

4 **Outline**

5 1. Introduction

6 1. Fermented SCG hydrolysate by lactic acid bacteria, yeast and mixed strains and analysis of  
7 the composition.

8 2. Extraction of fermented SCG with different concentrations of ethanol and determination of  
9 phenolic content and enzyme inhibition activity.

10 3. Investigation of hypoglycemic activity in FL83B mouse hepatocytes.

11 4. Conclusion

12 **Abstract**

13 Spent coffee grounds (SCG) are rich in various bioactive ingredients such as  
14 polysaccharides, proteins, and phenolics. In a previous study, 38 strains of lactic acid bacteria  
15 and 14 strains of yeast were used for submerged fermentation with SCG. The results showed  
16 that the fermentation of *Lactobacillus* sp. FPP2508 and *Saccharomyces pastorianus* SP54  
17 inhibited  $\alpha$ -amylase and  $\alpha$ -glucosidase and promoted glucose uptake in FL83B cells. The aim  
18 of this study was to improve the biological activity of SCG by different fermentation and  
19 extraction methods to enhance the hypoglycemic activity. In the for future, it has the potential  
20 to be used in hypoglycemic health food.

21 In this study, SCG hydrolysate was fermented with FPP2508 and SP54 as single or  
22 combined strains. Proximate compositional analysis showed that crude protein, crude fat and  
23 ash of all fermentation groups decreased significantly to 14.36~14.50%, 13.54~14.21% and  
24 0.37~0.75%, indicating that nutrients and minerals in SCG were utilized during fermentation.  
25 SCG fermentation products extracted with 20% ethanol had the highest total phenolic content  
26 and  $\alpha$ -glucosidase inhibitory activity. The total phenolic contents of FPP2508, SP54 and the  
27 composite strains were 54.58, 63.95 and 44.42  $\mu\text{g}$  GAE/mL, and the  $\alpha$ -glucosidase inhibition  
28 rates were 78.61, 70.15 and 70.15%. The highest glucose uptake and glycogen amounts of  
29 111.83% and 0.9  $\mu\text{g}$  were obtained by 20% SP54 fermentation extract with insulin - resistant  
30 FL83B mouse hepatocytes, suggesting that SCG fermentation extract may enhance insulin  
31 sensitivity and thus promote hepatic glucose synthesis. The results suggest that SCG  
32 fermentation extract may help to reduce hyperglycemia in type 2 diabetic patients and has the  
33 potential to be developed as a functional food or dietary supplement for the prevention or  
34 reduction of type 2 diabetes.