ZAGAZIG UNIVERSITY
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جامعة الزقازيق
كلية الطب البيطرى

13

ZAGAZIG VETERINARY JOURNAL

VOL. XIII JUNE 1986

Arab Republic of Egypt

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Zagazig Vet. J. Vol. 13 (1986), PP. 54-61

DECONTAMINATION OF POULTRY RATION WITH AFLAGIN

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SUMMARY

This work was carried out to study the effect of Aflagin (antifungal primex) with 50% propionic acid on Aspergillus flavus contaminated poultry ration.

Total fungal count and moisture content of the treated contaminated poultry ration was tested at different intervals until 6 weeks post treament.

It was clear from the results obtained that, total fngal count was reduced to 33×10^2, 80×10^2 and 100×10^2 when contaminated poultry ration with 20% moisture content-treated with 0.2, 0.15 and 0.1 gm. Aflagin/100gm. ration, respectively. While the same concentration of Aflagin reduced the fungal count of contaminated poultry ration with 15% moisture content to 100×10^2, 30×10^3 and 200×10^2, respectively. Also it was found that, Aflagin reduced the fungal count of ration with 10 % moisture content within 3-5 weeks, while the time needed for the same concentration ranged from 4 to more than 6 weeks for ration with 20% moisture content. The results also showed that, the used concentration of Aflagin reduced the moisture content of the treated ration with nearly 99.45 - 99.73 % within 6 weeks.

Generally, it was found that Aflagin may be considered effective fungistat in a high moisture containing ration contaminated with A. flavus under laboratory conditions.

INTRODUCTION

Since the realization that contamination of food and feeds can result from fungal contamination before and after harvesting and during storage, intrest in finding suitable method for decontamination has increased.

Mould spoils the feed by destroying vitamins, minerals, and carbohydrates. They corrupt the taste of the food and they also release mycotoxins.

Recently several chemical inactivation decontamination methods using ammonia, piolet industrial application of mono-methylamine-lime, propionic acid, acetic acid and others (Simon et al., 1972; Drysdale, 1973; Helms and Prevot, 1973; Thiesen, 1977; Lee and Cucullu, 1978; Giddey et al, 1979; Jemmali, 1979 and Paster, 1979).

Additional information was provided on the safety and efficiency of chemical decontamination process by Douglas et al. (1983).

This work was done to study the effect of propionic acid (Aflagin) on Aspergillus flavus contaminated poultry ration.

MATERIAL and METHODS

1) Inoculum :

Aspergillus flavus strain isolated from stored corn in Dept. of Hygiene & Prev. Med., Zagazig University was used in this study. The inoculum was obtained by growing A. flavus on Czapek's agar slants for approximately 14 days at room temperature until well sporulated. Spores were harvested and prepared for inoculation of poultry ration with final spore concentration of approximately 5×10^6 spores/ml. according to Bauer et al. (1982).

2) Aflagin* (Antifungal premix) :

Aflagin mold control is a new product that controls the growth of molds, each Kg. contains 50% propionic acid absorbed in vermiculite 50 % , and presented in granules easy mixed with animal feed.

Aflagin is progressively as a gas made of Monomeric propionic acid drivatives (MPA); which have anti — fungal activity.

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* VIRBAC, Egypt.

Procedure :

Twelve petri dishes (15 cm.Ø) each containing 100 gm. of poultry ration previously sterilized twice by autoclaving, oven dired and were classified to three groups (each nad 4 dishes) after adding sterile distilled water to give final moisture content of 20, 15, and 10 %.

Each dish was inoculated with 5 ml. of A. flavus inoculum (5×10^6).

The following concentrations of Aflagin were added to three dishes of each group; 0.2 , 0.15 , 0.1gm./100 gm. of poultry ration and mixed well, the fourth dish was kept without treatment as a control. All dishes were stored at room temperature, (22 ± 5^oC).

Samples were collected at 3 hours after treatment and then after 1, 2, 3, 4, 5, and 6 weeks post treatment and were tested for the presence of fungal growth and total fungal count.

The moisture content of the different treatments and control were measured after 6 weeks post treatment.

Results obtained are shown in Table (1).

RESULTS and DISCUSSION

From the results obtained in Table (1) denote that the total fungal count in poultry ration of moisture content 20% was highly reduced from 250×10^3 to 33×10^2, 80×10^2 and 100×10^2 when treated with Aflagin concentrations of 0.2, 0.15 and 0.1 gm/100 gm. ration; respectively.

In ration with 15% moisture content, the count was 100×10^2 , 30×10^3 and 200×10^2 with 0,2 , 0.15 and 0.1 gm. of Aflagin/100 gm. ration; respectively.

Moreover, in ration with 10 % moisture content, the count was 100×10^2, 30×10^3 and 200×10^2 for Aflagin concentrations of 0.2 , 0.15, and 0.1 gm./100 gm. ration, respectively.

Concerning the untreated control ration with 20 % moisture content, the total fungal count was highly increased from 250 x 10^3 to 60 x 10^6 within 6 weeks.

From Table (1) it was clear that the time needed for ceasing mould growth was 4, 3, and 3 weeks when 0.2 gm. of Aflagin/100 gm. of ration with moisture content of 20,15 and 10%, respectively. While it needs, 5, 4, and 4 weeks when Aflagin used in a concentration of 0.15 gm./100gm. ration with moisture content of 20, 15, and 10% , respectively. Moreover, when 0.1gm. of Aflagin/100 gm. ration with moisture content of 20%, revealed that decontamination needs more than 6 weeks, while it was 6, and 5 weeks for ration with moisture content of 15 and 10%, respectively.

Similar results were obtained by **Burrell et al. (1973); Drysdale, (1973); Paster, (1978); Sauer, (1973) and Simon et al. (1972).**

From the results obtained, it was also noticed that, the moisture content of poultry ration as well as the amount of propionic acid used played an important role for the time needed for decontamination. The less the moisture content of the ration, the less the amount of propionic acid used, but for a period of exposure not less than 5 weeks. On the other hand when the moisture content of the ration increased upto 15-20 % the highest concentration of Aflagin should be used for exposure period of 3-4 weeks.

Also it was found tat, propionic acid may be considered effective as fungistat in high-moisture content ration, similar findings were reported by **Pasture, (1978); Lacey and Lord,** (1977) for its effective use with grains and hay of high moisture content.

Also Table (1) showed that, different concentration of Aflagin reduced moisture content of the ration with nearly 99.45 - 99.73 % within 6 weeks of treatment, a factor which increases the efficiency of Aflagin as a good fungistat.

It can be concluded that, propionic acid (Aflagin) was effective and economically practical fungistat for A. flavus contaminated poultry ration under the laboratory conditions.

Table (1)

Efficiency of Aflagin on ration's fungal contamination under different moisture content.

Moisture content	15 %					10 %					Untreated control ration 20 % moisture
Conc. / Time elapsed	0.2*	0.15	0.1	0.2	0.15	0.10	0.2	0.15	0.10		
3 hrs	$250x10^3$	$250x10^3$	$250x10^3$	$250x10^3$	$250x10^3$	$250x10^3$	$250x10^3$	$250x10^3$	$250x10^3$		$250x10^3$
1st week	$60x10^3$	$100x10^3$	$120x10^3$	$150x10^2$	$100x10^3$	$120x10^3$	$270x10^2$	$100x10^3$	$250x10^5$		$250x10^5$
2nd week	$200x10^2$	$82x10^3$	$100x10^3$	$100x10^2$	$82x10^3$	$90x10^3$	$100x10^2$	$30x10^3$	$260x10^5$		$260x10^5$
3rd week	$33x10^2$	00	$85x10^3$	00	$30x10^3$	$35x10^3$	00	00	$265x10^5$		$265x10^5$
4th week	00	00	$60x10^3$	00	00	$200x10^2$	00	00	$280x10^5$		$280x10^5$
5th week	00	00	$200x10^2$	00	00	00	00	00	$40x10^6$		$40x10^6$
6th week	00	00	00	00	00	00	00	00	$60x10^6$		$60x10^6$
Moisture after 6 weeks (%)	0.055	0.058	0.060	0.045	0.053	0.053	0.055	0.055	0.055		22.71
Reduction(%) in moisture	99.73	99.63	99.61	99.60	99.55	99.47	99.68	99.63	99.45		--

* gm. Aflagin/100 gm. ration.

However, these findings should be checked in further research during different seasons of the year, and under different storage condition.

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ازالة تلوث اعلاف الدواجن من الفطريات باستخدام الافلاجين

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اجرى هذا البحث لدراسة تأثير الافلاجين (مضاد لنمو الفطريات بالاعلاف) وبه نسبة ٥٠٪ من حمض البروبيونيك ، على فطر A. flavus الملوث لاعلاف الدواجن ٠

تم اختبار كمية الفطر الكلية وكذلك كمية الرطوبة فى الاعلاف الملوثة والمعاملة بالافلاجين على فترات لمدة ٦ اسابيع ٠

ولقد كان واضحا من النتائج ان كمية الفطر الكلية قد تناقصت من ٢٥٠ × ١٠^{٣} ، الى ٣٣ × ١٠^{٢} ، ٨٠ × ١٠^{٢} ، ١٠٠ × ١٠^{٢} عندما عوملت العليقة الملوثة والتى تحتوى على ٢٠٪ رطوبة بتركيزات ٢ر٠ ، ١٥ر٠ ، ١٠ر٠ جم/١٠٠ جم عليقة على التوالى ٠ بينما باستخدام نفس التركيزات من الافلاجين على علائق تحتوى على ١٥ ، ١٠٪ رطوبة وجد ان كمية الفطر الكلية تناقصت الى ١٠٠ × ١٠^{٢} ، ١٠ × ٣٠ × ١٠^{٣} ، ١٠ × ٢٠٠ × ١٠^{٢} على التوالى ٠

ولقد وجد ان فترة التناقص للفطر تتراوح مابين ٣ـ٥ اسابيع بالنسبة للعليقة التى تحتوى على ١٠ ٪ رطوبةبينما وصل الى فترة تتراوح مابين ٤ الى اكثر من ستة اسابيع فى العليقة التى تحتوى على ٢٠٪ رطوبة ٠

ولقد اظهرت النتائج مدى تأثير الافلاجين الواضح على نسبة الرطوبة فى العلائق المعاملة اذ وصلت نسبة التناقص فى الرطوبة الى مابين ٩٩ر٤٥ الى ٩٩ر٧٣ ٪ فى خلال ٦ أسابيع من المعاملة ٠

وعموما اثبتت النتائج فاعلية الافلاجين على الاعلاف ذات الرطوبة العالية والملوثة بفطر A. flavus تحت الظروف المعملية ٠