

**Project Code:** MRG5080201

**Project Title:** Effects of Chitosan on Physiological Responses Relating to Yield Potential of Corn (*Zea mays* L.) under Transient Waterlogged (hypoxia) Condition.

**Investigator:** Assistant Prof. Dr. Suchada Boonlertnirun  
Rajamangala University of Technology Suvarnabhumi  
60 Moo 3 Tumbol Huntra, Amphur Pranaknon Sri Ayuttaya,  
Pranaknon Sri Ayuttaya Province, 130000.

**E-mail Address:** [Kittihuntra@hotmail.com](mailto:Kittihuntra@hotmail.com).

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**Abstract:**

**Experiment # 1 Hypoxic Responses of Corn Seedlings**

Hypoxia usually influences plant growth and final yield. The objectives of this study were to evaluate hypoxic responses of waxy corn and field corn and then select to be tolerant and susceptible genotypes. This study was divided into two groups, waxy corn seedlings and field corn seedlings. In each group, pot experiments were conducted using a split plot in randomized complete block design with three replications. Main plots were two treatment conditions, normal irrigation (I-NC) and hypoxic condition (H-NC) and sub plots were a number of corn genotypes. For the waxy corn, it was found that three genotypes, namely Big white 852, Mungkorn Padtaew and Samlee Puifai, were selected as tolerant genotype whereas the susceptible genotype was Neaw Roiet, Nam Wang and Samlee Kaimook Pumpui. In terms of field corn, the tolerant genotype was 30Y87 (Pioneer), NSX 062030 and NSX 062029 but NK48 (Sygenta), 30B80(Pioneer) and Pac224 (Pacific) were selected as susceptible genotype. The main criteria to select to be tolerant and susceptible genotypes were waterlogged index of each characteristic and different value of all recorded data between I-NC and H-NC was also considered.

**Key word:** hypoxic response, corn seedling, waterlogged index

**Experiment # 2 Effects of Chitosan on Physiological and Morphological Responses of Corn Seedlings under Hypoxia.**

Chitosan acts as an elicitor in many plant species. It not only activates the immune system of plants, but also increases the yields. The objectives of this study were to investigate the effect of chitosan on physiological and morphological responses of corn seedling genotype, tolerant and susceptible, under hypoxia. This study was divided into two groups, field corn seedlings and waxy corn seedlings. Pot experiments were

conducted using a split plot in completely randomized design with four replications. Main plots were tolerant and susceptible genotypes of each corn group; NSX 062030 and 30B80 (Pioneer) were utilized as tolerant and susceptible genotypes respectively in field corn group whereas Big White852 and Neaw Roiet were utilized as tolerant and susceptible genotypes respectively in waxy corn group. Sub plots were three treatment conditions: normal irrigation without chitosan application (I-NC) , chitosan application before hypoxia(C-H) and hypoxia without chitosan application (H-NC).The results were found that slight genotypic effect was observed for aerenchyma development under various treatment conditions. However, a number of new roots, aerenchyma development, root dry weight and leaf chlorophyll content were affected by various treatment conditions. C-H had positive effects on a number of new roots and aerenchyma development and also tended to retain leaf greenness and chlorophyll content but did not affect soluble sugar accumulation and nitrate reductase activity (NR activity) in corn leaves.

**Keywords: chitosan, corn seedling, hypoxia, physiological and morphological response**