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## ASPERGILLOSIS IN PIGEON AND ROLE OF THIOBENDAZOLE OR GARLIC JUICE FOR PREVENTION OF INFECTION (With 8 Figs.)

By  
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الأسبرجيلوزيس في الحمام ودور الثيوبندازول والثوم في منع العدوى

علام نفادى ، طلبه عبد المطلب ، بخيت سالم ، كمال الزناتى

درست التغيرات الباثولوجية تجريبيا لمرض الأسبرجيلوزيس في الحمام باستخدام عترة  
الأسبرجيليس فيوميجاتس . كذلك تمت دراسة دور مركب الثيوبندازول وعصير الثوم لمنع  
حدوث العدوى بالمرض . وجد أن عصير الثوم له أثر مهم للفطر وأكثر فاعلية عن  
الثيوبندازول في حماية الطيور من العدوى بالمرض .

### SUMMARY

The pathological changes of aspergillosis in pigeon were studied experimentally by using pathogenic *Asp. Fumigatus*. The role of thiobendazole as well as garlic juice for prevention of the infection was also studied. It was found that garlic juice has a good fungicidal action than thiobendazole.

### INTRODUCTION

Aspergillosis is considered as the most important fungal diseases in birds caused by *Asp.* species. Clinical symptoms, pathogenesis and pathology of the disease in birds under natural and experimental conditions in Egypt were described by SALEH (1976); NAFADY (1978); EL-BATRAWI (1980); IBRAHIM, *et al.* (1983) and ABD-EL-MOTELIB, *et al.* (1988).

Thiobendazole as a chemical agent proved to have fungicidal effect and can eliminate *Asp. fumigatus* from incubators and hatcheries without any effect on egg hatchability when used by fumigation (SAIF and REFAL, 1977). Also, SAIF (1976) and ABD-EL-MOTELIB (1988) reported that thiobendazole proved to have fungicidal effect on *Asp. flavus* and *Asp. fumigatus* cultures.

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Scientific studies made on garlic revealed that it was effective against a variety of human and animal pathogens including parasites (AMONKAR and BANERGI, 1971), bacteria (SHARMA, et al. 1977) and fungi (BARONE and TANSEY, 1977; MOORE and ALKINS, 1977; PRASAD, 1979 and PARASAD and SHARMA, 1981).

The aim of this work is to study the fungicidal effect of thiobendazole and garlic juice against *Asp. fumigatus* infection in pigeons. Also, to determine their efficacy as an antifungal feed additive.

### **MATERIAL and METHODS**

**Fungi:** *Asp. Fumigatus* previously isolated from naturally infected cases of pigeon was used for experimental infection.

**Birds:** 30 pigeons aged 8 weeks were collected from the local market and used as experimental birds.

**Methods:** Millet grains were proved mycologically to be free from fungi and mycotoxin seeded with a fresh culture of *Asp. fumigatus* for ten days and used for feeding the experimental birds for 21 days. The birds were divided into three equal groups. All groups were fed with the millet grains inoculated with *Asp. fumigatus*. Birds of first group were allowed to drink fresh tap water without medication. The second group was allowed to drink tap water containing 2.5 mg/ml thiobendazole during the period of the experiment *ad libitum*. The third group was allowed to drink tap water containing 1-16 garlic juice during the period of the experiment *ad libitum*.

The experimental birds were kept under observation for 21 days. Dead birds were dissected and the survival birds were sacrificed at the end of the experiment. Tissue samples from intestine, liver, lung, kidney, heart and brain were taken and fixed in 10% neutral buffer formalin. The fixed samples were embedded in paraffin, sectioned and stained with hematoxylin and eosin as well as PAS reaction for detection of the fungi in the tissues.

### **RESULTS**

#### **Clinical signs:**

All birds belonging to the first group showed depression, greenish, diarrhea, difficult breathing, emaciation and died within 10 days from the beginning of the experiment. While birds of the second group showed mild diarrhea, slight depression, difficult breathing of varying degree, inappetence and 4 birds died within 15 days from the beginning. The third group showed slight depression within the first week and after that appeared apparently healthy till the end of the experimental duration.

#### **Gross pathology:**

Severe congestion of the intestine, liver and kidneys with consolidation of the lungs were constant findings in the first group. Dead birds belonging to the second



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group showed slight congestion of the visceral organs with presence of numerous grayish nodules in the lung tissue. While sacrificed birds in the second and third groups showed solitary nodules in size of millets or smaller in the lung tissue.

**Histopathology:**

Intestine of the first group revealed severe congestion of the vasculature, necrosis and sloughing of the most villar epithelium and thickening of the villar cores (Fig. 1). The villus cores as well as submucosa were showing oedema and macrophage cell infiltration. The fungal particles in form of septated mycelia or fragments in the intestinal reactions could be noticed.

The intestine of birds belonging to the second and third groups showed slight congestion of the serosal blood vessels. The mucosa and submucosa did not show any pathological changes (Fig. 2). Also, the fungal particles could not be detected in the tissues by using PAS reaction.

Livers of the birds belonging to the first group were showing severe congestion of the vasculatures, haemorrhages, focal areas of hepatic cell necrosis and hydropic degeneration of the hepatic cells in a diffused manner (Fig. 3). Also, granulomatus reactions formed by macrophages with the presence of fungal particles in the reactions could be observed.

Livers of the birds belonging to the second group showed moderate fatty degeneration of the hepatic cells and mononuclear cell infiltration in the portal tissue (Fig. 4). While in the third group, the livers showed mild hydropic degeneration of the hepatic cells as well as mononuclear cell infiltration in the portal tissue. The fungal particles in the hepatic tissue could not be detected in the both groups.

Kidney sections prepared from the first group showed, severe congestion of the vasculature, tubulonephrosis and presence of focal areas of necrosis infiltrated with macrophages and lymphoid cells (Fig. 5). Also, by using PAS reaction fungal fragments could be detected in the reactions in the same sections. The other two groups showed mild tubulonephrosis of hydropic type and the fungal particles could not be detected in the kidney sections.

Concerning to the first group, the reactions in the lungs were in the form of diffuse fibrinous pneumonia with numerous focal areas of caseous necrosis (Fig. 6). The primary and secondary bronchi showed necrosis of the epithelium, hypraemia of the blood vessels and the lumen was filled with mucofibrinous exudate. Fungal particles in form of septated mycelia could be seen in the lung reactions.

In the second group, the lungs showed granulomatous pneumonia. These granulomas were numerous and large in dead birds, while solitary and small in sacrificed birds. The granuloma formed by central necrosis and moderate cellular reactions of macrophages, giant cells and lymphoid cells (Fig. 7). These granulomas tend to be encapsulated by connective tissue capsules. Also, fungal particles in the granulomatous reactions could be detected.



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In the third group the lung reactions were in form of small solitary granulomas formed by aggregated macrophages with presence of fungal particles in the center (Fig. 8).

In the heart and brain, significant pathological changes in all groups could not be detected. Only in the dead birds of the first and second groups congestion of the vasculatures could be observed.

### DISCUSSION

Appearance of severe clinical symptoms, high mortality rate which reached 100% and prominent histomorphological changes in the first group that the *Asp. fumigatus* used in our study was highly pathogenic. Also, tissue reaction in the intestine, liver, kidneys and lungs with presence of fungal particles in the lesions of the same group seem to be resulted from a systemic infection. Absence of the granulomatus reaction as well as the fungal particles in the intestine liver and kidneys in the treated birds with thiobendazole or garlic juice proved that both materials have antimycotic properties.

The milder clinical symptoms, low mortality rate and localization of the pathological changes in the second and third groups, proved that the thiobendazole and garlic juice have fungicidal effects. The garlic juice was more effective than the thiobendazole, where the birds belonging to the third group showed marked diminution of the lesions with the absence of mortality when compared with the second group.

According to these findings, it can be considered that, garlic has a fungicidal effect which protect the birds from the infection through ingestion or inhalation of the fungi, although the garlic juice was given in drinking water.

These results are in agreement with those stated by Barone and TAUSEY (1977), MOORE and ALKINS (1977), PRASAD (1979), and PRASAD and SHARMA (1981). Garlic has also been found to be effective against pathogenic bacteria including those present in the intestinal tract (SHARMA et al., 1977). Thus, the use of garlic in poultry ration will act as antibacterial and antimycotic agent.

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