PHYSICOCHEMICAL PROPERTIES OF SOLUBLE AND INSOLUBLE DIETARY FIBER SOURCES

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Background and Objectives

- The physicochemical properties of DF are determined by the composition of monosaccharides leading to different effects on intestinal health and metabolism of pigs.
- The aim was to evaluate hydration-related properties of five sources of soluble fibers and five sources of insoluble fibers.

Material and Methods

SOLUBLE FIBERS

Vegetables pulp

Apple pulp

Citrus pulp

Beet pulp

Guar gum

INSOLUBLE FIBERS

Lignocellulose

DDG

Soybean hull

Wheat bran

SmartFiber®

- Water holding capacity (WHC) = (W2 – W3) / W1
  Measured by mixing a sample of 0.5 g (W1) of each ingredient with 10 mL of distilled water. The wet samples were weighed (W2) dried and weighed again to obtain the final weight (W3).
- Viscosity measurements were performed in a Brookfield LVF and RVT models using the adaptors UL and 4 (Brookfield Lab) with the samples at a shear rate of 30 – 100s^{-1}.
- Bulking = volume occupied by sample / initial weight.
  Measured by mixing a sample of 1.0g of each ingredient with 10mL of distilled water.
- Variables were analyzed by ANOVA using Tukey as post-hoc test. Statistical differences were set at $p<0.001$.

Results

- Guar gum had the highest values for all variables. while DDG had the lowest values.
- Beet pulp and citrus pulp followed guar gum as ingredients with high WHC.
- Wheat bran. SmartFiber®. and beet pulp viscosity was similar with DDG with the lowest values.
- Beet pulp and apple pulp followed guar gum as ingredients with high bulking.

Physicochemical properties of ingredients

Ingredients	WHC (g/g)	Viscosity (cP)	Bulking (mL/g)
Lignocellulose	3.76$^{c.d}$	3.84$^{d.e.f}$	2.75$^{e.f.g.h}$
SmartFiber®	3.58$^{c.d.e}$	3.41$^{g.h}$	3.12$^{d.e.f.g}$
DDG	2.22^{g}	3.72$^{d.e.f.g.h}$	1.76^{i}
Soybean Hull	3.48$^{c.d.e}$	4.34^{c}	3.86$^{b.c.d}$
Wheat bran	2.76^{f}	3.32^{h}	2.62$^{g.h}$
Vegetable pulp	3.44$^{c.d.e}$	3.59$^{e.f.g.h}$	3.62$^{c.d.e.f}$
Apple pulp	3.76$^{c.d}$	4.99^{b}	4.43$^{b.c}$
Citrus pulp	3.99$^{b.c}$	4.03$^{c.d}$	3.82$^{b.c.d.e}$
Beet pulp	4.88^{b}	3.74$^{d.e.f.g.h}$	6.11^{b}
Guar gum	31.78^{a}	6.92^{a}	997.37^{a}

Discussion and Conclusion

Ingredients rich in soluble fibers had higher values of hydration-related properties. This indicates a potential to provide metabolic and physiological benefits to sows, such as distention of the gastrointestinal tract. Decreasing the felling of hunger and increasing the welfare