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TASTIER AND HEALTHIER BAKERY PRODUCTS: REPLACE FAT WITH CHIA FIBER (Benexia® Xia Powder 435 LM)

Fat reduction in food is a significant concern today, as market demands increase for products lower in saturated fats in particular. This is related to data showing the prevalence of overweight and obesity has more than doubled in the last 30 years (Hruby, 2015). Obesity has reached epidemic proportions globally, with at least 2.8 million people dying each year as a result of being overweight or obese (WHO, 2021). Overweight and obesity have been cited as risk factors for and associated with a host of chronic diseases and poor health outcomes. Overweight and obesity are complex, with a constellation of factors that contribute. Fat reduction—which reduces the type or energy contribution in a food—is one, but one of relevance and interest in the bakery space, where products often contain higher levels of fat. However, those who work in this arena know that fat substitution poses many challenges.

Consumers today demand great-tasting, sweet bakery products that are also high in nutrients. They want it all! Sweet breads typically contain more than 10% fat and sugar with respect to the flour mass. And fat is essential for sensory attributes such as texture, elasticity, flavors and dough handling of baked goods.

POUND CAKES

We know that fat provides several benefits to pound cakes. For example, fat helps yield a higher volume and softness in the final product, due to higher air incorporation during batter preparation and inhibition of gas-bubble coalescence, leading to a finer and softer crumb structure (Bennion & Bamford, 1997; Bobbio & Bobbio, 2003). In addition, fats and emulsifiers delay starch gelatinization by slowing water transfer into the starch granule, by the formation of complexes between polar lipids and amylose during baking, thus improving the tenderness, moisture content and flavor of the cakes, as well as extending shelf-life (Bennion & Bamford, 1997; Luna Pizarro, Almeida, Samma, Chang, 2013).

Because of these contributions, several problems typically appear when fat content is reduced in pound cakes, such as lower volume, denser crumb, firmer eating qualities, and losses in flavor and palatability compared to traditional cakes (Cauvain & Young, 2006). It has thus been a challenge to provide palatable and marketable products while reducing fat in pound cakes.

FAT REPLACEMENT

Over the years, different ingredients have been used for replacement of fat in foods, such as gums, fibers or mucilage. Chia fiber mucilage has been researched as a potentially favorable fat replacer that preserves—and even enhances—what is lost when fat is reduced.

The applications of chia fiber as fat or egg replacer in cake formulations has been assessed by different researchers (Borneo et al. 2010). The researchers found that replacement of 25% oil with chia fiber resulted in a more nutritious product with acceptable sensory characteristics. They further reported that replacement with the chia fiber resulted in improved product quality up to 50% fat replacement. They noted that the best results overall for the baking experiments were obtained with 25% fat replacement through ground chia gel: The highest volume yield with the softest crumb was achieved after 48 hours.

Other research has looked at reducing fat in pound cakes by using chia mucilage gel (Felisberto et al., 2015). They found that the best results were achieved with 25 g chia mucilage gel per 100 g of fat leading to an improved quality product with both a higher volume yield and prolonged freshness. Of note, the researchers reported that fat replacement at a higher percentage however leads to a dough that is more difficult to process and is not recommended.

A number of researchers have noted that dough where chia gel has been incorporated is actually softer (Borneo et al. 2010). This observation can be explained with the increased amount of water that chia fiber attracts and absorbs resulting in higher elasticity of doughs and therefore more flexibility, higher growing rates of the dough in proofing, and ultimately, higher volume yields in the baking experiments.

In addition, researchers have observed that as a result of the dough growing faster, the volume yields of the sweet breads with incorporated chia gel increased compared to the standard control (Zettel and Hitzman, 2016). Ultimately, a small replacement of fat with chia gel leads to both a better nutritional profile for the product as well as positive effects on the volume.

An additional market advantage and benefit for using chia as fat replacer: Clean label innovations or reformulations. By using chia fiber that achieves many positives to volume, texture, moisture and nutrition, no other additives or ingredients are needed to reduce the amount of fat in sweetbreads.

Benexia Xia Powder 435 LM is 56% Chia fiber. At a 1 to 2% inclusion level, Benexia Xia Powder 435 LM can be a clean label addition in your product's emulsifiers and stabilizers system while replacing 25% fat or oil dosage in your pound cake formulation. In addition, Benexia Xia Powder 435 LM can significantly improve your finished product nutritional composition in fiber, omega-3, protein, and calcium while maintaining a natural and whole-grain texture.

More information: info@benexia.com

References:

Hruby A, Hu FB. The Epidemiology of Obesity: A Big Picture. Pharmacoeconomics. 2015;33(7):673-689. doi:10.1007/s40273-014-0243-x

WHO. (2021). Obesity and overweight. World Health Organization.

Bennion, E. B., & Bamford, G. S. T. (1997). The technology of cake making (6th ed.). London: Blackie.

Bobbio, F. O., & Bobbio, P. A. (2003). Introduçao a química de alimentos (3rd ed.). Sao Paulo: Varela.

Luna Pizarro, P., Almeida, E. L., Samman, N. C., & Chang, Y. K. (2013). Evaluation of whole chia (Salvia hispanica L.) flour and hydrogenated vegetable fat in pound cake. LWT e Food Science and Technology, 54(1), 73e79.

Cauvain, S. P., & Young, L. S. (2006). Ingredients and their influences. In S. P. Cauvain, & L. S. Young (Eds.), Baked products e science, technology and practice (p. 228). Oxford: Blackwell Publishing.

Borneo, R., Aguirre, A., & Leon, A. E. (2010). Chia (Salvia hispanica L) gel can Be used as egg or oil replacer in cake formulations. Journal of the American Dietetic As- sociation, 110(6), 946e949.

Mária Herminia Ferrari Felisberto, Adriana Lucia Wahanik, Cristiane Rodrigues Gomes-Ruffi, Maria Teresa Pedrosa Silva Clerici, Yoon Kil Chang, Caroline Joy Steel, Use of chia (Salvia hispanica L.) mucilage gel to reduce fat in pound cakes, LWT - Food Science and Technology, Volume 63, Issue 2, 2015, Pages 1049-1055.

V. Zettel and B. Hitzman. Fat replacer chia. International Journal of Food Science and Technology 2016
Technology 2016