

## Enhancement of Glycyrrhizic Acid and Microbial Decontamination of *Glycyrrhiza glabra* (licorice) by Gamma Radiation

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### ABSTRACT

*Gamma irradiation is an effective means for controlling pathogenic microorganisms in many herbal materials. This study evaluated the effect of gamma radiation on microbial load, antioxidant activity, and total phenolic content, including the amount of glycyrrhizic acid of *Glycyrrhiza glabra*, or licorice powder. Gamma irradiation was applied up to 20 kGy (at 5 kGy intervals) to powdered root samples. Total bacteria, yeast and mold, and coliform bacteria were counted after gamma irradiation; all decreased with increasing dose. After irradiation at 5 kGy, total bacterial count and total yeast and mold diminished by 2 log cycles. A dose of 5 kGy was sufficient to eliminate the pathogenic bacteria, such as coliform bacteria *Escherichia coli* and *Clostridium perfringens*. The antioxidant properties and total phenolic content did not differ significantly between non-irradiated and irradiated samples. However, treatment with gamma radiation altered the quantity of glycyrrhizic acid; the measured glycyrrhizic acid content increased in samples treated with 15 and 20 kGy radiation. To conclude, the microbial quality of licorice powder can improved by treating with gamma radiation without affecting the antioxidant activity and phenolic compositions. In addition, a gamma irradiation dose higher than 15 kGy enhanced the glycyrrhizic acid content in the extract.*

**Keywords:** *Glycyrrhiza glabra*, Gamma radiation, Decontamination

### INTRODUCTION

*Glycyrrhiza glabra*, commonly known as licorice, is a Thai traditional medicine belonging to the Fabaceae family. The plant is widely distributed in the subtropical and warm temperature regions of the world. Licorice has a distinctive sweet taste because of glycyrrhizin, which is 50 times sweeter than sugar (Khattak and Simpson, 2010). In traditional medicine, this plant has been used for centuries in the treatment of sore throats, coughs, asthma, gastric ulcers, and allergic reactions. The roots of *G. glabra* are also used in the tobacco industry to flavor cigarettes, pipe tobacco, and anti-smoking preparations (Khattak and Simpson,