The administration of UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry increased body weight and did not increase estrogen hormone level in female albino rat (Rattus norvegicus) Wistar strain

Abstract

Background: This study aimed to prove that administration of UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry increased body weight and estrogen levels in female albino rat (Rattus norvegicus) Wistar strain.

Methods: This research was a true experimental with randomized pretest-posttest control group design. The research subjects were 18-female-albino-rats aged 21-days, weight 25-28 grams, divided into 2-groups: control group which was given standard food and sugar solution (0.36 grams of sugar dissolved in 1 ml aquadest), and intervention group which was given standard food and UltraMimi Kids® UHT milk 1 ml for the first 14-days and upgraded to 2 ml for the rest 14-days, given three times a day for 28-days. The rats body weight and estrogen levels were measured using Tanita-KD-192-digital-scales and ELISA method.

Results: The control group had an increased body weight (26.2±1.2-66.1±5.94 grams; \(p<0.001\)), but there was no change in estrogen levels (38.59±11.19-44.59±5.42 ng/L; \(p=0.217\)). Whereas, the intervention group had an increased body weight (25.77±0.83-85.33±10.24 grams; \(p=0.008\)), but there was no change in estrogen levels (39.91±3.73-42.66±2.24 ng/L; \(p=0.066\)). After 28-days of intervention (posttest), it was found that the mean of body weight in the intervention group was higher than the control group (\(p<0.001\)), there was no significant difference in estrogen levels (\(p=0.339\)) and food intake from the remaining feed in both groups (0.51±0.81-0.36±0.55 grams; \(p=0.823\)).

Conclusion: The administration of UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry increased body weight and did not increase estrogen hormone level in female albino rat (Rattus norvegicus) Wistar strain.

Keywords: UHT milk, UltraMimi Kids®, Body weight, Estrogen

Introduction

Nowadays, there are a lot of foods and drinks that contain hormone in society and can affect people’s health. Foods and drinks that contain hormone presumed can increase body weight and estrogen hormone level in children. Milk is an important substance for a balanced diet but it is not a compulsory food as nutrients of milk can be replaced by another food that have similar nutrients.¹ UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry contains phytoestrogen 1.57 pg/g according to phytochemical examination in Analytic Laboratorium University of Udayana. After
humans become adult, the body components cannot develop anymore. Otherwise, it will decrease because of the aging process. UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry can be one of the factor that cause aging process. Consuming a lot of UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry can reduce the production of estrogen endogen and cause imbalance of hormones in the body. Signs and symptoms of aging process appears because of the imbalance of hormones in the body.

**Methods**

This study used the simple randomization method to randomize pretest-posttest control group design. Subjects were 18-female-albino-rats (*Rattus norvegicus*), Wistar strain, aged 21-days, post-weaning, body weight between 25-28 gr and healthy. Exclusion criteria was the rats died during study period. Rats were divided into 2-groups, the control group and intervention group. After the rats were 21 days old, given adaptation, and before the study began, body weight of the rats were measured using Tanita KD-192 digital scales and measurement of estrogen hormones were taken from the blood using ELISA reader Multiskan.

The control group was given standard food and sugar solution (0.36 grams of sugar dissolved in 1 ml aquadest) and intervention group was given standard food and UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry 1 ml for the first 14-days dan upgraded to 2 ml for the rest 14-days, given three times a day for 28-days (08.00, 13.00 and 9.00 WITA). Control group and intervention group were given 7 grams of 594 feed everyday as their standard food. After the intervention, body weight of the rats were measured using Tanita KD-192 digital scales and measurement of estrogen hormones were taken from the blood using ELISA reader Multiskan. The results of estrogen hormones were analyzed using SkanIt 3.2 software. Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 25.0. Descriptive analysis, normality test, homogenity test and comparative test were done for all the variables. Shapiro Wilk test was performed for the normality test. The distribution of all the variables were normal. The level of significance was 5%. Parametric test was used to calculate the p-value.

**Results**

The results showed that the control group had an increased body weight (from 26.2±1.2 grams to 66.1±5.94 grams; *p*=0.001), but there was no significant change in estrogen levels (from 38.59±11.19 ng/L to 44.59±5.42 ng/L; *p*=0.217). Whereas, the intervention group had an increased body weight (from 25.77±0.83 grams to 85.33±10.24 grams; *p*=0.008), but there was no significant change in estrogen levels (from dari 39.91±3.73 ng/L to 42.66±2.24 ng/L; *p*=0.066). After 28 days of intervention (posttest), it was found that the mean of body weight in the intervention group were higher than the control group (from 66.1±5.94 gram to 85.33±10.24 gram; *p*=0.001), there was no significant difference in estrogen levels (from 44.59±5.42 ng/L to 42.66±2.24 ng/L *p*=0.376) and food intake from the remaining feed in both control and intervention groups (from 0.51±0.81 to 0.36±0.55 grams; *p*=0.823).

**Discussion**

**UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry effect on body weight and estrogen level**

In this study, we proved that UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry increases body weight but does not increase estrogen level. UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry contains saturated fat that will be stored in the body (lipogenesis). UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry contains high quality protein, especially whey protein. Milk protein has specific effect for treating malnutrition. Lactose content in UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry has prebiotic effect and induce lipogenesis. Besides that, mineral contents, such as kalium, natrium, magnesium, zinc and phosphorus are beneficial for human growth. The weight gain from consuming UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry is still in normal range. Composition of UltraMimi Kids® UHT milk, such as saturated fat, protein, lactose and minerals causes this milk can be used...
to treat and prevent malnutrition.4

Consuming UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry that contains phytoestrogen in a large quantities can cause a negative feedback to hypothalamus produce less GnRH (Gonadotropin Releasing Hormone). Less GnRH will produce less LH (Luteinizing Hormone) and FSH (Follicle Stimulating Hormone) in anterior pituitary. Then the production of estrogen hormone will be reduced in ovary.5 Estrogen has an ability to distribute visceral fat.6 If the production of estrogen hormone reduce, there will be deposit of visceral fat in the body. As fat cells can produce estrogen hormone, the cumulation of fat in the body will produce more estrogen hormones and estrogen level in blood will increase.2 Besides that, UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry contains cholesterol. Cholesterol will be synthesized become progesterone and then progesterone will be converted to androgen. Androgen will be converted to estrogen by aromatase enzyme.7 But, in this study, we proved UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry does not increase estrogen level significantly. This can be caused by low concentration of hormone content in UltraMimi Kids® UHT milk.

UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry effect on aging process

One of the problem that has to be solved to prevent aging process is obesity. Risk factors for precocious puberty are girl, obesity and exposed to sex hormones in this study.5 When a girl was born, there were 1-2 million ovums but only about 300-ovums would be released for fertilization.9 When ovulation occured, there would be 1 ovum released. When a girl experienced faster puberty or menarche than the usual age, the ovums would run out faster and menopause could happen faster than women of the same age.

Menopause is a normal phase of women aging process and usually happens at 45-55 years old. In menopause, there will appear signs and symptoms of aging and the production of hormones in the body has reduced. Consumption of UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry increases body weight but does not increase estrogen level in albino rats. The weight gain from consuming UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry is still in normal range. UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry does not have effect on aging process.

Conclusion

In conclusion, the results of this study indicated that the administration of 0.1-0.2 ml UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry increased the bodyweight of the female albino rats but did not increase estrogen hormone level. Further studies are required to prove that UltraMimi Kids® UHT milk by PT. Ultrajaya Milk Industry can be used to treat children with malnutrition.

Acknowledgment

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