A PILOT STUDY: ACCEPTANCE AND CONSUMPTION OF DIFFERENT MACRONUTRIENT RAT FEED FORMULA BY SPRAGUE DAWLEY RATS
Khairil Azwan¹, Pamela David², Resni Mona¹, Jannathul Firdous¹, Noorzaid Muhamad¹*
¹Cluster for Integrative Physiology and Molecular Medicine (CIPMM), Faculty of Medicine, Royal College of Medicine Perak, Universiti Kuala Lumpur, Jalan Greentown, 30450 Ipoh, Perak, Malaysia.
²Department of Anatomy, Faculty of Medicine, University of Malaya, Kuala Lumpur 50603, Malaysia

ABSTRACT
Experiments using different kinds of rat feed diet is being used in many researches. Many of the diets used in commercialized special rat feed relate mainly to western diets. We developed several formulas to mimic the diet of the local population of Malaysia. Our aim is to observe the acceptance and consumption of the Sprague Dawley rats to different rat feed formulas. Eight Sprague Dawley rats were fed five different rat feed diets on different days for five days. Namely the five diets are normal rat chow, high sugar, high starch, high protein and high fat rat feed formula. The rat feeds were given ad libitum with tap water. The result was the rats accepted and consumed all types of different macronutrient formulated diets.

Keywords: Sprague Dawley, macronutrients, rat feed, consumption

INTRODUCTION
Diet has been identified as one of the leading causes of metabolic syndrome¹. Researches using different diets on Sprague Dawley rats to see their effects on their physiology are documented. Diet is one of the important factor which influence experimental types, particularly those measuring food intake. High sugar diet was identified as one of the main factors contributing to metabolic syndrome, among other factors²³. Also different diets high in fat which leads to insulin resistance were found to play a role in this predicament⁴. Developing a rat diet similar to the local diet consumed by the local population is important as different macronutrient value can have different physiological effects. Using local ingredients, the experiment will reflect more truly on the eating habits of the locality. This is important as different communities have different habits and lifestyles and will affect the health status of the community. Although low physical activity⁵ and sedentary lifestyles⁶ are factors to developing insulin resistance and cardiovascular disease, diet has its specific role in the development of these diseases⁷.

MATERIALS AND METHODS
Eight male Sprague Dawley rats aged 8 weeks old were kept in a constant temperature room (22 °C) with alternating daylight and night cycle. The rats were kept in four separate cages (two rats in one cage). The rats were fed different rat feed formula each day for five days and supplied with tap water ad libitum.

Day 1 – The rats were fed normal rat chow (Gold Coin). The nutrient breakdown is as follows: crude carbohydrates 64%, crude protein 21%, crude fiber 3%, crude fat 3%, ash 8%, calcium 0.8% and phosphorus 0.4%.

Day 2 – The rats were fed high sugar rat feed formula. The formula used was normal rat chow combined with 100% table sugar (Gula Perai) at a 50:50 ratios. Both the ingredients were blended together in a blender and added water to form a dough. The dough was broken down into golf ball size and were dehydrated overnight in an oven at 60 degrees Celsius.

Day 3 – The rats were fed high starch rat feed formula. The formula used was normal rat chow combined with sticky rice flour (3 Gajah) at a 50:50 ratio. The ingredients were prepared as the high sugar feed.
Day 4 – The rats were fed high protein rat feed formula. The formula used was normal rat chow combined with whey protein (GNC 100% Whey Protein Advanced) at a 50:50 ratio. The ingredients were prepared as the high sugar feed.

Day 5 - The rats were fed high fat rat feed formula. The formula used was normal rat chow combined with palm oil (Sime Darby) at a 60:40 ratio. Cocopeat fiber was added to stabilize the dough. Amount of fiber added was one third the amount of palm oil used. The ingredients were prepared as the high sugar feed.

All rat feed were refilled to the brim into the food dispenser of each cage in the morning of the day and will be observed for any balance on the next morning. All rat feed were prepared the day before and dispensed from the oven the next morning ready to be consumed.

All animal experimental methods are in compliance with the guidelines approved by the FOM IACUC University of Malaya (Ref: 2019-21114/UNIKL/R/KAMJ)

RESULTS

The different types of rat feed were fully consumed by the Sprague Dawley rats. No significant residue or feed balance was noticed. There was no sign of preferential dietary consumption of the rats towards any of the different diets. All the diets were well received and accepted by the Sprague Dawley rats without prejudice.

DISCUSSION

Incorporation of local ingredients into experimental rat feed is relevant to see the true reflection of the effects of the local diet on the local population. In this experiment we use staple ingredients readily available and consumed by the local population and use them in our formulated rat feeds. This can be used as a reference for future research aspiring to use local ingredients in their experiments.

Regarding the high sugar feed, the total carbohydrate in this formula reaches akin to many of the high sugar sweets and cakes in consumed by the local population. High starch feed formula uses sticky rice flour which is one of the ubiquitous ingredient of making sweets and cakes in the region. This formula is also high in carbohydrates but in this feed formula we use complex carbohydrates instead of simple sugar.

Our high protein rat feed uses whey protein supplements used by bodybuilders locally and around the world. Many Malaysians are beginning to be health conscious and are gym goers. These types of protein supplements are quite rampant in usage by average health conscious people and are usually used as supplements in addition to their local staples.

Palm oil is one of Malaysia’s main produce and export and it is used widely locally and regionally. This makes palm oil the source of fat of choice for our high fat feed. Instead of using lard, olive oil or other kinds of oil, palm oil is more familiar to everyday local food and is a staple for years. Forty percent is a high percentage for high fat formula as it reflects the fried foods available locally and is usually consumed with complex carbohydrates. Adding a bit of fiber to the formula is important as palm oil tend to have a melting point at 24 ºC. Added fiber stabilize the dough avoiding it to be runny and messy for feeding without significant nutritional changes and adverse effects on the rats.

CONCLUSION

All rat feed using different macronutrient formula were fully accepted and consumed by the Sprague Dawley rats.

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