Canine Gut Health: Kibble or Raw Meat Diet

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Outline

- History of Dog Food
- What is Kibble and the Commercial Food Diet
- What is the Raw Food Diet
- Effect of Kibble on the gut
- Effect of Raw Meat Diet on the gut
- Are there diets nutritionally different

History

- Dogs began by eating scraps, organ meats, and sometimes foods mixed with milk and whey (James, 2022)
- In the industrial revolution due to a large population of working horses and a large majority of this population dying of disease and other health problems, their meat was repurposed as dog food (James, 2022)
- First commercially-prepared food was made in the 1860s by Spratt in the form of a biscuit formed from wheat, vegetables, beef blood, and beet. (Scahffer, 2009)
- Horse meat returned to dog food in the 1900s as canned dog food called “Ken-L Ration”
- With WWII dog food became non-essential and Spratt’s dog biscuits soon developed into modern day kibble.

Kibble vs. Raw Diet

What is kibble and the commercial food diet?

- Commercial dog food is widely sold and widely used brands of dog food that come packaged in bulk. It can be bought at a huge variety of stores. In this case it is primarily referencing kibble which is dry commercial dog food. Raw dog food diets are sold commercially, but generally both commercial and homemade raw food is similar with some variations.
- Kibble is dry pellets made by mixing different ingredients and drying.
- Ingredients vary widely between manufacturers and different brands.

Pros & Cons

- Meals are already premade and kibble comes in large quantities
- Storage will be very easy
- Supplements and other additions can be easily added

- The ingredients of the food is very much up to the manufacturer
- Even with the right ingredients their quality is unknown
- Some of the more high quality kibble is very expensive

What is the Raw Diet?

- Feeding predominantly animal products such as offals, bones, and meat with a very minor amount of fruits and vegetables (Schmidt et. al, 2018)
- This was a diet that paralleled human's diets from its move away from more commercially processed foods to 'natural' or 'organic' ones (Davies et. al, 2019)

Pros & Cons

- The composition of the diet is more easily controlled
- The quality of the ingredients are assured by the owners
- Supplements can be easily added

- The origin of the meats will need to be controlled carefully
- Storage of the raw meat products will need to be done carefully
- There is a risk of bacterial contamination
- The ingredients alone are very expensive
- It will take time everyday to prepare it

Nutritional Value

Nutritional Value of Kibble (Tanprasertsuk J. et al, 2021 & Kazimierska et. al, 2021)

- A calculation of the nutrient composition of the kibble that was studied. It was anticipated that this would be similar to the other fresh options studies with the exception of the moisture content and protein and fat.
- Overall, the dry matter weight of kibble and the fresh foods for phosphorus and calcium have been relatively similar.
- Some kibble does contain much too high amounts of carbohydrates

Table 1.
Nutrient composition of the study diets

Measure	Kibble-chicken		
	FW	DM	g/Mcal ME[a]
Nutrient (%)			
Moisture	5.40	–	13.78
Protein	35.44	37.46	90.44
Fat	18.25	19.29	46.57
NFE	29.76	31.46	75.94
Total dietary Fiber	12.5	13.2	31.9
Crude fiber	3.3	3.5	8.4
Soluble fiber	9.2	9.7	23.48
Ash	7.85	8.30	20.03
Phosphorus	1.04	1.10	2.65
Calcium	1.37	1.45	3.50
Ca:P ratio	1.32	1.32	–
Calculated ME density (kcal/kg)[b]			
Atwater	4,251	4,493	–
Modified Atwater	3,833	4,051	–

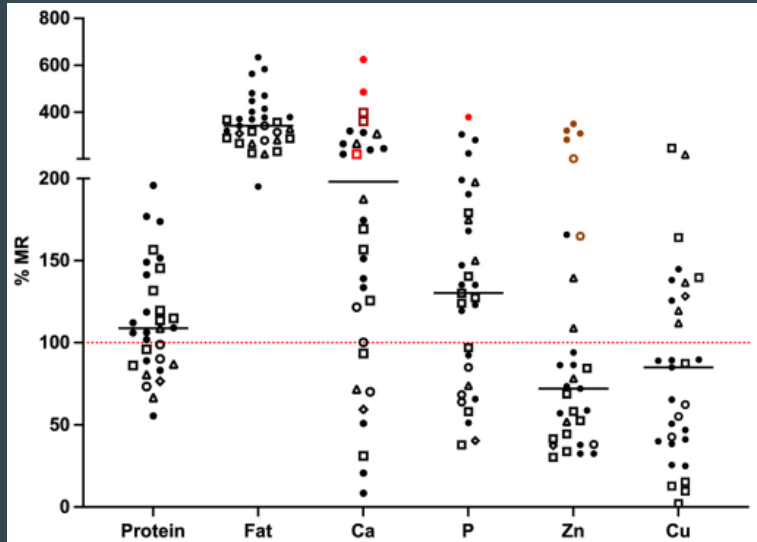
Nutritional Value of Raw Diet (Vecchiato et. al, 2022)

- Very susceptible to nutritional imbalance and deficiencies
- In this case a calculation of the nutritional value of commercial raw food diet was used as homemade raw food diets are usually varied and each owner would have made modifications to the original recipe regardless.

Table 3. Comparison of declared vs. measured analytical constituents in RMBDs in % aberrancy beyond legally tolerated concentrations (EC No 767/2009; Annex IV, part A).

Constituent	Number of Analysed RMBDs	RMBD (n) Compliance with EU Regulation §	Discrepancies Detected	
			Below	Above
Crude fat	42	23	5	14
aberrancy [%] median (range)			28.7 (2.6–70.1)	33.7 (2.1–141.3)
Crude protein	42	28	11	3
aberrancy [%] median (range)			10.2 (3.3–38.2)	9.9 (2.8–17.0)
Crude ash	41	33	0	8
aberrancy [%] median (range)				33.4 (3.2–72.9)
Crude fibre	40	38	2	0
aberrancy [%] median (range)			70.9 ± 19.0	
Moisture	43	40	0	3
aberrancy [%] median (range)				13.3 (3.3–15.7)

§ Crude fat: <16%, 4% absolute (abs.) above and 2% abs. below; 16–24%, 25% abs. above and 12.5% abs. below; crude protein: <16%, 2% abs. above and below; 16–24%, 12.5% relative (rel.) above and below; >24%, 3% abs. above and below; crude ash: <8%, 2% abs. below and 1% abs. above; crude fibre: <10%, 1.75% abs. below and above; moisture: >12.5%, 8% rel. above and none below.



Microbiota

Qualitative Study (Morelli et al, 2019)

- 55 dog owners and their dogs were asked and accepted to take part in a self reporting study
- Their average age, weight, and body condition scores were recorded along with a margin of error.
- The two groups were divided into two: kibble and raw food.

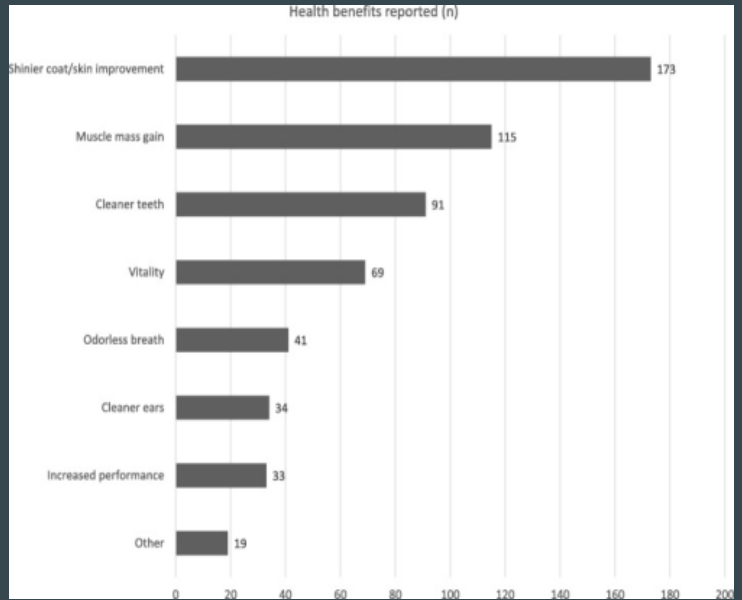
Table 1.

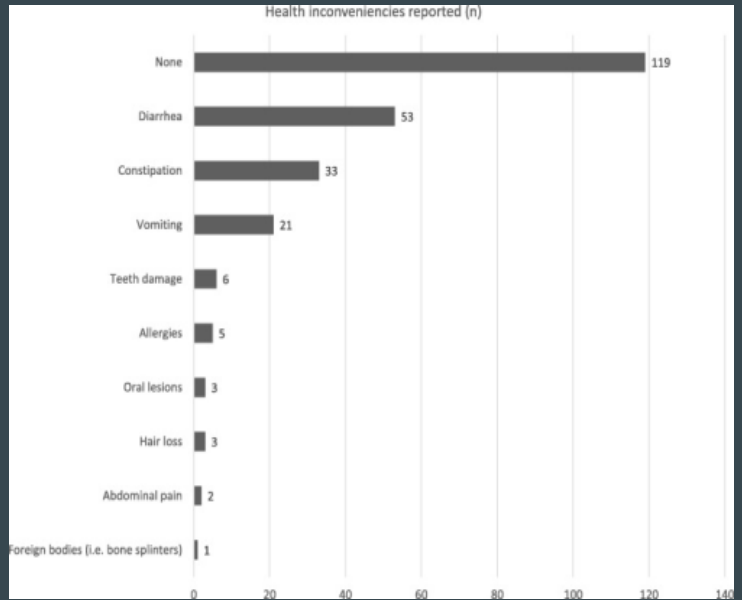
Characteristics of dogs enrolled in the study[1]

	Kibble	Raw	*P*-value
Number enrolled	*n* = 27	*n* = 28	
Gender	M = 5; MC = 11; F = 0; FS = 11	M = 4; MC =7 ; F = 6; FS = 11	0.06
Age (mean ± SD)	4.5 ± 2.1 yr	6.9 ± 2.6 yr	<0.001
Weight (mean ± SD)	27.81 ± 13.6 kg	24.14 ± 11.1 kg	0.28
BCS (mean ± SD)	5.1 ± 1.4	3.8 ± 1.2	0.001
Breed (multiples)	BC = 3; Lab = 3; GD = 3; Aussie = 2; Mixed = 9	BC = 11; Rott = 4; ESS = 3; Lab = 2; Mixed = 5	0.08
Breed (singles)	Corgi, Golden, Husky, Heeler, Greyhound, Staffy, and Beagle	GSD, GSP, Mal, and BM	

Qualitative Study (Morelli et al, 2019)

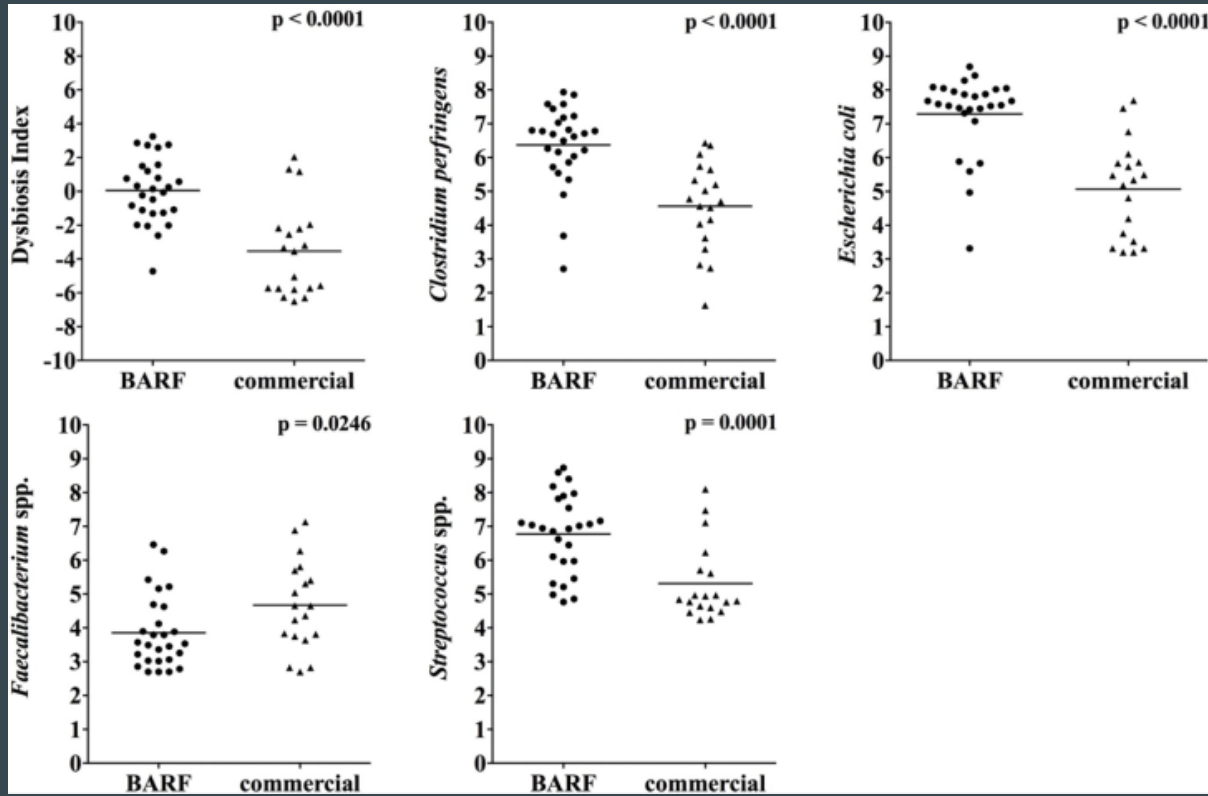
- The owners were asked to report any changes to their dogs whether it be positive or negative.





Differences in the Gut (Schmidt et. al, 2018)

- Higher amounts of microbial imbalance in the gut bacteria as measured from fecal samples.
- Higher amounts of *Lactobacillales*, *Enterobacteriaceae*, *Fusobacterium*, and *Clostridium* in dogs fed primarily raw food.
- *Clostridiaceae, Erysipelotrichaceae, Ruminococcaceae,* and *Lachnospiraceae* were the abundant bacteria found in the fecal samples of dogs fed commercially.



Conclusion

- Both diets have their pros and cons.
- A mix of both diets could work by balancing the high carbohydrate content of the kibble with the high fat and protein content of the raw food diet.
- Supplementing with more vegetables and fiber would also help with maintaining the microbiota of the dogs decreasing issues with their bowel movements and nausea.

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