BIOPHARMA GROUP - APPLICATION NOTE

Biopharma Group's MicroPress - Differentiating Dog Treats.

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INTRODUCTION

The MicroPress is an instrument which can quantitatively determine the strength and physical characteristics of freeze-dried cakes in-situ. With set parameters and analysis methods, the MicroPress is able to analyse structural integrity rapidly and reliably, enabling fast and effective batch screening—often in less than one minute per sample.

Beyond its established role in assessing pharmaceutical products, new data demonstrates that the MicroPress also has the potential to discern differences in the mechanical properties of various dog treats. This insight can inform preferences for texture and crunch, key attributes in pet food development, and highlights the broader industrial relevance of the instrument.

OBJECTIVE

Different dogs have their own preferences for treats depending on flavour, size of treat and mouth feel. As for the mouth feel, some enjoy hard biscuits while others like a soft treat which is chewy and flavourful. Also, the size of the treat is often a preference. The goal of this study was to determine whether the MicroPress can differentiate among different treats to inform product development and customer preferences.

METHODOLOGY

Using Biopharma Group's MicroPress instrument, several dog treat samples with differing hardness levels were analysed. All samples were tested under the same set of parameters, which can be easily defined and adjusted as needed through the instrument's user-friendly software.

TYPES OF DOG TREATS TESTED:

The samples differed in their size/ shape as shown in the photographs below and were assessed for their hardness/ softness.

TYPE	PHOTOGRAPHS
BISCUITS	
CHEWS - BITE SIZED	
CHEWS - LONG	

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RESULTS

The mechanical properties were assessed by plotting stress against strain. When a 3 mm indenter was first used to test the mechanical strength of two different "biscuits", it was unable to penetrate the sample surface which explains why the instrument registered a very high stress (520-531 kPa) as shown in Figure 1. A very high stress would indicate very high stiffness of the material.

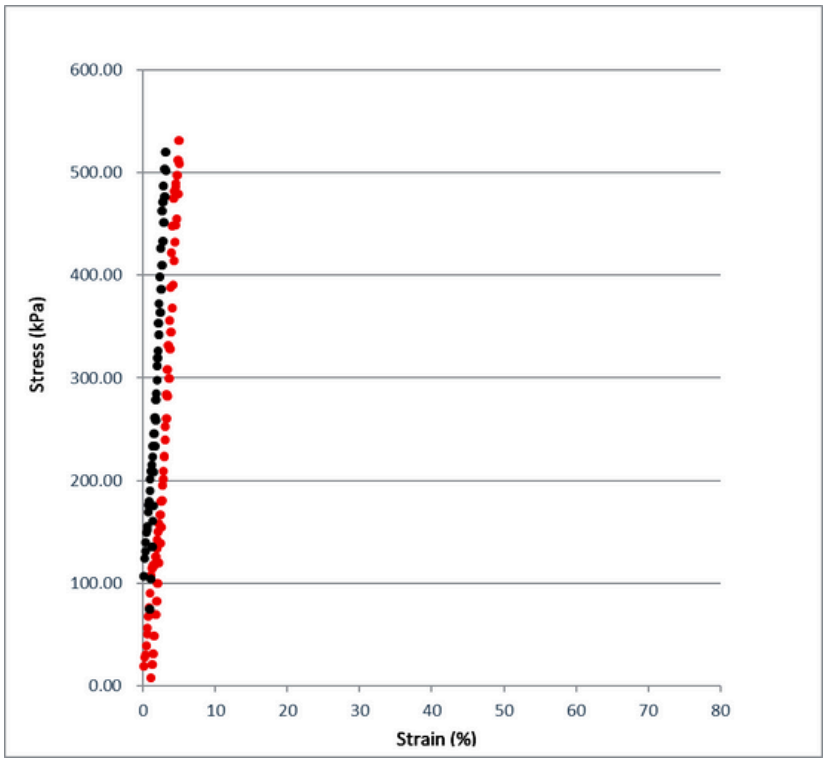

Figure 1: Stress vs. Strain Data for "biscuits" using the 3 mm indenter.

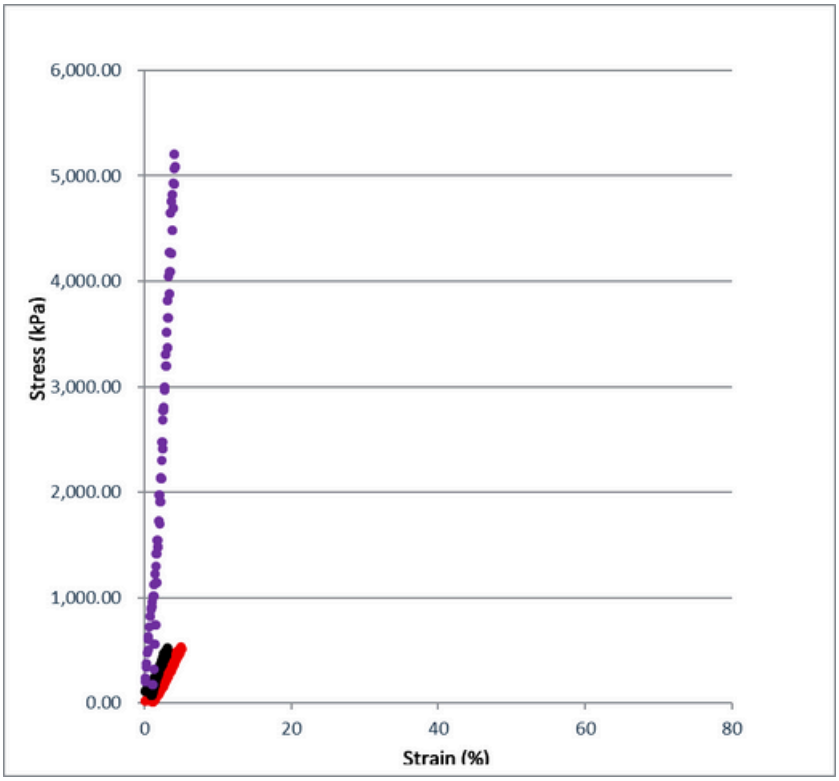

Figure 2: Stress vs. Strain Data for "biscuits" using the 3 mm indenter and 1 mm indenter

To increase the applied force per unit area, the indenter was replaced with a 1 mm probe, following the principle that force is inversely proportional to contact area. Despite the reduced diameter, the 1 mm indenter was still unable to breach the sample. The resulting data, shown in Figure 2, demonstrate substantially higher stress values (10 times higher) relative to strain compared with the measurements obtained using the 3 mm indenter. Based on these results, this particular dog treat sample was classified as a "hard treat."

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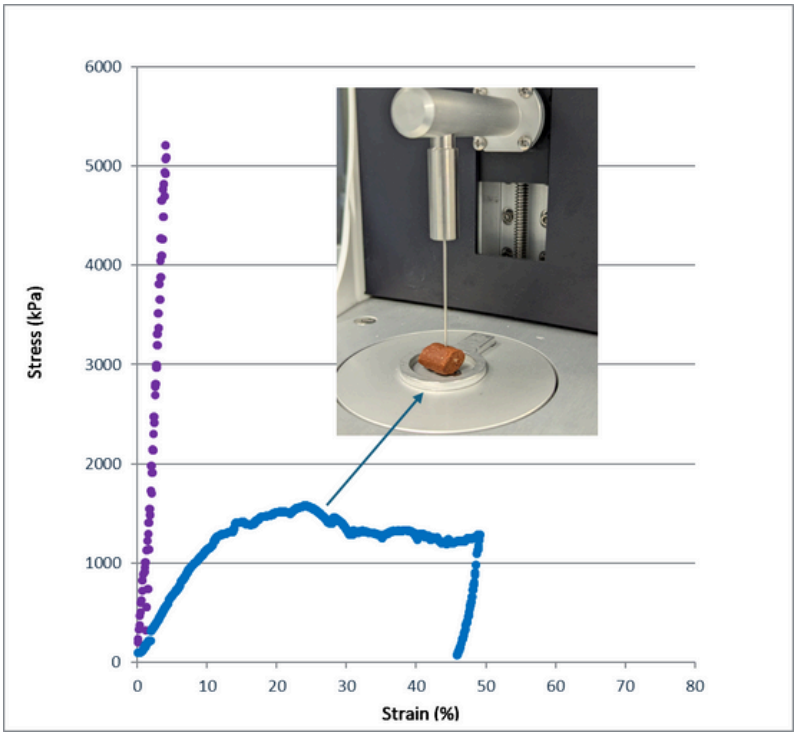
Figure 3 presents comparative data for "biscuits" and a bite-sized chewy treat. The chewy sample exhibited markedly lower stiffness, as evidenced by the reduced stress response relative to strain. The stress–strain profile also indicates substantial plastic deformation within the material, attributable to the ability of the 1 mm indenter to successfully penetrate the sample surface.

Figure 3: →
Comparative data for "biscuits and the "chewy" dog treats



↓ Figure 4: Stress vs. Strain Data for "biscuits", "chewy dog treat" and samples taken from a "long" treat but differing in thickness.

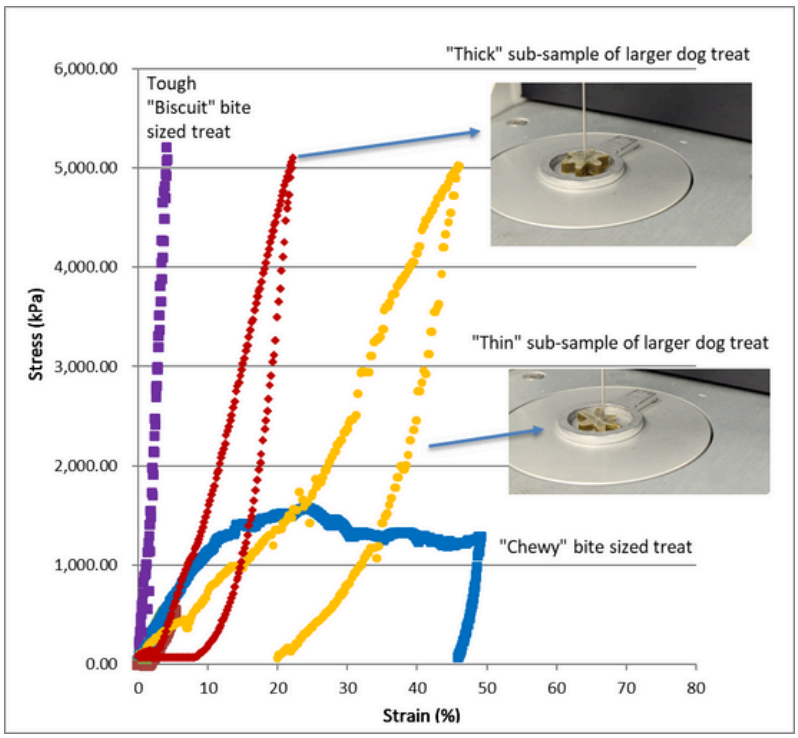


Figure 4 shows the mechanical data for "long" treat samples, which were differentiated by sample thickness. The MicroPress stress–strain profiles demonstrate that increased thickness correlates with higher stiffness, consistent with greater resistance to deformation under applied load. Although both specimens originated from the same parent treat, the thicker section exhibited superior stiffness compared to the thinner section. Importantly, both variants displayed greater mechanical robustness than the "chewy" treat. On this basis, the "long" treat was characterised as possessing mechanical toughness intermediate between that of the "biscuit" and "chewy" treat categories.

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CONCLUSION:

Dog preferences for treat texture and size are highly variable; not all dogs prefer crunchy or long, thick treats. For smaller breeds, softer, chewable treats are often more palatable, and appropriately sized portions are critical to ensure safe mastication and gastrointestinal processing. While physically subdividing larger treats is one approach, manufacturers could optimize formulations by producing smaller, bite-sized versions that maintain desired mechanical characteristics. In this context, the MicroPress instrument provides a valuable tool for quantifying the mechanical properties, such as stiffness, hardness, and deformation behaviour, of different treat formats. By integrating this data during the formulation and development process, manufacturers can more accurately tailor treats to specific textural preferences and ensure both safety and palatability across a range of dog sizes.

CONTACT US

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