



Role of Diet in Toxicity Testing

Laboratory animal diet is a very significant component before and after the inclusion of animals in any experimental. Nutritional requirements of animals are varying from species to species and with the physiological state of the animal within the same species.

Laboratory animal diets in various physical forms have been used for feeding the laboratory animals, viz. meal, pelleted, crumbled, extruded, etc. The pelleted and natural ingredient diet is the one most widely used for feeding the laboratory animals. The main benefit of a pelleted diet is the minimised wastage, along with an easy to measure daily dietary intake of the experimental animals.

The natural ingredient diets are unable to completely control the nutrient concentrations. Batch to batch variation in nutrient concentration and for possible contamination with pesticide residues, heavy metals, or other agent has the potential to alter the response to the experimental result. The purchasing of raw material is important to maintain the quality of diet. Special attention must be given to consistent nutrient level, hygiene, and contamination of undesirable substances.

The standardisation of the laboratory animal diet is important for the reproducibility of experimental results, animal health, and welfare. An increased effort of dietary enrichment is expected to contribute to the improvement of the welfare of animals and more reliable experimental results.

Diet used in the long-term toxicity testing should be free from contaminants. There should be as minimum as practicable a variation in the dietary composition to ensure reproducibility of the experimental results. Variations in dietary composition can result in different experimental data. Due to this batch-to-batch variation, it is advisable, always, to analyse diet batch to batch to know the status of nutrient content, microbiology, and contaminants of each batch

Contaminants in laboratory animal diet arise from the biological as well as the non-biological sources. Biological contaminants originate from microorganisms growing on plants in the field, grain, and prepared feed. These are mainly estrogen, aflatoxins, and trichothecene toxins. Biological contaminants, estrogens that may occur in animal feed. These are formed when a crop is infected with fungi in the field or during storage. Estrogenic activity of the feed, viz., three estrogens-genistein, coumestrol, and zearalenone should be tested when animals are used for studies on reproduction. Non-biological contaminants are usually pesticide residue and nitrosamines.

When laboratory animals consume any contaminant residue daily in their diet, they are in effect chronically exposed to a considerable amount of the contaminant over their lifetime. These dietary contaminants have the potential for affecting the outcome of long-term animal experiments in various ways. They may act as carcinogens, cancer promoters, teratogens, mutagens, or general toxicants.

Monitoring of the contaminants in the diet is necessary to ensure the quality of diet, as well as the desirable experimental outcome.

Jai Research Foundation (JRF) procures standard certified diets from the approved vendor(s) and offers to animals to get the desirable experimental outcome. JRF also analyses each batch of diet for nutrient contents, heavy metals, pesticides residue, phytoestrogen level to ensure the quality of diet for animals, as well as, to avoid interference of undesirable substances in experimental outcome.



References

- Bimal, C. P., Robert, H. R. & Harry A. M. (1984). Nutritional requirements and contaminant analysis of laboratory animal feeds.
- GV-SOLAS, Guidelines for the quality-assured production of laboratory animal diets, EN A -06-2002.

About The Author



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Mr. Rajesh Posia, MVSc is a principle research officer leading a team of animal breeding facility having more than 14 years experience of breeding of various species of laboratory animals for toxicology research.

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