

Effects of olive leaf water extracts on physical properties of chicken breast sausage

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Abstract

Olive leaf (*Olea europaea* L.) is an underutilized resource of olive tree but has a high polyphenol content, so it has the potential to be used as a food ingredient. In this study, we investigated the effects of olive leaf water extracts on the physical properties of chicken breast sausage (CBS). Olive leaf water extracts were prepared at 4 (OEx₄) and 80°C (OEx₈₀) from dried olive leaf powder and they were applied to CBS preparation within the concentration range 0.05 to 0.5% (w/w minced meat). OEx₄ had 32% lower polyphenol content than OEx₈₀. Water content, expressible water, breaking strength, and viscoelastic properties of CBS with OEx₄ and OEx₈₀ were measured. The analyses of the sausage physical properties showed that adding 0.1% OEx₄ increased the breaking stress (115%), breaking strain (68%), modulus of elasticity (20%), coefficient of viscosity (23%), and water-holding capacity (9%), and the enhancement effects of OEx₄ were much greater than those of OEx₈₀. The gel network of OEx₄-containing CBSs observed by scanning electron microscopy was finer and denser than that of the control CBS. Chemical analyses of the meat proteins showed that OEx₄ induces polymerization of myofibril proteins, especially myosin, via non-disulfide covalent bridges formed between amino and/ or thiol groups. These results indicate that the application of OEx₄ improves the sausage gel properties by inducing non-disulfide-type protein polymerization. This study supports the feasibility of OEx₄ as a new ingredient to improve the texture of gel products prepared from chicken breast minced meat.

Keywords : olive leaf, chicken breast sausage (CBS), gel strength, polyphenol

I Introduction

Chicken breast sausage (CBS) is one of the most popular processed meats. CBS is consumed in many countries, especially in Islamic common, because it is easily adaptable to halal food requirement. The primary material of CBS is chicken breast meat, which is a low-fat and high-protein food, and well recognized healthy meat product. However, CBS has the drawback of poor textural properties such as a rubbery dry texture and lower shear stress^{1, 2)}, which negatively affects consumer preference because texture is an important attribute of consumer preference.

There are several ingredients that can improve the textural quality of sausage gel. Polyphosphates are widely used for

several reasons, such as enhancing the binding property of meat; improving the elasticity, texture, and water-holding capacity of gels; and decreasing cooking loss^{3, 4)}. Starches from various plant sources such as grains (wheat, corn), tubers (potatoes), and roots (tapioca) are used to improve the binding property of meat and the water-holding capacity of gels⁵⁾. Transglutaminase (TGase), derived from a microbial variant of *Streptovorticillium mobaraense*, is also used to improve the textural properties of sausage gel^{6, 7)}. Using TGase in ground meat results in polymerization of myofibrillar proteins, especially myosin, through the formation of an ϵ -(γ -glutamyl) lysine bond (G-L bonds)⁸⁾. The TGase-induced covalent cross-linking results in improved meat binding properties and enhanced elastic properties of sausage gel^{9, 10)}.