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## Radiation-Modified Carrageenan as Plant Food Supplement: Making a Breakthrough with Philippine Farmers

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Radiation processing of kappa carrageenan by either gamma or e-beam irradiation produces low molecular weight fragments that can induce growth promotion effects on plants. The fragments that are produced have an average molecular weight (MW) of less than 10 kDa. These low MW kappa carrageenan increases yield in Pechay plants when applied either by foliar spraying or in hydroponics condition. (Abad, et al., 2015). Recent studies in the Philippines indicated improved agronomic traits with a dramatic increase in yield in mungbean and peanut plants of 200 - 400% and 150 - 200%, respectively using screen house experiments. Field experiments in mungbean produced around 10 times higher yield than the normal farmer's practice. Multi-location trials of around 2,000 ha. rice field in different regions of the Philippines indicated an average increase in yield of 15- 30% compared to normal farmer's practice. Highest yield of as much as 60% was obtained. Increased resistance to tungro virus was also noted. Likewise, there was extensive root growth and sturdy stems that prevent lodging of rice plant. Testimonies given by farmers indicated a substantial increase in their income with the utilization of radiation-modified carrageenan. Degradation of  $\kappa$ -carrageenan by E-beam irradiation is inhibited by the formation of crosslinks. Optimization by addition of hydrogen peroxides to improve degradation is discussed. Data on pilot scale production of radiation modified carrageenan is presented.

### Reference:

[1] Abad, L.V., Aurigue, F.B., Relleve, L.S., Montefalcon, DR.V., Lopez, GE.P. Characterization of low molecular weight fragments from gamma irradiated  $\kappa$ -carrageenan used as plant growth promoter. Radiation Physics and Chemistry 118 (2015), 75-80.

### Country/Organization invited to participate

Philippines

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