P03-041

# *In Vitro* Evaluation of Anti-cancer and anti-inflammatory activities using GINOS and Fermented GINOS Extract

**Jinnatun Nahar [1)], Dong-Wook Lee [2)], Yue Huo [1)], Ramya Mathiyalagana [1)] , Jong Chan Ahn[1)], Yaxi Han [2)] , Mohanapriya Murugesan[1)] and Deok Chun Yang [1),2)*]**

*1) Graduate School of Biotechnology, College of Life Science, Kyung Hee University, Yongin-si, Gyeonggi-do 17104, Republic of Korea*

*2) Department of Oriental Medicinal Biotechnology, College of Life Sciences, Kyung Hee University, Yongin-si, Gyeonggi-do 17104, Korea.*

**Email : dcyang@khu.ac.kr*

## Abstract

**Background:** Cancer and inflammation incidence rate has been increasing drastically. Ginseng has been used a traditional herb for anti-inflammation effect. Yet the research gap targeting the benificial activities of GINOS has not reported elsewhere.

**Methods and Results:** We report the fermentation of GINOS which was the complex mixture of white ginseng, red ginseng, black ginseng, taegeuk ginseng, fermented Red ginseng and CRMG extract using commercial hydrolytic enzymes and lactic acid bacteria. Ginsenosides content was confirmed by HPLC and its antioxidant inhibition activities were analyzed by DPPH and reducing power activity. we observed cytotoxicity and NO inhibition activity of FGINOS in Raw 264.7 Macrophage cells. Moreover, we were also analyzed cytotoxicity on A549 human lung cancer cells and HepG2 liver cancer cells by MTT reagent. Ginsenoside Rh1, Rh2, F2 and Compound K was increased significantly by fermentation of GINOS. FGINOS even at high concentrations such as 400 and 800 µg/mL not showed any cytotoxicity in the Raw 264.7 cells than GINOS which decreased approximately 20% and 60% of cell viability at above concentration. FGINOS inhibited NO production at 200 µg/mL than GINOS. Also, it was not much toxic to lung and liver cancer cells at 24h treatment.

**Conclusion:** These results suggest that FGINOS has less toxicity effects on RAW 264.7 cells and more inflammation reduction effect through inhibition of LPS induced NO production than GINOS which increase minor ginsenoside contents through fermentation. FGINOS could be a potential drug for anti-inflammation.

## Results

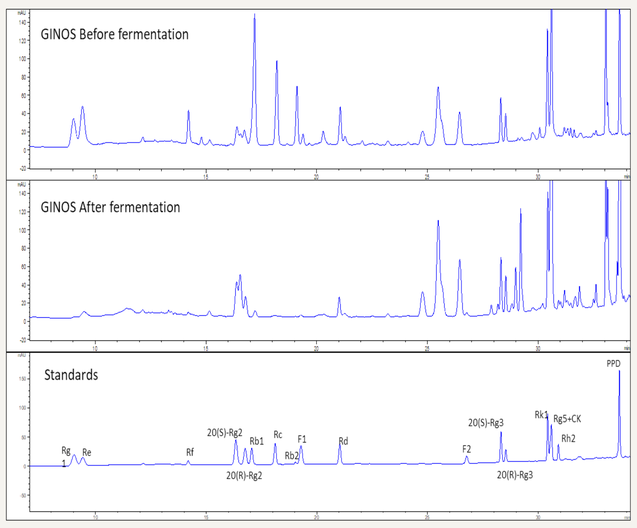
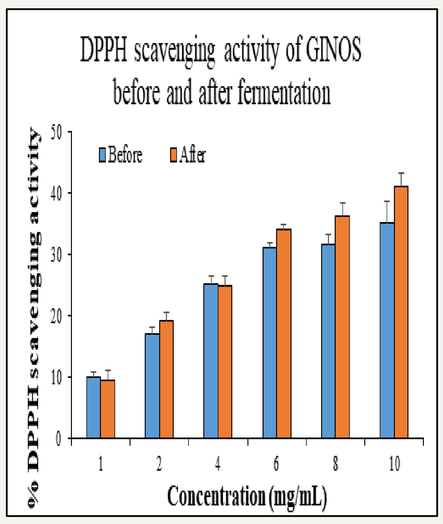



Fig 1. HPLC data analysis of GINOS before and after fermentation



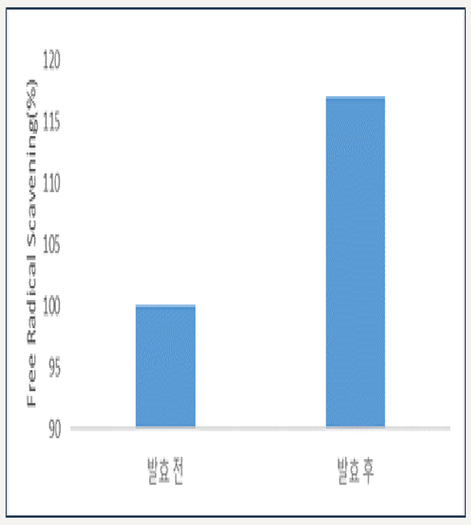
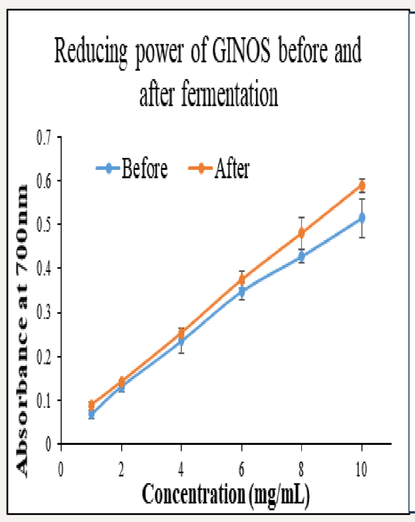




Fig 2. DPPH scavenging activity of GINOS before and after fermentation process



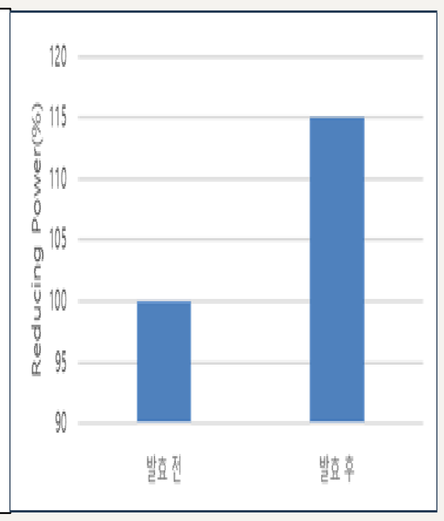
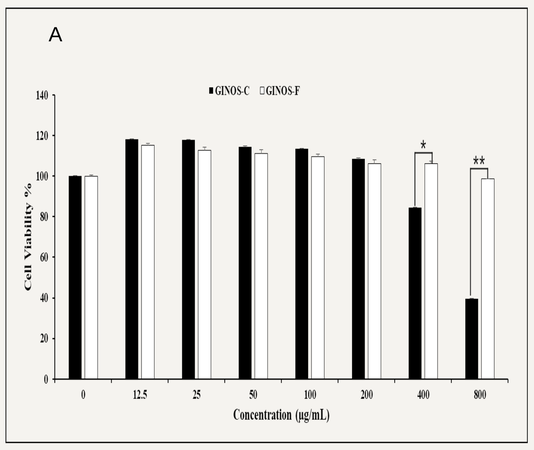




Fig 3. Observation of reducing power of GINOS before and after fermentation



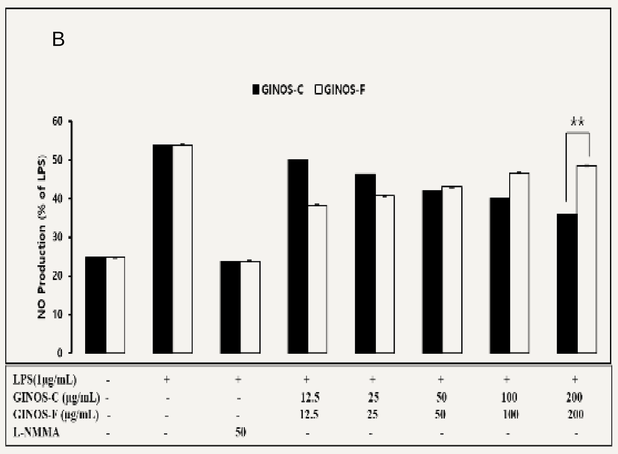
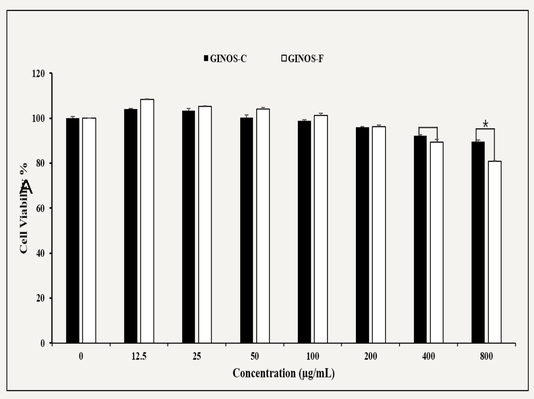




Fig 4. Cell cytotoxicity of GINOS and FGINOS in RAW 264.7 cells (A) compared to the controls and (B) NO production, LPS-treated RAW cells (to induce NO production and cause inflammation).



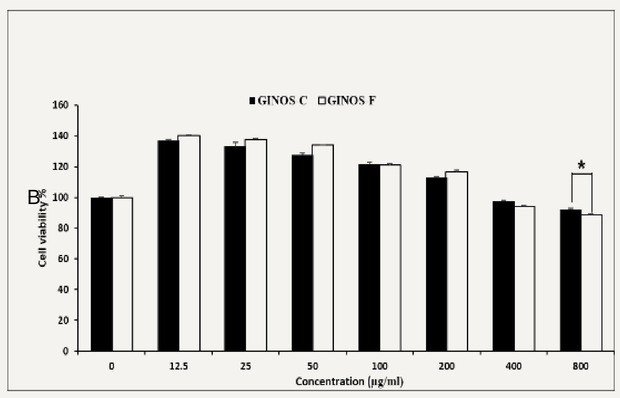




Fig 5. Cell cytotoxicity analysis of GINOS and FGINOS using MTT assay on (A) A549 human lung adenocarcinoma cells and (B) HEPG2 liver cancer cells at different concentration at 24 H

## Conclusion

In summary, these results suggest that FGINOS has less toxicity effects on normal RAW 264.7 cells and more inflammation reduction effect through inhibition of LPS induced NO production than GINOS in Vitro model which could due to increased minor ginsenoside contents through fermentation process. So, FGINOS could be a potential drug candidate anti-inflammation related further studies.

Acknowledgement

**This work was supported by Korea Institute of Planning and Evaluation for Technology in Food, Agriculture and Forestry (IPET) through Agri-Food Export Business Model Development Program, funded by Ministry of Agriculture, Food and Rural Affairs (MAFRA) (Project No: 320104-03) and the study was also supported by a grant from The National Research Foundation of Korea (NRF) (Project no: NRF- 2020R1I1A1A01070867).**

Lab of Hanbangbio 경희대학교 한방바이오 연구실