Antioxidant Activities And Total Phenolic Content Of Malaysian Herbs As Active Packaging Film In Meat Patties

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Abstract. Active packaging incorporated with natural extracts is a promising technology to extend shelf life of perishable food. Therefore, this study aims to produce the bioactive edible film from semi refined carrageenan (SRC) plasticized with glycerol (G) and incorporated with natural extract to improve lipid oxidative stability and storage quality of meat patties. Evaluation of five Malaysia herbs (*Cosmos caudate;* CC, *Piper sarmentosum;* PS, *Persicaria minor*; PM, *Centella asiatica*; CA and *Syzygium polyanthum*; SP) were analysed for their phenolic content and antioxidant activities and total phenolic content using Folin-Ciocaltea method, and the antioxidant activities of plants were determined using 2,2-diphenyl-1-picrylhydrazyl (DPPH) method, trolox equivalent antioxidant capacity (TEAC) and oxygen radical absorbance capacity (ORAC). PM extract demonstrated highest total phenolic content (1.629 mgGAE/Lsample) and antioxidant activities value in TEAC (27.166 mg TE/ L sample), DPPH (719.89 mg eq. trolox/L sample) and ORAC (5.81 mg TE/ L sample). Thus, PM extract was selected to be incorporated into active packaging film with concentration of 0.4,1.5 and 2.0% in 2% SRC and 0.9% G (w/w) film formulation. The developed films were wrapped with meat patties under refrigerated condition (4±2℃) and monitored for 14 days storage period. Film wrapped with 2% (w/w) PM exhibited significantly lower lipid deterioration rate analyzed by TBARS method ($p<0.05$) and low changes of % metmyoglobin value that indicates the minimum development of brown color ($p<0.05$). Hence, the active packaging edible films incorporating PM demonstrated potential as a packaging material to improve food safety and quality of the meat.

INTRODUCTION

Food spoilage is usually occur by lipid oxidation. Generally, deterioration of foodstuff easily occur with high lipid content of food especially those with unsaturation high grade. The oxidation of lipids in foodstuffs results in severe problem that cause development of off-flavors, rancidity, modify texture and colour, and leads to the growth of microorganisms and vitamin losses [1]. According to previous literature, the formation of toxic aldehydes and the loss of nutritional quality because of polyunsaturated fatty acid (PUFA) degradation cause by lipid oxidation. To minimize lipid oxidation, many strategies have been enforced [2]. For example, the direct addition of antioxidants to foods or the design of a suitable packaging technology such as vacuum or modified-atmosphere packaging combined with high-barrier packaging materials [3]. Commonly, the packaging system are introduced by conventional packaging which it consist of synthetic antioxidants such as Butylated Hydroxyanisole (BHA) and Butylated Hydroxytoluene (BHT) that can cause potential health risk to human life [4,5]. However, there are significant concerns related to their toxicological aspects and potential health risks cause by such compound. The combination of natural preservatives and biodegradable plastic into one food packaging formulation was a promising approach to extending product shelf life [6].

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