviewer comments, so we try to figure out what is the revision should look like.

Current Nutrition and Food Sciences CNF <cnf@benthamscience.net> Oct 28, 2020, 4:44 PM Reply

to me

Dear Dr. Murwani,

Thank you very much for your email. Kindly clarify your email, we cannot get the matter of reviewers comments as mentioned in your email.

Please stay in touch for any query.

Regards,

Nida Badar
Senior Manager (Publications)

Retno Murwani <rmurwani.undip@gmail.com> Wed, Oct 28, 2020, 7:15 PM Reply

to Current

Regarding the email from youi below, I need information regarding our revised manuscript.
Is it full article with all the tables and pictures in one file? Or should it be separated into main text, abstract, Tables, Figures?

Dear Dr. Murwani,
Thank you very much for your email. Kindly submit your article via email attachment.
Please stay in touch for any query.
Regards,
Nida Badar
Senior Manager (Publications)

Current Nutrition and Food Sciences CNF <cnf@benthamscience.net> Thu, Oct 29, 2020, 11:17 AM Reply

to me

Dear Dr. Murwani,

Thank you very much for your email. Yes, please submit your complete manuscript via email attachment along with tables and figures in a word file and we will replace it in our records.

Please stay in touch for any query.

Regards,

Nida Badar
Senior Manager (Publications)
Note:
Please reply to this email at cnf@benthamscience.net otherwise your email will not reach me.

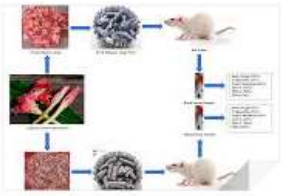
Retno Murwani <rmurwani.undip@gmail.com> Oct 29, 2020, 3:12 PM Reply

to Current

Hi Ms Nina Badar,
attached is our full manuscript along with Tables and Figures.

Corresponding Author
Retno Murwani, PhD.
Universitas Diponegoro Semarang
Indonesia

4 Attachments




Current Nutrition and Food Sciences CNF <cnf@benthamscience.net> Oct 29, 2020, 5:25 PM Reply

to me

Dear Dr. Murwani,

Thank you very much for your email. I will replace the files in my records.

Please stay in touch for any query.

Regards,

Nida Badar
Senior Manager (Publications)
Note:
Please reply to this email at cnf@benthamscience.net otherwise your email will not reach me.

Manuscript Provisional Acceptance letter | BMS-CNF-2020-98

2020_Dini_Bentham_CurrNutFS

Current Nutrition and Food Sciences <admin@bentham.manuscriptpoint.com>
to me, cnf, qasit

Sun, Nov 1, 2020, 10:56 AM Reply

Reference#: BMS-CNF-2020-98

Submission Title: Etlingera elatior (Jack) R.M, Sm Normalizes Body Weight, Lipid Profile, and Malondialdehyde in Metabolic Syndrome Rats

Dear Dr. Retno Murwani,

I am pleased to inform you that your article entitled **"Etlingera elatior (Jack) R.M, Sm Normalizes Body Weight, Lipid Profile, and Malondialdehyde in Metabolic Syndrome Rats"** has been provisionally approved for publication in "**Current Nutrition and Food Sciences**". Please note that the acceptance of your article will be subject to a detailed scrutiny and approval of the following items:

a. The standard of English language in the articles should be suitable.

b. "IMRAD" Structure: Headings such as Introduction/background, Methods and Materials, Experimental, Result and Discussion are mandatory for research articles.

c. Abstract should be in the format of a STRUCTURED ABSTRACT, having explicit headings such as background, introduction, method, result and conclusion

d. References should be in the correct format.

e. All references mentioned in the reference list should be cited in the text, and vice versa.

f. Permission should have been obtained for use of copyright material from the appropriate sources (including the Internet) and submitted to us.

g. There should be no difference in the list of Authors in the revised manuscript from what was submitted at the time of submission of the article.

h. If your study involves human or animal subjects, you should have obtained ethical approval. Please state whether Ethical Approval was given, by whom and the relevant Judgement's reference number.

- Ethical Committee Name:

- Guidelines for Human or Animal:

Please ensure that all the above points have been properly taken care of to avoid delays in publication.

We wish to thank you for submission of the manuscript to "**Current Nutrition and Food Sciences**" and look forward to continued collaboration in the future.

With warm regards,

Ms.Nida Badar
Manager
Bentham Science Publishers
E-mail: nidabadar@benthamscience.net

Retno Murwani <rmurwani.undip@gmail.com> Sun, Nov 1, 2020, 1:19 PM Reply

to nidabadar, Current

Dear Ms Nina Badar,
thankyou for the good news. I wonder about the title of the article. It was asked to be changed by one of the reviewers and we have revised it and stated in our rebuttal letter. Will the title remain the same as the original unrevised title?

Regards
Corresponding author
Retno Murwani PhD
Prof in Nutritional Biochemistry
Universitas Diponegoro Semarang
Indonesia

Current Nutrition and Food Sciences CNF <cnf@benthamscience.net> Mon, Nov 2, 2020, 10:54 AM Reply

to me

Dear Dr. Murwani,

Thank you very much for your email. We will revised the title on the system according to your revised manuscript.

Please stay in touch for any query.

Regards,

Nida Badar
Senior Manager (Publications)

Note:
Please reply to this email at cnf@benthamscience.net otherwise your email will not reach me.

Retno Murwani <rmurwani.undip@gmail.com> Thu, Nov 5, 2020, 6:34 PM Reply

to Current

Dear Ms Badar,
thankyou for the correction. We are working on it.

Best regards
Corresponding author
Retno Murwani, PhD.
Universitas Diponegoro Semarang

Retno Murwani <rmurwani.undip@gmail.com> Fri, Nov 6, 2020, 8:30 AM Reply

to Current

Dear Ms Badar,
attached is the manuscript that has been edited for references in the text and list of references.

Corresponding author
Retno Murwani PhD
Prof in Nutritional Biochemistry
Universitas Diponegoro Semarang
Indonesia

Current Nutrition and Food Sciences CNF <cnf@benthamscience.net> Fri, Nov 6, 2020, 11:48 AM Reply

to me

Dear Dr. Murwani,

Thank you very much for your reply. We have safely received your corrected manuscript. Please stay in touch for any query.

Regards,
Nida Badar
Senior Manager (Publications)
Note:
Please reply to this email at cnf@benthamscience.net otherwise your email will not reach me.

Retno Murwani <rmurwani.undip@gmail.com> Fri, Nov 13, 2020, 7:37 AM Reply

to Current

Dear Ms Nina,
Can you inform me any update regarding our manuscript.

Regards
Corresponding author
Retno Murwani

Current Nutrition and Food Sciences CNF <cnf@benthamscience.net> Nov 13, 2020, 1:35 PM Reply

to me

Dear Dr. Murwani,

Thank you very much for your reply. Your manuscript is in inhouse processing at the moment.

Please stay in touch for any query.

Regards,

Nida Badar
Senior Manager (Publications)

Manuscript Status [BMS-CNF-2020-98]

Editorial Office 2:07 PM (2 hours ago)

Reference Number: BMS-CNF-2020-98
Dear Dr. Retno Murwani
This is to update you about your manuscript entitled "Etlingera Elatior (Jack) R.M, Sm Containing Diet Normalizes Some Metabolic Syndrome Markers Due To High-Fat High-Fructose Diet In Wistar Rats" submitted to the journal "Current Nutrition And Food Sciences". Your manuscript is currently in "**MANUSCRIPT IN COPYEDITING**" stage.

You may track all the stages of publication online until your manuscript is finalized and is ready for publication. Log onto JMS and click the article reference number from the available list of your submitted manuscripts to view the detailed status at every stage of the peer-review process and editorial decision.

Best Regards
JMS Support System

Retno Murwani rmurwani.undip@gmail.com 3:21 PM (1 hour ago)

to Editorial
Thank you for the update of my manuscript. Looking forward to the publication.

On Fri, Dec 4, 2020 at 2:07 PM Editorial Office <admin@bentham.manuscriptpoint.com> wrote:
Reference Number: BMS-CNF-2020-98
Dear Dr. Retno Murwani

This is to update you about your manuscript entitled "Etlingera Elatior (Jack) R.M, Sm Containing Diet Normalizes Some Metabolic Syndrome Markers Due To High-Fat High-Fructose Diet In Wistar Rats" submitted to the journal "Current Nutrition And Food Sciences". Your manuscript is currently in "**MANUSCRIPT IN COPYEDITING**" stage.
You may track all the stages of publication online until your manuscript is finalized and is ready for publication. Log onto JMS and click the article reference number from the available list of your submitted manuscripts to view the detailed status at every stage of the peer-review process and editorial decision.

Best Regards
JMS Support System

COVERING LETTER 1ST Galley Proofs | BMS-CNF-2020-98

Inbox

Current Nutrition and Food Sciences **Jan 14, 2021, 2:33 PM (1 day ago)**

to me, cnf

URGENT

Dear Dr. Murwani,

The composed version of your article is available on the dashboard of our online portal. I shall be grateful if you could kindly carefully check the composed version for any potential errors, missing lines/paragraphs and errors in figures/diagrams etc.

A reprint order form will also be mailed to you shortly through which you can avail of various services that we offer.

The uploaded proofs have been prepared directly from the final manuscript provided by you. However, in the transformation process, certain errors may have occurred due to a difference in the softwares used for which the Composing Department is not liable. The PDF version may distort your original figures. Therefore kindly check them carefully. All figures will be reproduced directly from your supplied soft copies.

The resolution of the figures will be exactly the same as supplied to us with the original manuscript (except chemical structures). All references must be complete and accurate (according to the IFA of the Journal Current Nutrition and Food Sciences).

Moreover, as a part of the publication process, the manuscript has undergone copyediting for generally minor grammatical inconsistencies and specifically for some significant ambiguities (where necessary), to bring in clarity to the content. You are therefore requested to read the proofs thoroughly and send approval for all the corrections made in order to ensure that the original meaning of the content has not been altered in case of significant changes in the text.

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With best wishes,
Ms.Nida Badar
Manager
Bentham Science Publishers
E-mail: nidabadar@benthamscience.net
galleyproofs@benthamscience.net

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Retno Murwani <rmurwani.undip@gmail.com> 6:36 PM (28 minutes ago) Reply

to Current

Noted, we are proofreading it

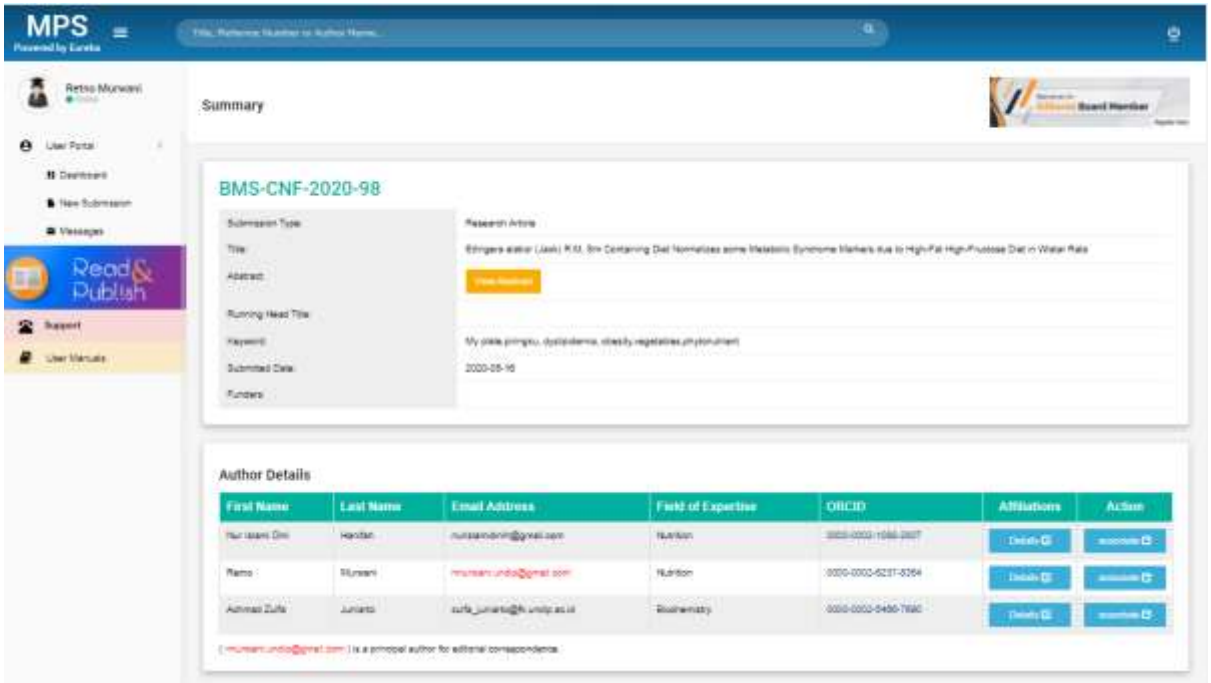
Retno Murwani <rmurwani.undip@gmail.com> Mon, Jan 18, 6:54 PM (9 days ago) Reply
to Current

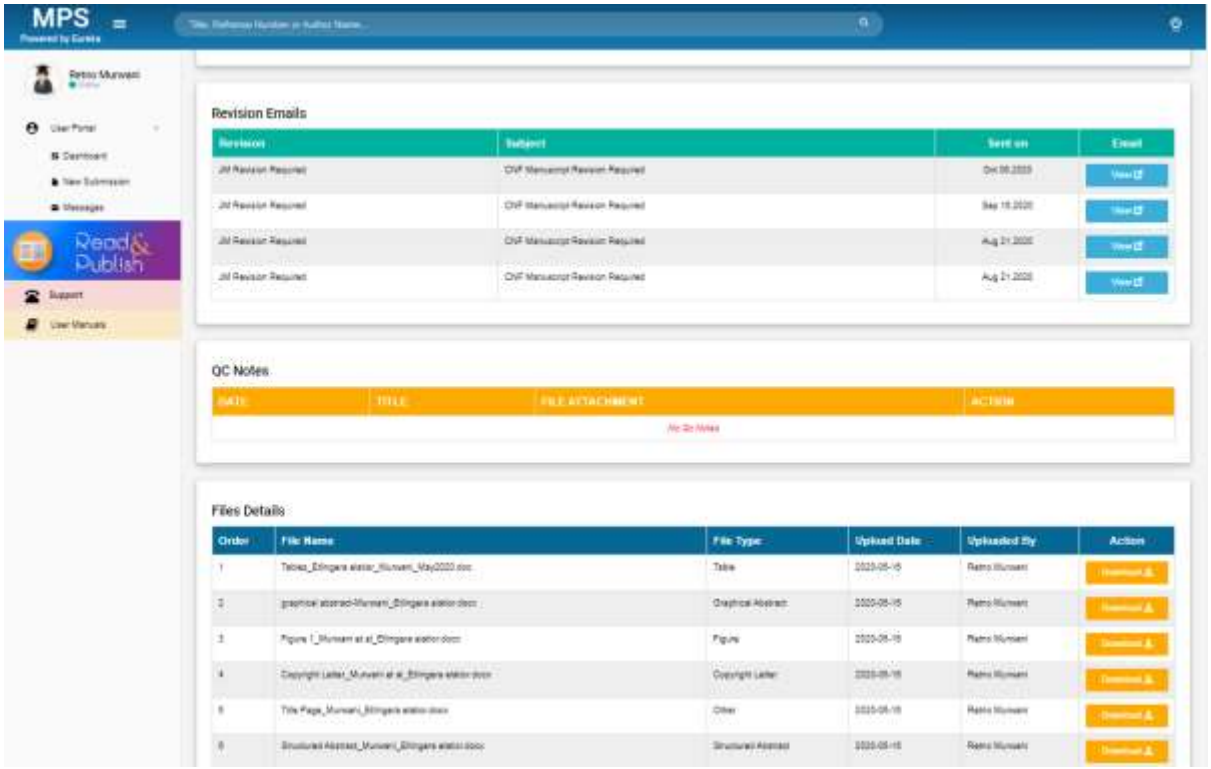
Dear Sir,
The galley proof is correct. We do not find any error.

Thankyou.

Best regards
Corresponding author

Author page, urutan submission, revisi, sampai pdf proof

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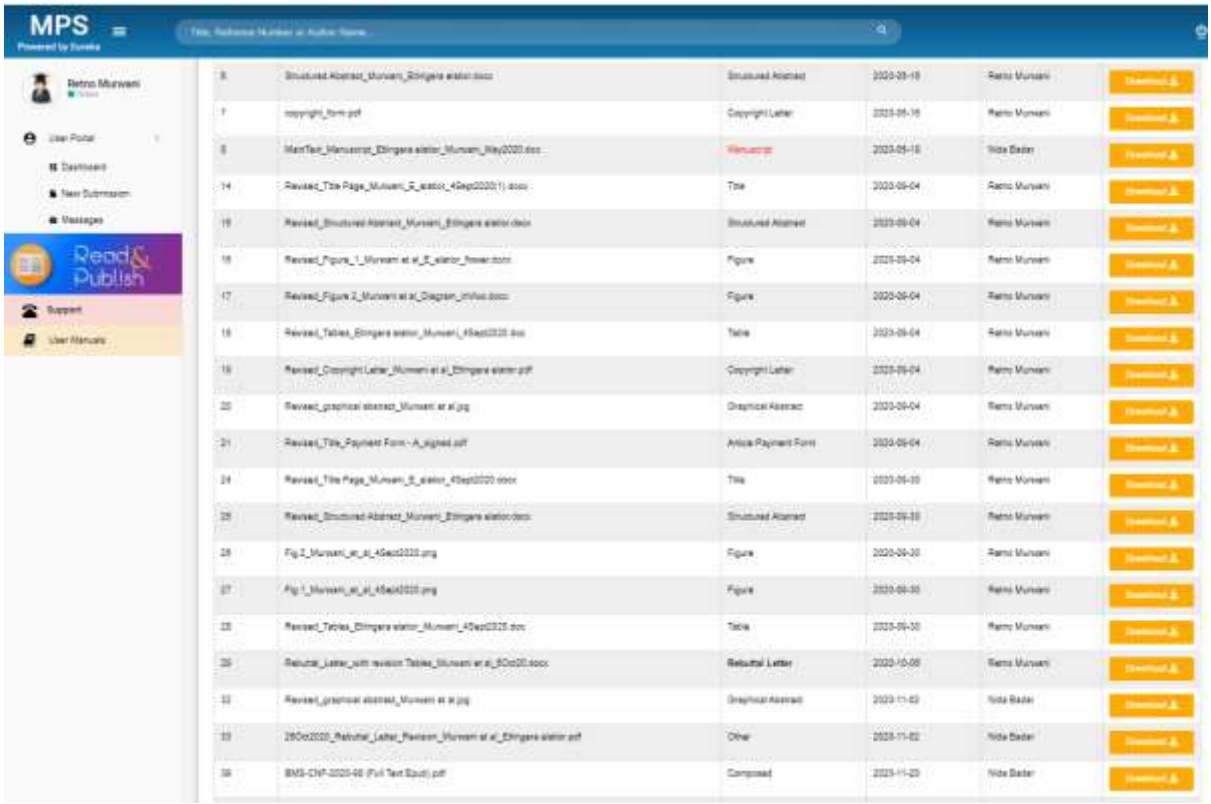
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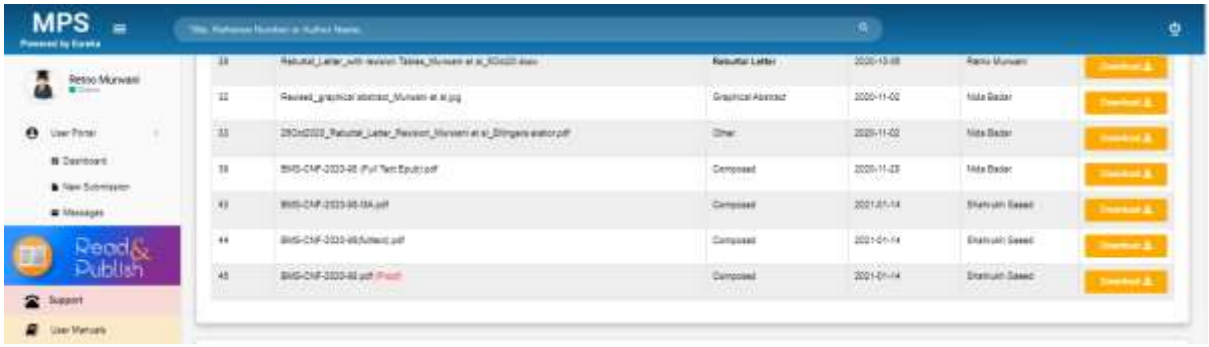
Nida Bader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