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PREVALENCE OF ASPERGILLUS SP. CONTAMINATION IN COMMERCIAL POULTRY FEED AND FEED INGREDIENTS IN MALAYSIA

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PREVALENCE OF *ASPERGILLUS SP.* CONTAMINATION IN COMMERCIAL POULTRY FEED AND FEED INGREDIENTS IN MALAYSIA

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CERTIFICATIONS

It is hereby certified that we have read this project paper entitled "Prevalence of *Aspergillus sp.* Contamination in Commercial Poultry Feed and Feed Ingredients in Malaysia", by ZahidahbintiRoslan and in our opinion it is satisfactory in terms of scope, quality, and presentation as partial fulfillment of the requirement for the course VPD 4999 – Project

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DEDICATIONS

This thesis is dedicated to

My parents,

Roslan bin Jaafar&JuriahbintiBuang

For all their support and prayers.

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LIST OF ABBREVIATIONS

% Percent

˚C Degree Celsius

AS *Aspergillus species*

AFB1 Aflatoxin B1

Cfu/g Colony forming unit per gram

Mg/kg Milligram unit per kilogram

ppmPart per million

KELAZIMAN KONTAMINASI *ASPERGILLUS SP.* DALAM MAKANAN KOMERSIAL DAN BAHAN MAKANAN AYAM DI MALAYSIA

By

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ABSTRAK

Mikotoksin boleh berlaku secara semulajadi dalam bahan makanan ternakan dan ia boleh membahayakan kesihatan ternakan dan manusia. Ia dihasilkan sebagai metabolit toksik apabila suhu dan kelembapan adalah optimum untuk pertumbuhan kulat tertentu pada bahan makanan ternakan, dan ini boleh berlaku samaada di ladang, semasa pengangkutan atau penyimpanan, atau semasa pemprosesan dan pembuatan. Kajian ini dijalankan untuk menentukan pencemaran *Aspergillus sp.* (AS) dalam makanan ayam. Sampel makanan telah diambil daripada beberapa kedai haiwan di kawasan Bangi, Kajang dan Serdang. Empat jenama makanan komersial ayam pedaging iaitu makanan pemula dan makanan penamatnya. Keputusan kiraan kulat bagi semua jenama makanan lengkap dan bahan makanan dibandingkan. Semuas ampel makanan

Ayam telah dikultur pada “sabouraud dextrose agar”. Spesies kulat tersebut seterusnya dikenalpasti secara makroskopik dan mikroskopik selepas disimpan pada suhu bilik selama seminggu. Hasil kajian menunjukkan bahawa kontaminasi AS didapati tertinggi pada bahan

makanan sumber tenaga iaitu jagung gred A dengan nilai 1.9 x 10^2 cfu/g, manakala bagi makanan sumber protein ialah mil kacang soya mencatat nilai kontaminasi sebanyak 0.7 x 10^2 cfu/g. Perbandingan diet komersial di antara empat jenama menunjukkan bahawa makanan pemula ayam pedaging Jenama A mempunyai kiraan kulat tertinggi (2.1 x 10^2 cfu/g) danJ enama D mempunyai kiraan kulat sifar. Bagi makanan lengkap penamat ayam pedaging, Jenama D mencatatkan kiraan kulat yang paling tinggi (3.1 x 10^2cfu/g) dan Jenama A pula mencatat kiraan kulat yang paling rendah (0.3 x 10^2cfu/g). Julat jumlah kontaminasi AS dalam diet komersial adalah antara 6% hingga 30% dengan nilai purata sebanyak 21.2%; manakala julat jumlah kontaminasi AS untuk bahan-bahan makanan ayam ialah antara 12% hingga 30% dengan nilai purata sebanyak 20.6%. Dalam makanan komersial, AS yang mempunyai bilangan terbanyak ialah *Aspergillus terreus* (30.3%) dan diikuti oleh *Aspergillus flavus* (27.3%).Antara bahan makanan ayam, AS yang paling banyak dikenalpasti ialah *Aspergillus terreus* (29.4%), dan diikuti oleh *Aspergillus flavus* (23.4%). Keputusan kajian menunjukkan bahawa hamper semua makanan yang digunakan dalam kajian ini mempunyai tahap kontaminasi AS, dan perkara ini boleh membahayakan kesihatan dan prestasi ayam.Makanan ayam harus diperiksa secara berkala untuk memastikan keselamatan dan prestasi haiwan tidakterjejas.

Kata kunci: *kontaminasi, diet komersial, bahan makanan, aspergillus, ayam*

PREVALENCE OF *ASPERGILLUS SP.* CONTAMINATION IN COMMERCIAL POULTRY FEED AND POULTRY FEED INGREDIENTS IN MALAYSIA

By

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ABSTRACT

Mycotoxins can occur naturally in feedstuffs and may endanger the health of livestock and man. They develop as toxic metabolites when temperature and humidity are optimum for the growth of certain fungi on feedstuff, whether in the field, in transport or in storage, or during processing and manufacturing. This study was conducted to determine the occurrence of *Aspergillus sp*. (AS) contamination in poultry feed. Feed samples were bought from several petshops in Bangi, Kajang, and Serdang areas. The four brands of commercial broiler diet consisted of broiler starter and grower-finisher diets. The fungal counts for all commercial brands and all feed ingredients were conducted and results were compared between each feedstuff. The fungal species were isolated from the all feed samples cultured on sabouraud dextrose agar. They were identified macroscopically and microscopically after being incubated under room temperature for a week. The results showed that AS isolated from feed ingredients was highest in grade A corn (1.9 x 10^2 cfu/g) and soybean meal (0.7 x 10^2 cfu/g). Among

commercial diets, Brand A had the highest fungal count (2.1 x 10^2 cfu/g) and Brand D had zero fungal count for broiler starter diet. For grower-finisher complete feed, Brand D had the highest fungal count (3.1 x 10^2cfu/g) and Brand A had the lowest fungal count (0.3 x 10^2cfu/g). The AS contamination in commercial diets range from 6% to 30% with an average of 21.2% but the AS contamination in feed ingredients range from 12% to 30% with a mean value of 20.6%. The main AS identified from the commercial diets were *Aspergillus terreus* (30.3%) and followed by *Aspergillus flavus* (27.3%) respectively. Among single feed ingredients, the main AS identified was *Aspergillus terreus* (29.4%),and followed by *Aspergillus flavus* (23.4%). The results suggested that almost all feeds in this study have some level of AS contamination and this is of concern because of the health hazards it presents to the broilers. The feeds should be periodically examined for ensuring safety towards the poultry optimal performance.

Keyword: *contamination, commercial diet, feed ingredient, aspergillus, poultry*

1.0 INTRODUCTION

Poultry sector is the biggest component of livestock industry in Malaysia, and it supplies about 81 % of the total meat and almost 111% egg demand by the domestic market (Nizamuddin et al., 2013). Hence, the health of the poultry should be under control at all times to prevent outbreak of disease that may or may not give consequences towards humans' health and also the production performance. Feed with adequate amounts of the necessary nutrientsare important for consumption of poultry for the purpose of health and production(Keenum, 2014). Commercial feeds from a reliable feed company and retail stores is a balanced diet which have all the nutrients in the right proportions that chickens need; which is necessary for optimal growth and production.

Poultry feed may serve as a carrier for a wide variety of microorganisms and other contaminants, and hence act as a carrier for animal and human pathogens contaminants.Poultry feed component of plants and animal origin are commonly contaminated with microorganisms, mostly bacteria and fungi. The number and type of microorganisms vary depending on the function of materials, location of its origin, climatic conditions encountered, harvesting, processing, storage transport technologies employed and packaging materials (D'Mello, 2006).

Different species of Aspergillus fungus originate from different places. Some of them develops and sporulates easily in poor quality bedding and environment, in contaminated feedstuffs,and especially in poor hygiene of indoor farm environments.Inadequate ventilation and dusty conditions increase the risk of bird

exposure to aerosolized spores (Thierry et al., 2011). The contamination of poultry feed with this toxigenic fungi under favorable conditions may lead to mycotoxin buildup in feeds and feed ingredients; reaching to injurious levels for farm animals and human health (Saleemi et al., 2010). This study will focus on the contamination of selected commercial poultry feeds and feed ingredients in Malaysia, with the aim of determining the AS contamination in the feeds.Results from this study will allow us to understand the severity of the problems and come out with action plan to minimize feed contamination in poultry feeds. Therefore, the objectives of this study are to determine the occurrence of AS in poultry feeds; to determine the type of poultry commercial feedsand feed ingredients with highest risk for AS and mycotoxin contamination. The hypothesis for this study is that there is high prevalence of AS contamination in poultry commercial diets and feed ingredients.

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