

### Liquid fermentation of red ginseng marc using effective microorganisms

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Red ginseng marc (RGM) is a by-product of the manufacturing of red ginseng extract, which is either discarded or used for animal feed in the form of solid. RGM contains various bioactive components such as ginsenosides (saponin) and acidic polysaccharides, but the availability of bioactive components within RGM tends to depend on the digestive ability of individual animal. Fermentation of RGM by microorganism could produce various metabolites of bioactive components which are beneficial to intestinal absorption irrespective of individual animal. Thus, we fermented RGM with effective micro-organisms (EM) including photosynthetic bacteria, lactic acid bacteria, actinomycetes and fungi. Growth inhibition with RGM content was not shown, but the culture viscosity dramatically increased with RGM content. The culture broth after fermentation contains organic acids as well as ginsenosides and their metabolites. The concentration of organic acids such as acetic acid and lactic acid in the culture broth increased with additional supply of molasses. The culture broth also showed a powerful anti-oxidant activity.