

## Water management for soybean production in upland and drained paddy

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Economical crop management is very important for matching growers' profits. Our experiment target was to increase seed yield and improve grain quality (grain weight/size) in soybean by water managements. Water is essential for the germination and growth of all plants, however, we tried to find out best water management in view of water supplying stage/duration and water supplying point by testing soil moisture condition. We hypothesized that water management for soybean is important at germination stage and ripening for best seedling establishment and high grain yield and quality, respectively at both sites [drained paddy field (DPF), upland]. Two irrigation treatments, from seeding to R8 (SSR8) and R5 to R8(R5R8), were layed out at main plots and 4 levels irrigation points, -0.03, -0.05, -0.1MPa and natural, were made as sub-plots in both irrigation stage at both sites. To verify our hypothesis, level low cultivations were done with seeding space of 10 x 60 cm and 15 x 60 cm in upland and DPF, respectively. Germination percentage was the highest in -0.03MPa at both sites, however, seedling establishment ratio was the highest in -0.05 and -0.1MPa, suggesting that irrigation should be stopped shortly after germination for seedling establishment to prevent plots from initial excess water damage. Two plants per hill were maintained to evaluate growth characteristics and yield parameters under different water management conditions at both sites. The highest grain yield was acquired at -0.03 and -0.05MPa in SSS8 and R5R8 treatment, respectively, in drained paddy field. Upland was similar to the DPF, except the second highest yield was obtained at -0.05MPa in SSR8 which was almost 20% higher than R5R8. As we hypothesized, seed yield was the lowest in natural plot by showing about 2/3, compared to best water managed plots. It is concluded that irrigation is essential during seed germination at both sites, however, irrigation is not economically viable during actively growing stage in drained paddy field. But whole growth stage should be water managed in upland by irrigation to reach saturation point from -0.05MPa of soil moisture condition.

## Antioxidant Activity and Cytotoxic Effects with Cell Lines of Two Peptides Isolated from Korean Fermented Soybean Paste, *Chungkukjang*.

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Experiment was performed to investigate the effects of two peptides isolated from Korean fermented soybean paste, *chungkukjang*, on the protection of oxidative stress. Antioxidant activity in the isolated peptides from *Chungkukjang* was further assessed with 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenylterazolium bromide (MTT) cell viability assay and fluorescence-activated cell sorting (FACS) analysis of cells treated with hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>). Cytotoxic effects of two peptides were examined against HT-29, SK-OV-3, and H4 IIE cell lines.

The two peptides were isolated using a preparative LC and measured their radical scavenging activities. Four fractions were separated from *Chungkukjang* using a preparative LC equipped with GS-310 column. They were subjected to antioxidant activity by DPPH and NBT-reduction inhibition methods, identifying that the second fraction had higher antioxidant activities of 72.4% in DPPH and 81.4% in NBT method. The second fraction was re-fractioned with the W-252 column and separated into five fractions of which two fractions were identified to have higher antioxidant activity. The antioxidant activity was 69.1% and 70.5% in NBT method. Then, the two fractions were determined to have eight amino acids which were aspartic acid, threonine, serine, glutamic acid, glycine, lysine, histidine, and arginine. Glycine was found quantitatively to be the major amino acid. The obtained two fractions were nominated as *P-NICS-1* and *P-NICS-2*, respectively.