Aspergillus flavus Infection of Peanuts in Thailand

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タイ産ピーナッツの *Aspergillus flavus* 汚染

Aspergillus flavus infection of agricultural commodities in tropical areas has received much attention because it may cause aflatoxin contamination. However, it has not yet been clear when the initial infection of peanuts by *A. flavus* takes place. For example, a paper¹⁾ reported on the common occurrence of *A. flavus* in peanuts before harvest in India. However, the authors' investigation could not indicate that *A. flavus* infection may occur in the field before harvest²⁾.

This paper deals with an examination of *A. flavus* infection of Thai peanuts at harvest time using some samples from different regions.

Materials and Methods

1. Samples

The peanuts samples used in this study were harvested in rainy season (September 1984). They were 7 varieties of peanuts from test fields (Nos. 1-2, 4 and 6-7) and farmer's fields (Nos. 3 and 5). One kernel sample (No. 8) sold in market was also examined.

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2. Examination of fungal infection

After the pods of each sample were shelled, kernels and shells were surface-sterilized in 1% NaOCl solution and rinsed with water. Fifty kernels and 36 pieces of 1/4-shells of each sample were plated (six per plate) on PDA and M40Y agar in six partitioned Petri dishes and incubated for 7 to 10 days at 25 C.

3. Artificial inoculation test

In order to examine whether the tested kernels are resistant to *A. flavus* infection, artificial inoculation test was carried out. The kernels of each sample previously confirmed to be free from *A. flavus* by plating test on agar media were inoculated individually by a loop of conidia suspension of *A. flavus* and incubated at 25 C.

Results and Discussion

The results of examination of fungal infection for kernels and shells are summarized in Table 1 and Fig. 1 respectively. These results show that *A. flavus* infection was not detected in both kernels and shells of Nos. 1 to 7 samples. On the contrary, the marketed kernel sample (No. 8) yielded *A. flavus* infection with high frequency. Thus, natural infection was detected only from the marketed kernels. From these results, it is suggested that *A. flavus* infection of peanuts mainly occurs in marketing channels (during from harvesting and handling to storage). In fact, the artificial inoculation test revealed that *A. flavus* could invade easily into all of tested kernels.

There was a tendency that *Macrophoma* sp.

Table 1. Mycoflora of peanut kernels harvested in rainy season (September 1984)

Fungus	Percentage of infected kernels															
	(1)		(2)		(8)		(4)		(5)		(6)		(7)		(8)	
	PDA	M40Y	PDA	M40Y	PDA	M40Y	PDA	M40Y	PDA	M40Y	PDA	M40Y	PDA	M40Y	PDA	M40Y
<i>Alternaria alternata</i>					4				44	36						
<i>Aspergillus flavus</i>															48	44
<i>A. niger</i>	8	4													4	
<i>A. tamarii</i>																4
<i>Fusarium moniliforme</i>		4	4		4											
<i>F. solani</i>	32	52	16	4			12						4			
<i>Glomerella cingulata</i>										4						
<i>Macrophoma</i> sp.	32	16	20	68	20	36		4	28	36					28	16
<i>Nigrospora sphaerica</i>															12	8
<i>Penicillium citrinum</i>			20				52	60	4	16		4			28	16
<i>Rhizoctonia</i> sp.	32	4	56	16	20	8			60	60					36	72
Other fungi		8					8	20		12		4				
Non-infected kernels	20	20	4	16	56	56	32	16	0	4	100	92	100	96	0	0

* = *Sphaeropsis* sp.

1. *Alternaria alternata* 2. *Aspergillus niger* 3. *Fusarium moniliforme* 4. *Fusarium solani*
 5. *Macrophoma* sp. 6. *Penicillium citrinum* 7. *Rhizoctonia* sp.

Fig. 1. Isolation frequency of predominant fungi in the shells.

and *Rhizoctonia* sp. were predominantly isolated from both the kernels and the shells. Although *A. niger* and *F. moniliforme* were also isolated rather frequently, they were little isolated from the kernels. The relation between shell- and kernel-infection may be confirmed by future investigations.

References

- 1) Subrahmanyam, P., Rao, A.S.: Curr. Sci. (India), **43**, 707 (1974).
- 2) Saito, M., Tanaka, K., McDonald, D., Mehan, V.K., Tsuruta, O., Manabe, M. and Matsuura, S.: Proc. Jpn. Assoc. Mycotoxicol., **20**, 7 (1984).