

LED 처리에 의한 인삼에 존재하는 진세노사이드 함량변화  
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### Induction of Ginsenosides in Raw Ginseng Roots by Light-Emitting Diodes

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#### 실험목적 (Objectives)

To investigate the effect of the specific emission spectra from various LED light sources on ginsenoside production in raw ginseng roots.

#### 재료 및 방법 (Materials and Methods)

- LED emission spectra : 380, 450, 470, and 660 nm
- Treatment: closed LED boxes (24x50x60cm, WxHxD) at 25° C
- HPLC analysis :
  - column : Capcell-pak C<sub>18</sub> MG (4.6 x 250 mm) (Shiseido Inc, Tokyo, Japan)
  - Condition flow : 0-10 min, 18-18% acetonitrile, 10-24 min, 18-19%, 24-35 min, 19-25%, 35-54 min, 25-25% 54-71 min, 25-38%, 71-100 min, 38-100%, 100-105 min, 100-100%

#### 실험결과 (Results)

- Compared with untreated (4° C) ginseng roots, ginsenosides were induced from 2% to 74% by exposure to various emission spectra using LED light sources
- LEDs with both 450 nm and 470 nm emission spectra significantly induced ginsenosides with 65% and 74% induction, respectively
- These two treatments (450 nm and 470 nm) significantly increased Rb<sub>1</sub>, Rb<sub>2</sub>, Rc and Rd more than 100% as well as significant induction of Rg<sub>1</sub> by 450 nm (116%)
- LEDs with three emission spectra (380, 450, 470 nm) increased the ratio higher than 1, while three other treatments (4° C, dark, 660 nm) showed less than 1

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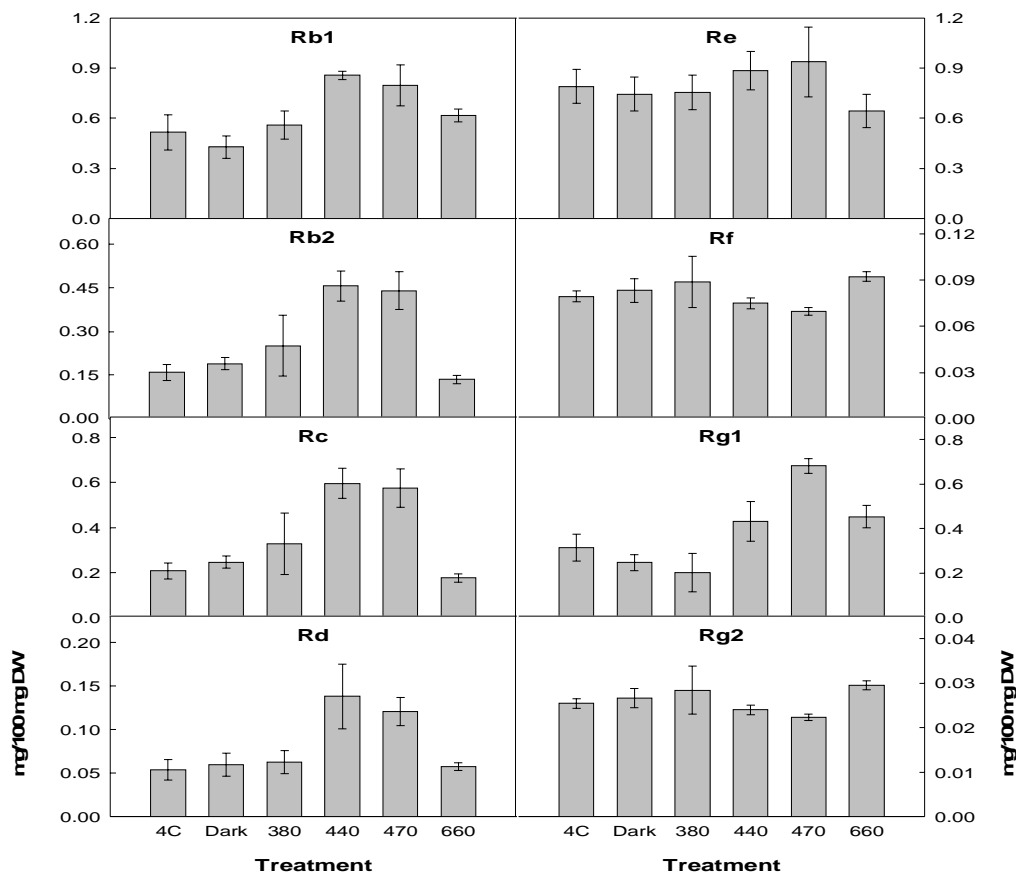
\* 시험성적

**Table 1.** The changes in ginsenoside content in ginseng root following LED treatment

Treatment	Ginsenoside (mg/100 mg DW)	Changes (%)	PPD/PPT*
4° C	2.348 ± 0.303	0	0.778 ± 0.085
dark	2.200 ± 0.251	-6	0.852 ± 0.037
380 nm	2.480 ± 0.549	6	1.057 ± 0.140
440 nm	3.871 ± 0.133	65	1.448 ± 0.098
470 nm	4.087 ± 0.477	74	1.142 ± 0.081
660 nm	2.395 ± 0.115	2	0.836 ± 0.098

Values are presented as mean ± SE with 3 replications.

\*Protopanaxadiol (Rb<sub>1</sub>, Rb<sub>2</sub>, Rc, Rd) / Protopanaxatriol(Rg<sub>1</sub>, Rg<sub>2</sub>, Re, Rf)



**Figure 2.** Comparison of ginsenoside contents

Ginsenoside contents of ginseng roots were compared after treatment with 4° C and dark as well as LEDs with four different light emission spectra (380, 450, 470, and 670 nm) at 25° C for 7 days. The content of individual ginsenosides changed after treatments. Values are presented as mean ± SE with 3 replications.