The effect of fermented soy pulp on the growth performance of Syrian hamster, *Mesocricetus auratus*

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Abstract. This study aims to reveal the potential of fermented soy pulp on the growth performance of the Syrian hamster, *Mesocricetus auratus*. Soy pulp is a byproduct in soy milk production. It was reported to contain high nutritional values. The feeding experiment was carried out for 28 days in triplicates and one group of Syrian hamster which received commercial pellets was used as a control group. At the end of the experiment, growth performance parameters such as weight gain, feed conversion ratio (FCR) and specific growth rate (SGR) were recorded and analyzed. The results of the experiment showed that the growth performances of Syrian hamsters that received fermented soy pulp were lower compared to those of the control group with significant differences ($p<0.05$). The findings of the present study revealed that fermented soy pulp alone cannot be used as a supplement feed for Syrian hamster.
Key Words: FCR, feed, nutrition, SGR.

Introduction. The Syrian hamster, *Mesocricetus auratus*, is a well known pet worldwide. It can be found in outskirts and big cities (Rusin et al 2013). The market price of a hamster is ranging from 1 to 10 USD per piece. Due to its adorable characteristics, this hamster has a huge market demand. The short production cycle of this rodent attracts more investors in hamster farming, in order to cope with the market demand. The hamster is an omnivorous animal and consumes everything that it can fit into its mouth. However, like other animals, it needs fibers in its diets, the lack of fibers possibly leading to high mortalities (Salley & Bryson 1957). Therefore, plant based diets that contain high fiber content, such as soy (*Glycine max*), can be used as diet supplements for hamsters.

Soy is an important world commodity. Spain alone imported soy up to 2.5 million tons in 2004 (Mateos-Aparicio et al 2010). Soy has many uses and it can be processed into beverages, foods and health supplements. As a result, there are large soy pulp quantities from the mentioned soy processing activities. Usually, soy pulp is discharged as a waste of processing, and used as a fertilizer in agriculture activities. Soy and soy pulp have high nutritional values, but also antinutritional factors. In order to improve soy and soy pulp nutritional values, fermentation is applied to reduce the antinutritional values (Bo et al 2012). Hence, in the present study, the effect of fermented soy pulp on the growth performance of Syrian hamster was investigated in order determine if it can be an alternative food source for the Syrian hamster.

Material and Method

Feeding trial. The experiment was carried out in April 2015 at the Aquaculture Laboratory, Malaysia Kelantan University. 18 hamsters were purchased from a local pet shop with the weight ranging from 39 to 47 g. Groups of 3 hamsters were placed in 6

glass aquaria with the size of 1x1x1 m. 3 groups were used as control, where hamsters received commercial pellets as feed (crude protein 18%) (Prima Mekar, Malaysia). Another 3 groups received pelleted fermented soy pulp (crude protein 18%) (Prima Mekar, Malaysia). Daily feeding rate for all groups was 5% of total biomass with *ad libitum* water supply. All aquaria were cleaned every 2 days. Growth parameters such as weight gain, food conversion rate (FCR) and specific growth rate (SGR) were recorded every week for 4 weeks (18 days) consecutively. The formulas for weight gain, FCR and SGR are presented below (Lee et al 2016; Lee et al 2017):

$$Weight\ Gain(g) = Final\ Weight - Initial\ Weight$$

$$Specific\ Growth\ Rate, SGR\ (\%) = (Ln\ Final\ Weight - Ln\ Initial\ Weight) \times Days$$

$$Feed\ Conversion\ Ratio, FCR = \frac{Total\ Dry\ Feed\ Intake}{Total\ Weight\ Gain}$$

Statistical analysis. The present study results were expressed in mean value and standard error of means (SEM). The results were subjected to t–test to determine significant differences between control and treatment groups with $p<0.05$.

Results and Discussion. In the present study, the results showed that the weight gain (13.0±2.65 g), FCR (4.9±0.59) and SGR (7.0±0.75%) of *M. auratus* that received fermented soy pulp were significantly lower ($p<0.05$) compared to the control group that received commercial pellet (weight gain 34.7±4.51 g; FCR 1.6±0.57; and SGR 7.0±0.75%) (Table 1). Low of weight gain and high FCR were observed in the study of Sakaguchi & Matsumoto (1985), where the experimental hamsters received monesin treatment. Similar findings were also recorded in the present study, where low range weight gain and high FCR were observed for hamsters that received fermented soy pulp. This may be due to the experimental organisms needing more time to adapt to the new flavor of feed. The protein content of feed for both treatments in the present study was 18%. According to Feldman et al (1982), hamsters that received feed with a crude protein content of 18% can present increased growth, but this can also lead to severe kidney lesions. Bo et al (2012) reported that soy pulp is a by-product from tofu and soymilk production processes, containing almost 50% fibers, being a potential supplement in animal feeds. Hence, soy pulp can be applied in animal feeds in moderate proportions to avoid kidney disease.

Table 1

Growth parameters of hamster (*Mesocricetus auratus*) fed with commercial pellets (control) and fermented soy pulp

Growth parameters	*Fermented soy pulp*	*Control*
Initial weight (g)	46.7±4.29	39.3±1.24
Final weight (g)	59.7±6.92	74.0±9.17
Weight gain (g)	13.0±2.65[a]	34.7±4.51[b]
Feed Conversion Ratio	4.9±0.59[a]	1.6±0.57[b]
Specific Growth Rate (%)	7.0±0.75[a]	18.4±5.74[b]

Note: data are presented as means ± standard deviation; different superscripts in the same row show significant differences.

The weight gain of hamsters in the control group was found increasing consistently, whereas weight gain of hamster in the group that received fermented soy pulp did not occur in the first week, but increased consistently in the second week and onward (Figure 1).

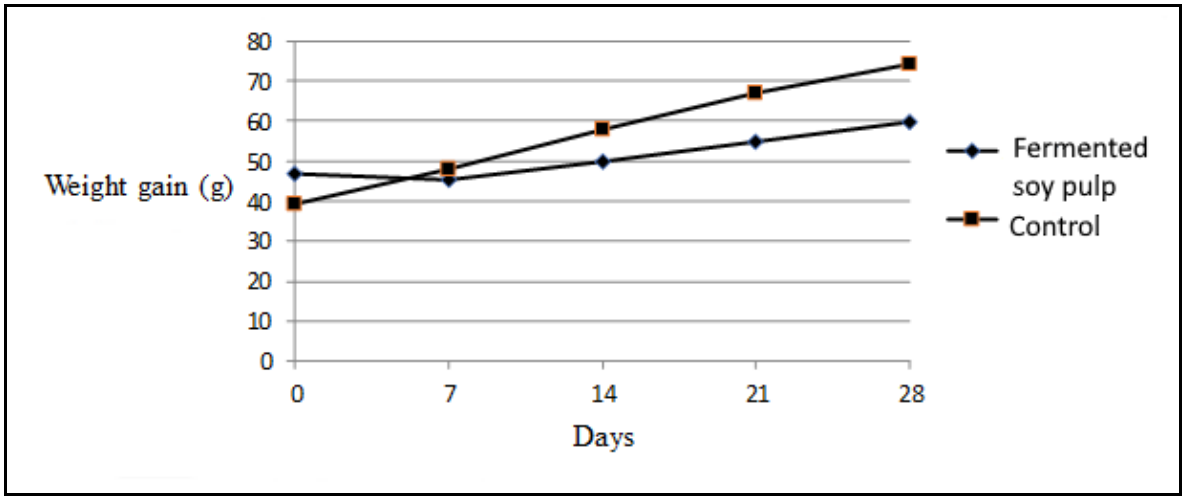

Figure 1. Weight gain of *Mesocricetus auratus* for 28 days.

This may be due to the experimental hamsters needing more time to adapt to the new flavor of feed. Soy pulp has been widely used in animal farming. For example, Alabi et al (2021) claimed that soy pulp was used in feeds for monogastric farm animals in Africa and this is the first report on the effect of fermented soy pulp on the growth performance of hamster in the literature. Based on the present findings, we may conclude that fermented soy pulp alone cannot be used as a feed for hamster. Therefore, we suggest that fermented soy pulp could be used as a supplement feed coating the present commercial pellets for hamsters.

Conclusions. The findings of the present study revealed that fermented soy pulp alone cannot be used as feed for hamsters. However, fermented soy pulp is rich in fiber and other nutritional values, and can be used as a supplement feed. Further studies need to be carried out before we can come to a certain conclusion.

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Conflict of Interest. The authors declare that there is no conflict of interest.

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