

Nutrichew: A New Nutritious Chew Toy for Furbabies

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Abstract: *The usual Filipino household has at least 1 dog for guarding their homes, so it's just right that we show them some love by giving them toys specifically chew toys. The purpose of this paper is to make a study to introduce a new nutritious and more affordable dog chew toy that can be used also as a fertilizer for plants to the market of dog owners, and to inform dog owners that their dog's teeth are an important part of their health chew toy. Chew toy will help to avoid dental issues such as: gingivitis, plaque and cavities in fact the researchers have found out that most dog owners have most likely never examined their dogs' mouth and teeth. In addition to that it also helps to relive stress and anxiety by chewing. The researchers used experimental design for this study, experimenting on what ingredients works best for plants and are also beneficial for dogs. The researchers found out that scent plays a big role in the attraction of dogs to their toys. Scent can also help for possible attitude change. Overall, this study is made to help not only the dogs but possibly to the plants also.*

Keywords— Chew toy for dogs, Experimental design

1. INTRODUCTION

Since we are all inside our homes because of the pandemic. Many people have started to buy or adopt dogs from breeders to keep themselves company and entertained. So, it just comes naturally that we have to provide toys for our dogs, especially chew toys for them to avoid chewing up our couches and shoes. So, the common trend in chew toys in the market that can be observed is that it's either rubber or it's a material similar to a bone, it may also look like rugs that are braided together for "Strong chewers" probably big dogs like Rottweilers, Labrador retrievers, German shepherds etc.

According to N·H·瑟伦森 [1]most dog owners have never carefully inspected their dogs mouth and teeth, this fact is very unfortunate since according to estimates 80% dog has serious oral problems. We aim to create a chew toy that is both safe if ingested, and is beneficial for our dogs' oral health. We will do so by adding calcium, we will incorporate ingredients like milk and bananas into this chew toy so that it will help strengthen the teeth and bones of our beloved furbabies.

The objective of this study is to give the dogs a better dental health and mental health. When the dogs are anxious or stressed it is normal for them to chew to ease anxiousness and stress, through the product that the researchers are formulating. Chewing the toy helps in their dental health, while chewing the toy the saliva of the dog rinses the food debris in the mouth and while chewing it will give the dog the nutrients because the chew toy that the researchers are creating contains nutrients that are needed to sustain the dog's dental health

The contributions that we will add is we will introduce a new chew toy to the market that is both nutritious and affordable. The researchers will study well to develop a chew toy that is organic and can be used as a fertilizer once the dog is done with it.

This study aims to find an alternative chew toy that is healthy for the pet and able to be re-used again as a decomposable material for plants.

2. RELATED WORKS

The more dogs that dog owners bring home, the more product from dog food and dog toy companies are needed. That's supply and demand,[2] "If the market doesn't offer pet toys, they're rewarded with missed sales."—Jim Glick, Pet Qwerks. Now if the market offers QUALITY pet toys, they're going to be rewarded with abundant sales.

The procedure that we're going to follow will be the [3]Himalayan dog chew toy that has been passed down from generation to generation, and of course we added our own touch and ingredients to it, that are good for dogs and plants(Egg shells etc.).Fortunately, it isn't as prominent in the Philippines as it is in other countries like U.S.A. It is a good alternative to the other chew toys because not only is it cheaper than most chew toys, our product can also become a fertilizer once your dog is done with it. That's the beauty of our product, not only is it super cheap, not only is it super nutritious, but we've also researched about the ingredients that are good for plants and for dogs as well.

According to [4] Murtagh, Katie, Farnworth, Mark J, Brilot, Ben O."They (Dogs) are more likely to play with rabbit or lavender-scented chew toys and behave more positively around scented toys. "We the researchers have found out that scent plays a big role in capturing the interest of dogs.[4]"Dogs were significantly more likely to interact, and interacted for longer, with scented toys."

[5]According to Stott, Louise Owner compliance and a lack of education in dental disease is also a key factor contributing to poor oral health. That is why we will add to our ingredients things that will improve your dog's dental health and prevent bad breath.

[6] According to Rute(2020) et al Zinc is a fundamental minor component for creatures in a few organic cycles, especially in energy creation, and it is obtained from food ingestion. In this specific situation, a microplate-based fluorometric test was produced for basic, quick, and ease assurance of zinc in pet food utilizing in addition to that zinc

is an important element for feeding the living beings because zinc is the one that separates the metabolism of proteins and nucleic acids also zinc deficit is regularly related with development impediment in youthful creatures. Zinc is a practically nontoxic substance, however it can some of the time become toxics when it collaborates with different supplements in the creature's body. That is why an enough content of zinc is good for the body of animals. We the researchers will put the exact amount of zinc for the dogs to be healthy.

Tooth fracture is common nowadays that's why dog owners should be aware on what chew toys that the dog owners are giving according to Meilla[7], Lisa chew toys can be a decent method to help keep a canine's oral cleanliness, not all chew toy would be viewed safe. In addition to that dog owners should be aware on how hard a chew is because sometimes it is the cause of tooth fracture.

Dogs also need their teeth to be clean because dirty teeth can cause in to disease. According to Nishiswapna[8] et al the most prevalent inflammatory dental disease caused by a lack of oral hygiene measures in domestic animals. The periodontal disease complex arises as a result of bacterial biofilm deposition termed as plaque on the tooth surface. Lack of cleaning measures either mechanical or chemical credit for the condition. In addition, chew toy is one of the effective cleaning aids to remove the bacteria and plaques from your dog's teeth

Dental health to man's best friend is a must. The owner must be aware if the dog is experiencing a dental health problem such as halitosis, plaque and, gingivitis. But in the other hand chew toy is one of the solutions to prevent dental health problem in addition to that every day administration of the dental chew was seemed to reduce halitosis, similarly as, through and through decline gum sickness and, plaque and likewise may accept a basic part in the improvement of canine oral prosperity as time goes on. To finish up as per the investigation the chew toy is truly compelling to lessen dental medical issue. Daily administration of the dental chew was appeared to diminish halitosis, just as, altogether decrease gum disease and, plaque and accordingly may assume a critical part in the improvement of canine oral wellbeing over the long haul. To conclude according to the study the chew toy is really effective to diminish dental health problem.

Fats and oils are required in dog's balanced diet usually a 10-15 fat percentage is best to maintain health for adult dogs but too much fat in the dog's body can affect their bloodstreams however exercise can be a great choice if you think your dog consumed too much fat. According to Fatma [9] et al Canines favored food containing sunflower oil more than food containing creature fats. It was inferred that canines showed an inclination with respect to the linoleic corrosive level in every food. To sum up the researchers will put the exact amount of oil or fat in the chew toy.

According to Bonny Canteen (2020) [10], Copper is a cofactor for enzymes that catalyze reactions including energy production, free radical detoxification, and neurotransmitter and structural protein synthesis. Copper is kept in its cuprous

(reduced) state by superoxide dismutase, the enzyme that converts potentially dangerous superoxide into harmless oxygen. During the reaction, copper transforms into the cupric (oxidized) state. Copper's function as a cofactor in a variety of enzymes reflects its significance in both animals and humans. Clearly, adequate dietary, readily available copper is required for normal body metabolism and disease prevention. . At the same time, the body requires strict control to prevent excessive, toxic accumulation of copper in the liver, which acts as copper-storage site.

In another research by, Gabriela et al.(2020) [12], the study's aims were to make dog food with curcumin instead of synthetic antioxidants and to see whether it had any positive impact on animal growth and health. Curcumin (100 mg/kg) and other micronutrients were added after the extrusion process. Curcumin had a final concentration of 32.9 mg/kg. The control feed contained the same ingredients but did not contain curcumin. The feed composition and pH did not differ after 6 months of storage; however, the feed containing curcumin had lower protein oxidation, lipid peroxidation, and a higher total antioxidant ability. Twelve young Beagle dogs were given either curcumin-containing food (n = 6) or the control diet (n = 6) after two months of feed production. Individual kennels were used to feed the animals twice a day. On days 1, 35, and 42, blood samples were taken. The animals had natural infectious diseases for the first 30 days of the study, which were treated with anti-protozoans and antibiotics. On days 35 and 45, dogs fed curcumin had more red blood cells, and on day 42, there were more white blood cells as a result of increased neutrophils. A substantial reduction in the number of lymphocytes was observed in dogs that ingested curcumin (d 42) at the end of the experiment, indicating an anti-inflammatory effect manifested as a decrease in globulin levels. The animals were clinically stable at the conclusion of the trial, which lasted 15 days. Curcumin-fed dogs had higher levels of glucose, urea, triglycerides, and cholesterol in their tissue. Curcumin increased the activity of many antioxidant enzymes, as well as non-protein thiols and serum total antioxidant ability, decreasing oxygen reactive species levels. Curcumin supplementation did not help dogs develop or gain weight. Regardless, it was determined that curcumin improved animal health, with a focus on antioxidant system stimulation and evidence of an anti-inflammatory impact.

On the other hand, a research conducted by Anton C. Beynen (2020) [13], Garlic is said to be helpful to dogs by others, but it is poisonous to others. Total foods, snacks, and supplements containing garlic are all implicated in the controversy (oil). There is no empirical proof that garlic in the diet has any health benefits. Benefits for dogs' welfare in comparison, a study found that a liquid garlic extract is harmful to dogs, but the volume consumed was substantially higher than that found in garlic-containing foods. Garlic is widely used as a flavoring agent in commercial dog food, but there is no empirical evidence that it is effective. Garlic is a safe pet food product, but it hasn't been shown to have any health benefits. Garlic extract, when ingested, is thought to

provide flea relief for dogs by making their blood unpalatable to fleas. Uncooked garlic has been recommended to benefit dogs with bad breath, despite the fact that it causes “garlic breath” in humans.

Another research conducted by Anton C. Beynen (2019) [14], Fluoride is not added to pet food on purpose, although it is present in bone residues in animal ingredients. Fluoride can be an essential food for dogs in small quantities, but large concentrations, depending on the chemical type, may be harmful. Fluoride has a maximum cap set by European legislation: 170 mg total fluoride per kg full canned or kibbled dog food when fully dried (1, 2). To help prevent human dental decay, public, fluoridated drinking water contains around 1 mg fluoride/kg. Too much absorbable fluoride in the mouth during infancy creates chalky patches in the enamel. Such dental mottling was observed in puppies fed a diet containing 167 mg fluoride per kg dietary dry weight, but not in puppies fed other fluoride sources. Long-term feeding of a high-absorbable-fluoride diet to dogs is likely to cause skeletal fluorosis, which is characterized by bone outgrowth and stiffness. Fluoride is also called a bone-seeking element.

3. STATEMENT OF THE PROBLEM

This study sought answers to the following questions:
What materials are going to be used that is safe for the pet and the environment, but durable and flexible at the same time?

- 1.What are the issues encountered by dog lovers in feeding their furbabies?
- 2.What are the materials and processes needed in creating nutritious chew toy?
- 3.What does the Nutrichew look like?
- 4.How may the Nutrichew be of help to dog owners?

4. METHODOLOGY

The researchers used an experimental method of research to perform the analysis, which is a study that attaches specifically to a scientific design. Experimental research is a study that strictly adheres to a scientific research design. It includes a hypothesis, a variable that can be manipulated by the researcher, and variables that can be measured, calculated and compared. Most importantly, experimental research is completed in a controlled environment. The researcher collects data and results will either support or reject the hypothesis. This method of research is referred to a hypothesis testing or a deductive research method (Babbie 4) [19].

5. RESULTS AND DISCUSSIONS

I.Issues and problems encountered in feeding furbabies

The issues that our respondents encounter in feeding furbabies is that according to respondent 1” He’s (his dog) a picky eater” This problem is not uncommon for

dog owners. Puppies/juvenile/adult dogs can become picky eaters out of the blue for reasons like: sickness, got tired of eating the same dogfood, and when a female dog near them is in heat, and according to respondent 5 he also encounters the “picky eater” problem on his furbaby he states that “he (his dog) always want meat but when it comes to eating veggies, my dog won't eat it.”

II.Materials and processes needed in making Nutrichew

- A. Materials
1 gallon (4 liters) Skim milk



Lime juice



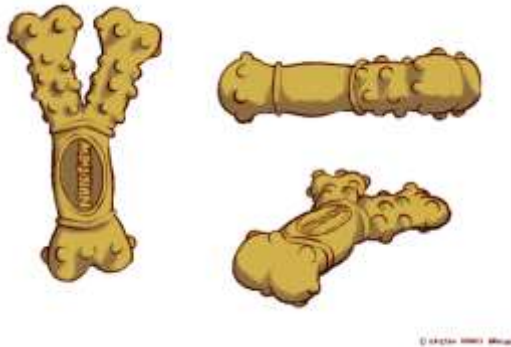
Himalayan salt



Cheese cloth/fabric



Y-shaped bone cutter



Dog all in one vitamin



B. Procedure

1. Transfer the skim milk in to a pot and bring it to boil
2. Powderize the vitamins then put it in the boiled milk
3. Put the ½ cup of lime juice and Himalayan salt
4. Stir it 1-2 minutes to from the cheese curds
5. Strain the cheese curds
6. Put it in the cheese cloth apply pressure for 4-6 hours
7. Cut the dried chew using the y-shaped cutter

Skim milk:

<https://norcofoods.com.au/product/skim-milk/>

Lime juice: <https://www.heb.com/product-detail/pompeii-lime-juice/320441>

Himalayan salt: <https://www.tarazu.com/PINK-HIMALAYAN-SALT>

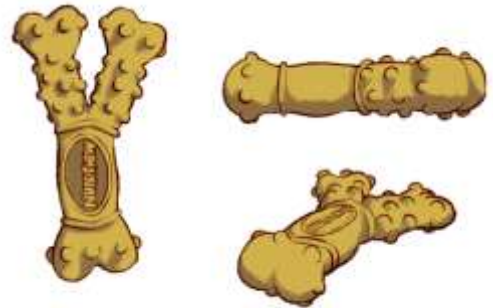
Cheese cloth: <https://www.amazon.com/Regency-Natural-Cheesecloth-Straining-Kombucha/dp/B001B14ODG>

dog all in one vitamin:

<https://naturvet.com/product/all-in-one-soft-chews/>

III. The Nutrichew

We the researchers have constructed a model



A. Durable

With its great and unique structure, the Nutrichew can last long enough for the dogs to play with. Large breeds of dogs with high bite force can still enjoy the nutritious and fun to play Nutrichew.

B. Efficient

With its uniquely Y-shaped figure, the Nutrichew can be taught for dogs as a treat for them when they did a good thing. The distinct shape and smell of the Nutrichew makes it easy for dogs to remember.

C. Eco-friendly

One great benefit of Nutrichew is that it is safe for the environment and no harmful chemicals were added in the product. In this way, the man's bestfriend can enjoy the health benefits of Nutrichew while not harming the environment. The owners can simply use it as a fertilizer or throw it in the garbage while not having a doubt of harming the precious nature.

IV. Benefits of Nutrichew

A. Health benefits

The benefits of our Nutrichew is that it is very nutritious, it is filled with multivitamins that will make your dogs' teeth and overall body stronger. It has calcium in milk, the lime juice can make your dog's coat shinier and whiter. Lime juice can also act as a "Flea repellent." It's also a good source of vitamin C for dogs.

B. Training

Nutrichew is also very useful in dog training, because of its natural good taste and attracting shape. The dog's drive can be directed towards the toy. Exercises like fetching are very doable with the use of Nutrichew. You can also program puppies to learn how to bite by baiting the chewtoy and letting them bite (for protection dog training.)

C. Good Alternative

Nutrichew is a great substitute for today's chewtoys. Unlike other chewtoys, Nutrichew's unique shape reduces health hazards for dogs like choking for example. Nutrichew also promotes organic materials unlike today's common material, pig rawhide. As for being on its early stages, Nutrichew can be improved much more and may start a new trend or new choice of owners for their dogs.

6. CONCLUSION

The researchers have drawn the following conclusions: First, Nutrichew is very easy to do with just 7 steps. Second, it can also be used in training dogs which will come in very handy because it's not just a chewtoy, but it can also be a training tool as well. It can work well with juvenile to adult dogs since they can fully grip it with their mouths. Next, this chewtoy is a very good option for dog owners to give to their pets, because it makes their coat shinier, strengthens their teeth and bones, and it cleans their mouths, the body part of our pet wherein we rarely check. Lastly, it might be the most nutritious chewtoy in the market out there because of its loaded multivitamins, which is ideal for when we want our dogs to have a better general health.

7. RECOMMENDATIONS

In the findings and conclusion of the given study, the researchers offer the following scope for the future research:

1. Explore more about the correlation between scent and dog behavior and how to apply them to chewtoys
2. Consider studying in depth about the differences in chewtoy flavor like lamb and milk.

For the limitations of this study, first is the quantity of respondents. The researchers suggest gathering more respondents so that future researchers can study more data to make the research very solid. Second the researchers should study more indepth about the dog's attraction to certain scents and how to incorporate them in chewtoys and even in dogfoods.

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