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Characterization of bifunctional protein from *L. purpureus* reducing aflatoxin contamination in maize

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Objectives

The specific objectives are to characterize protein from *L. purpureus* which is involved in reducing aflatoxin contamination in maize.

Materials and Methods

1. Materials

Lablab purpureus, Aspegillus flavus

2. Methods

Lectin assay (hemagglutination), α-amylase inhibitor assay

Result and Discussion

Maize is the one of the most important crop in the world. Aflatoxins (AF) are toxic and carcinogenic components produced on maize kernels by *A. flavus*. Contamination of AF is a serious problem before and after harvest. A 36kDa protein (AILP) from *Lablab purpureus* inhibited the alpha-amylase from a number of fungi as well as by *A. flavus*. We cloned the gene (*Lai*) coding the AILP from *L. purpureus*. The recombinant proteins of *Lai* genes in yeast expression system were subjected to lectin activity and -amylase inhibitor activity assay. Three of them have lectin activity. According to the result of heamagglutination, the proteins exhibit different affinities. It is correlated with the structure of the proteins. -amylase inhibitor differs from lectin by deletion (GAP1, GAP2, GAP3) of three short surface loops from the compact lectin structure and has two of 4 carbohydrate binding sites conserved in lectin. This suggested that, therefore, there exist a carbohydrate binding site in Lai. It has been reported that lectins protect plants from fungi containing chitin and glucans in their walls and that carbohydrates are involved in plant-host relationship. Moreover, those recombinant proteins having lectin activity inhibited -amylase activity of *A. flavus*. These data show that recombinant proteins characterized here were bifunctional protein having lectin activity and -amylase inhibitor activity. This research will contribute information applicable to the expression of -amylase inhibitors in transgenic maize to control disease.

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