



Annual Research & Review in Biology

Volume 39, Issue 11, Page 18-24, 2024; Article no.ARRB.125893

ISSN: 2347-565X, NLM ID: 101632869

(Past name: Annual Review & Research in Biology, Past ISSN: 2231-4776)

Use of Meat Industry By-products in Pet Food Industry: Prospects and Sustainability for Startups in India

Kuleswan Pame ^{a*}, S.K. Laskar ^a, K.M. Handique ^a
and S. Choudhury ^a

^a College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: <https://doi.org/10.9734/arrb/2024/v39i112151>

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/125893>

Review Article

Received: 26/08/2024

Accepted: 28/10/2024

Published: 02/11/2024

ABSTRACT

With the increasing nuclear family, urbanization, incidents of theft, and isolation in society in the last decades there has been a drastic rise in the number of companion animals, especially pet dogs in the country. The pet food industry is witnessing rapid growth due to the increasing demand for pet foods since pet owners are much more aware of well-being and a balanced diet. India is one of the emerging pet food markets in Asia-Pacific. The country imports 45-50% of pet food to meet the domestic requirements. Therefore there is a huge opportunity in the Indian Pet Food Industry and immense potential to venture into the pet food segment. With a series of opportunities, the sector also witnessed a few challenges which include the absence of a uniform regulatory framework, isolated government policies, higher taxation for pet food compared to other food processing industries, and scattered availability of raw materials. This article throws light on the prospects,

*Corresponding author: E-mail: drpame35@gmail.com;

Cite as: Pame, Kuleswan, S.K. Laskar, K.M. Handique, and S. Choudhury. 2024. "Use of Meat Industry By-Products in Pet Food Industry: Prospects and Sustainability for Startups in India". *Annual Research & Review in Biology* 39 (11):18-24. <https://doi.org/10.9734/arrb/2024/v39i112151>.

sustainability, regulation issues, scope, and opportunities for start-ups in the pet food manufacturing segment by utilizing meat industry by-products as the primary source of protein components to produce cost-effectively and meet the recommended nutritional standards to fulfill the present demands of pet foods.

Keywords: Pet food; meat industry by-products; prospects; sustainability; regulations.

1. INTRODUCTION

The pet dog population in India increased from 19 million in 2018 to over 31 million in 2023, witnessing a growth rate of approximately 11 percent. Currently, India has the fifth largest pet population in the world (The Economic Times report, May 21, 2024). About 60% of Indians adopt pets. The dog is the most common pet with 34% and cat (20%) followed by fish (Mordor Intelligence Report, 2021). The increase in the adoption of dogs is mainly due to the steady rise in nuclear families, rapid urbanization, increasing theft, the need for companionship, and changing perceptions toward pet animals. Pet dogs are treated no less than a member of their family and due care is given regarding their diet, health, and overall well-being. Since last two decades pet owners are started shifting from conventional feeding of scrap and homemade food to commercially prepared pet foods, which are generally perceived to be more nutritious, more convenience in service and more acceptable. Moreover homemade pet diets are mostly deficient in protein, energy, calcium, phosphorus, vitamins and micro-minerals as these foods are often crudely balanced and may not achieve satisfactory palatability, digestibility or safety as required for a dog (Pattanaik, 2011). Commercial pet foods are mainly available in three basic form viz., dry, intermediate/semi moist and moist type pet foods. The pet food sector in India is gaining momentum, with the liberalization of economic policies, increasing urbanization, the influence of media, and awareness among pet owners about nutritionally balanced pet diets. The pet food market in terms of pet type has been segmented into dog food, cat food, pet bird feed, and aqua pet feed. Among these dog food segment holds the largest market share.

The global market size of pet food in 2023 was around 117.34 billion USD and is expected to grow at a Compound Annual Growth Rate (CAGR) of 4.4% from 2024 to 2030 (Pet Food Market Size, Share & Trends Analysis Report, 2023-2030). Another assumption made an average growth expectation of 5.5% CAGR, projected to reach 201.39 billion USD by 2033 (Alltech Agri-Food Outlook 2023). The Indian pet

food market is projected to register a CAGR of 13.7% during 2021-2026. More than 50% of the total market share is occupied by the dog segment (Research and Markets report 'India Pet Care Market Outlook', 2023). These facts and data witnessed a significant growth of the pet food sector in the country. So viewing its practical importance, venturing into the pet food manufacturing sector is highly justifiable and will be a financially rewarding enterprise in the current scenario.

2. WHY START-UPS IN THE PET FOOD SECTOR?

According to Department of Industrial Policy and Promotion, the term 'startup' refers to a young company established by one or more entrepreneurs to create unique products or services. It aims to bring innovation and build new ideas. It is a registered firm/business usually less than seven years of establishment whose turnover is up to 25 crores. Pet food is a preparation specially intended for domesticated animals formulated as per their nutritional requirement. Pet food generally consists of meat, meat by-products, cereals, grain, vitamins, and minerals. The term 'pet food' commercially refers to food specifically intended for consumption by pets. It is usually specific to the type of animals, like dog food, cat food; aqua fish feed, and pet bird feed (Boermans & Leung, 2007).

India is one of the emerging pet food markets in Asia-Pacific, accounting for a share of 2.1%, with an increase of 113.0% during 2017-2022. The ever-increasing trend in the pet food market is seen due to the rise in pet humanization and the higher usage of commercial pet food products over home-cooked foods. Dogs accounted for 87.7% of the pet population in 2022 (India Pet Food Market Growth Trend and Forecast, Mordor Intelligence, 2022). Indian pet owners invest a higher share in pet food and pet treats, which accounts for about 75-80% of the total pet expenditure (Mordor Intelligence, 2021).

The protein component is considered the most costly ingredient in the formulation of any animal food/feed. The protein component determines

the economy. In dog food, protein can be supplied by animal sources, plant sources, or a combination of the two. Common animal-based protein sources used in pet food include chicken, lamb, fish meal, and beef and plant-based protein sources used in pet food include corn-gluten meal and soybean meal. However, the increasing cost of skeletal muscle meat has led to the use of alternative sources i.e. by-products from meat processing plants. Presently in India pet food production is more of cereals based and less based on animal by-products. This results in pets competing with humans for grains and cereals which can be easily replaced by slaughterhouse by-products. Therefore it is a favorable idea to start a pet food manufacturing enterprise by utilizing by-products from the meat processing industry. A wide range of human non-edible components from meat processing is legally defined as pet food ingredients in the Official Handbook Association of American Feed Control Officials (The Association of American Feed Control Officials (AAFCO), 2007). Meat waste by-products range from 10-30% of the live weight of beef, pork, and lamb and 5 to 6% of the live weight of chicken (Ockerman & Hansen, 2000). The efficient use of these meat waste by-products will increase the income per unit of meat animals. Rendered animal products in the form of meat-cum-bone meals or rendered fat are an excellent source of protein, energy, and minerals. The most important and valuable use of animal by-products is as feed ingredients for domestic animals. Without rendering and further utilization, unprocessed animal by-products will pile up thereby increasing the cost of disposal and resulting in serious health hazards to both humans and animals (Meeker & Hamilton, 2006).

3. DEMAND DRIVERS FOR PET FOOD

➤ **Urbanization and Rise in pet ownership:** A growing middle class with disposable income results in a significant increase in pet ownership. The middle-class population is projected to grow from 50 million in 2020 to 475 million in 2030 (Credence Research Report, 2022). Nowadays pet owners treat pet animals as no less than a part of a family and due care and the best foods are provided. However due to the 'working out of home' culture pet owners often prefer convenient, nutritionally balanced, and ready-to-use food materials for their pets, and to meet this collective demand commercial processing of pet food is the only way to serve the purpose.

- **Rising disposable income of pet owners:** The rise in buying capacity and income of pet owners has fuelled the demand for high-quality pet food and a variety of food like functional pet food or premium pet food.
- **Pet humanization:** Foods play a crucial part in the well-being of pet animals. Therefore starting a pet food enterprise contributes to the health and happiness of the pets and encourages developing a deep emotional connection with the pet parents.
- **Innovation:** Pet animals are considered as part of the owner's family. They want to offer food of the same quality they have for themselves. This led to requirements for pet food varieties, leading to the development of various innovations and pet food diversity.
- **Economic feasibility:** Pet food manufacturing has a good market potential since the industry is experiencing significant growth globally, with a large market size and a positive projection. Viewing the facts and figures, entrepreneurs/start-ups can build a successful business with the right products and marketing strategies.
- **'Shifting from 'Pet owners to Pet parents':** Indians make space for pet products in monthly expenditure. Nuclear families in India are using their monthly average expenditure from Rs. 3000 to Rs 5000 per month on pets (The Economic Times report, May 21, 2024).
- **Growing awareness of pet health:** Since the last decade pet owners are becoming more informed and aware about the health and benefits of balanced nutrition and scientifically formulated pet foods.

4. PET FOOD REGULATIONS AND STANDARDS

The Food Safety Modernization Act, 2011 (FSMA) enacted in the USA, lays down standards for both human food and animal feed, including pet food. FSMA's regulation of pet food includes – compliance with Good Manufacturing Practices, Preventive Controls for Animal Food Rules including basic sanitation standards, hazard analysis, preventive controls food safety plan, adoption of a supply chain program, recall plan, monitoring and implementation procedures, etc. (FSMA, 2011). However, the Indian pet food sector lacks uniformity in manufacturing. Currently, there is no mandatory standard for domestic production of pet food. The present Bureau of Indian Standards (BIS) specification IS 11968:2019 relating to dog and cat food is

voluntary. Whereas the BIS standards for Compounded Feed for Cattle (IS 2052:2009) have been made mandatory by the Food Safety Standards Authority of India (FSSAI) (BIS, 2009). Food safety is the prime concern of FSSAI; food should not include any objectionable ingredients. Any food meant for pets should be prepared and produced in sanitary conditions, adhering to all safety precautions (FSSAI, 2006). The protein source intended to be used in pet food manufacturing may be one or more of the ingredients like animal fat, bone meal, blood meal, meat-cum-bone meal, meat meal, fish meal, liver meal (Listed in Appendix A, IS: 11968 – 1986, Indian Standard, specification for dog feeds). Artificial ingredients like antibiotics, hormones, or other drugs shall not be used in the formulation. Pet food shall be packed in clean sound, polythene-lined containers of food-grade quality. The container shall be pilfer-proof, moisture-proof, and sturdy enough to withstand rough handling in transit (BIS Act 1986 and the Rules and Regulations).

The Department of Animal Husbandry, Dairying and Fisheries, enacted the Pet Food Products of Animal Origin (Import into India) Order, 2008. The 2008 order controlled imports of certain veterinary drugs, to restrict entry of pathogens from outside the country. The order is applied only to the imported pet food products of animal origin. It does not regulate pet foods produced from vegetarian sources. Thus the domestic sector remains unregulated under the order (Ministry of Agriculture, Pet Food Products of Animal Origin (Import into India) Order, 2008). Animal nutrition in India is regulated to the extent that it affects the health of human beings. Hence, if the risk is communicable to human beings (through the consumption of meat or milk of livestock), the feed consumed by such animals is subject to mandatory standards. And when the food is intended for only pet animal use, then the regulation is weak or rarely enforced. However pet food manufacturers must take into account the application of BIS standards, since some states in India like Nagaland permit the sale and consumption of pet dog meat.

Hence it is the need of the hour, to focus on uniform and mandatory pet food regulations and standards. Until then, there may be scope for industry players to take advantage of the regulatory gap by avoiding compliances, license procurements, or safety & testing standards. The lack of science-based standards has led the small scale start-ups to an unfavorable condition

compared to large corporate companies that can spend on R&D. Therefore the adoption of a science-based approach in addressing the food safety issues in animal feed will lead to the overall growth of the sector as well as positive contribution to animal welfare.

Pet food standards: The nutritional values and technical purpose of any ingredients or feed additive used in preparation of pet food must be established by a legally-recognized due process or body. Any ingredient used must be within the limits of its established safety and utility (AAFCO, 2007). AAFCO works closely with FDA and state agencies to ensure all pet foods are safely manufactured and labeled properly. It does not directly test, regulate, approve, certify or otherwise endorse pet foods, it works. AAFCO is responsible for establishing the recommended nutritional requirements for dogs and cats. Hence most of the state feed laws and regulations refer to the AAFCO Officials Publication as part of the nutritional adequacy requirements for pet foods. As per National Research Council, 2006 dry type commercial pet food for growth and maintenance should contain 6-10% moisture, 16-30% protein, 7-20% fat, 41-70% carbohydrates and energy 2800-4050 Kcal/kg. On dry matter basis, the minimum crude protein required for growth and maintenance in dog feed is 22.5%, 8.5% fat and for adult maintenance crude protein requirement is 18.0% and 5.5% crude fat respectively (AAFCO, 2007).

Market Potential and Opportunities: In India, the pet food sector is gaining momentum, with the liberalization of economic policies, increasing urbanization, influence of media, and awareness of the owners about nutritionally balanced pet food. Over the last two decades, pet owners have started shifting from conventional feeding of scrap and home food to commercially prepared pet foods, which are generally perceived to be more nutritious, have better ease of service, and are more palatable. Moreover, home-made pet diets are mostly deficient in protein, energy, calcium, phosphorus, vitamins, and micro-minerals as these foods are often crudely balanced and may not achieve satisfactory palatability, digestibility, or safety as required for a dog (Pattanaik, 2011). The pet food industry in India is dominated by large-scale corporate players at present. The sector is yet to be explored by small and medium enterprises. India imports 45-50% of pet food to meet domestic requirements (India Pet Food Market Growth Trend and Forecast, Mordor Intelligence, 2021).

The cost of imported pet foods commercially available in the Indian markets at present is relatively higher than the pet food manufactured domestically. At the same time, there is much concern among pet parents about the rising cost and quality. Therefore, there exists a lot of scope for micro, small, and medium enterprises in dog food manufacturing in the country. India has a large availability of raw materials required for the processing of pet foods. India is one of the leading producers of meat and food grains, thus the by-products from the meat production and food grains can be used to manufacture pet foods.

Some of the studies in India highlighted the potentiality of pet foods with lower cost compared to commercially available pet foods without compromising the quality and nutrition. Pet food with good nutritive quality and palatability for dogs was developed by inclusion of 10-20% spent hen meal with a shelf life of 45 days at room temperature (Karthik et al., 2010). Brindha & Rao (2017), developed pet foods by using 35% poultry by-product meal viz. chicken head and feet, and 10% cruciferous vegetable by-product meal using minimum low-cost equipment. The cost of production was found to be Rs 70.00/kg, this exhibits a great market potential. The nutritional profiles of pet kibbles with 20% meat-cum-bone meal and 5% rendered fat were in line with AAFCO, 2007 recommendation for adult dogs for maintenance purposes. The kibbles were highly acceptable even on 60th days of storage at room temperature with a cost of production of Rs. 170/kg (Pame et al., 2017). The inclusion of 5% tripe powder with other non-meat ingredients significantly improved the intake ratio and nutrient qualities of the pet pasta with a cost of production of Rs 153.46/kg, which is an indication of good market potential (Yazhinidevi et al., 2022).

The demands for specific types of pet foods like organic, hypoallergenic, supplements, and specific-purpose foods are increasing. And the pet food industry offers niche opportunities to meet these demands. The pet food industry has opportunities for expansion into related product lines such as pet accessories, grooming, or training aids. This diversification can further enhance the revenue and ancillary sales. Promotes pet animal welfare, well-being, and health significantly by providing nutritious and high-quality foods, thus acquiring moral satisfaction in running the enterprise. The online pet food ordering business in India is in its

nascent stage, but witnessing exponential growth. With technological growth, internet facilities, convenience- and safety-prioritizing shoppers shifting to online pet food sales. The key online delivery players at present are Chewy, Petco, Petcarerx, Amazon, and Flipkart. Pet food sale through the Internet was estimated at 36% in 2021 out of total sales. The organized pet food enterprise has huge potential and a promising future (Pet food industry analysis: Latest insights and trends report, 2022).

5. CHALLENGES

Despite the series of potential opportunities, the pet food industry in India is still at a nascent stage and faces several challenges including; lack of uniform regulation, limited access to quality veterinarian expertise in pet food nutrition, lack of animal food testing laboratory, and absence of infrastructure. The pet food industry relies on a wide range of ingredients, including meat, grains, vegetables, and other additives. Procurement of high-quality raw materials is one of the major challenges. Lack of quality raw materials compromises the quality and safety of the final product. More particularly there is unavailability of the quality by-product ingredients due to the scattered nature of meat animal slaughter and the unavailability of by-products utilization plants. The pet food industry is highly competitive, with many corporate players. This leads to price pressures and supply chain disruptions. This makes it difficult to establish small-scale start-ups. It is also seen that there is reduce interest among human resources to work in this sector, especially in the by-product processing, which can have great potential in reducing the cost without compromising the nutritional values. Besides these, the pet owners, particularly in rural areas are still unaware of the specific dietary requirements of their pet animals. They still follow traditional feeding practices with homemade meals or leftovers.

6. CONCLUSIONS AND WAY FORWARD

The trend in urbanization and increasing pet ownership is set for increasing demands and sustained expansion of the pet food market. The by-products from the human food industry, such as the meat industry which are not regarded as 'human grade' can be utilized as primary raw material source in pet food. Therefore establishment of the pet food industry has an immense potential to increase farmers' income since the meat industry directly depends on the

farm supply. Harmonization of Regulations focused on policies, standards, ease of doing business, and uniform taxation for pet food will enable the industry to reach its true potential. It is the need of the hour to develop a quality assurance mechanism, supply chain transparency, and adherence to international practices to firmly establish confidence among consumers and promote sustainable growth.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

- Alltech Agri-Food Outlook. (2023). Retrieved from <https://www.altech.com>agri-food-outlook>
- Boermans, H. J., & Leung, M. C. K. (2007). Mycotoxins and the pet food industry: Toxicological evidence and risk assessment. *International Journal of Food Microbiology*, 119, 95–102.
- Brindha, N., & Rao, V. A. (2017). Cost-effective utilization of poultry and cruciferous vegetable waste as a raw material to develop a shelf-stable pet food. *Journal of Applied and Natural Science*, 9(2), 767–770.
- Bureau of Indian Standards Act 1986 and the Rules and Regulations. (1986). *IS: 11968 – 1986. Indian Standard: Specification for dog feeds*.
- Bureau of Indian Standards. (2009). *IS 2052:2009*. Retrieved from <https://law.resource.org/pub/in/bis/S06/is.2052.2009>
- Credence Research Report. (2022). Retrieved from <https://www.credenceresearch.com/report/india-pet-food-market>
- Department of Industrial Policy and Promotion. Retrieved from <https://www.startupindia.gov.in>sih>startup gov>start>
- Food Safety and Standards Authority of India. (2006). Retrieved from

<https://fssai.gov.in>cms>food-safety-and-standards-act>

- Karthik, P., Kulkarni, V. V., & Sivakumar, K. (2010). Preparation, storage stability, and palatability of spent hen meal-based pet food. *Journal of Food Science and Technology*, 47(3), 330–334. <https://doi.org/10.1007/s13197-010-0053>
- Meeker, D. L., & Hamilton, C. R. (2006). An overview of the rendering industry. In D. L. Meeker (Ed.), *Essential rendering* (pp. 1–16). National Renderers Association.
- Ministry of Agriculture. (2008). *Pet Food Products of Animal Origin (Import into India) Order, 2008, Notification No. S.O. 1086(E) dated May 2, 2008*. Retrieved from <https://aqcsindia.gov.in/pdf/trade>
- Mordor Intelligence. (2021). Research and Markets report *India Pet Care Market Outlook, 2021–2026*. Retrieved from www.mordorintelligence.com
- National Research Council (NRC). (2006). *The nutrient requirement of dogs and cats*. National Research Council, National Academic Press, Washington, D.C. USA.
- Ockerman, H. W., & Hansen, C. L. (2000). *Animal by-product processing and utilization*. CRC Press, Boca Raton, Florida, 128.
- Pame, K., Sathu, T., Vasudevan, V. N., Prajwal, S., & Gunasekaran, P. (2017). A Study on the Effect of Physico-Chemical Characteristics, Palatability and Storage Quality of Kibbles Incorporated With Slaughter House By-products for Canine. *International Journal of Livestock Research*, 7(8), 228-237. DOI:<http://dx.doi.org/10.5455/ijlr.20170610050311>
- Pattanaik, A. K. (2011). *Evaluation and optimization of the nutritional quality of homemade vegetarian foods for health and well-being of dogs - Final Report*. Indian Veterinary Research Institute, Izatnagar, India.
- Pet food industry analysis: Latest insights and trends report. (2022). Retrieved from <https://scandiweb.com>Home>Digital Growth>
- Pet Food Market Size, Share & Trends Analysis Report. (2023). Retrieved from <https://www.grandviewresearch.com>pet-food-industry>
- The Association of American Feed Control Officials (AAFCO). (2007). *Nutrient*

- requirement for cats and dogs. AAFCO Official Publications, p. 25.
- The Economic Times/Industry Report. (2024, May 21). Retrieved from <https://economictimes.indiatimes.com/industry/cons-products>
- The Food Safety Modernization Act, US FDA. (2011). Retrieved from <https://www.fda.gov/food/food-safety-modernization-act-fsma/full-text-food-safety-modernization-act-fsma>
- Yazhinidevi, R., Sathu, T., Sunil, B., Vasudevan, V. N., Naicy, T., & Vandana, S. (2022). Evaluation of quality and acceptability of pet pasta with buffalo tripe powder. *Journal of Veterinary and Animal Sciences*, 53(1), 60–64. <https://doi.org/10.51966/jvas>

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of the publisher and/or the editor(s). This publisher and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.

© Copyright (2024): Author(s). The licensee is the journal publisher. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:

<https://www.sdiarticle5.com/review-history/125893>