Biospectra : ISSN: 0973-7057, Vol. 15(1), March, 2020, pp.117-120
An International Biannual Refereed Journal of Life Sciences

Animal Science

ISSN : 0973-7057

Int. Database Index: 663 www.mjl.clarivate.com

Different nutrients requirements of a laboratory rat

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Received : 04th December, 2019 ; Revised : 27th February, 2020

Abstract: The laboratory rat is favoured for experiment during to its moderate size, extravagant reproduction & adaptation that is traceable. Change in diets has taught us about the nutritional requirements of rats & the diseases or effects which are caused by deficiency of these nutrition. Investigators monitor the weight gain & reproductive relation. Among the different strains of rat used reproductive characteristics such as onset of reproductive maturity, fertility, litter size, preweaning mortality vary considerably.

Key words: nutritional requirements, deficiency, extravagant reproduction

INTRODUCTION

The nutritional requirements change according to the reproductive activity, age & developmental state and hence are not static. There is considerable difference between male & female rats.[1] The nutrients which are being discussed here is as follows fat, proteins, calcium, magnesium, phosphorous, potassium, sodium, copper, iron & zinc.[2] Through there are more nutrients, emphasis on these nutrients is given here.

These nutrients help in maintaining most of the physiological activities inside the rat body.

- Fats are usually related with energy intake & body weight gain. Rats usually requires 112 k cal of energy per body weight. The daily intake of fat should be less than 70gm.[3]
- Proteins are building blocks of any organisms. High amount of protein is required especially during growth & reproduction.
- Calcium- It is used to maintain bone density as well as used in secondary signaling pathway. Increase in calcium ingestion is good for bone health & prevention of osteoporosis.[4]
- Magnesium- A long term dietary Mg deficiency increases blood pressure & induces sustained hypertension.[5]
- Phosphorous- It is an important nutrient, which is needed to make protein for growth maintenance, repair of cells & tissues. A high intake of phosphorous can cause a decrease in body weight gain.[6]
- Potassium- Potassium requirement is seen to decrease with the increase in age.
- Sodium- Sodium requirement remains constant during the growth period. High salt intake elevates the blood pressure.[7]
- Copper- It is essential for maintaining an

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appropriate amount of haemoglobin in blood. Copper deficient mice develop anemia.

- Iron- It forms the core of the haemoglobin molecule & hence is important for O_2 transfer in blood. Low levels can cause sickle shaped RBCs[8].
- Zinc- It is important during pregnancy & for maintaining learning & memory function in rats.

MATERIALS & METHODS

Different methods were applied for the clinical estimation of there more & micronutrients. The data on which requirements are based were reported from many different laboratories that used colony management practices. The values have been converted to dietary content by assuming a dietary intake of 15g/rat/day for growing rats or adult rats for maintenance, 15 to 20g/rat/day during pregnancy.

RESULT & DISCUSSION

From the table we can say that for amounts of nutrients per kg body weight, is seen to increase during pregnancy. A high increase in the requirement of Zinc & Iron indicates their importance in maintaining the foetus & its developments.

Table 1- Amounts of nutrients per kg body weight

		Amount per kg diet		
Nutrient	**Unit**	**Maintenance**	**Growth**	**Reproduction (female)**
Fat	g	50	50	50
Protein	g	50[b]	150[b]	150[b]
Calcium	g	5	5	6.3
Magnesium	g	0.5	0.5	0.6
Phosphorus	g	3	3	3.7
Potassium	g	.6	3.6	3.6
Sodium	g	0.5	0.5	0.5
Copper	mg	5	5	8
Iron	mg	35	35	75
Zinc	mg	12	12	25

CONCLUSION

The amount of nutrients required to sustain maximum growth of young rats is different from the amounts needed to maximize enzymal activities. Male & female nutritional values differ considerably. A deficiency of these nutrients can cause various diseases such as insulin resistance, obesity, bone deformation or osteoporosis etc. For the maximal utility of laboratory rats, they must be well fed with proper amounts of nutrients & a stable diet.

ACKNOWLEDGEMENT

I would like to express my deep gratitude to professor in charge Department of Zoology, B.N.M.University, Madhepura for the patience guidance, enthusiastic encouragement and support for this research work.

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