A Survey on *Aspergillus chevalieri* Infection Isolated from Poultry Feed

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Abstract: Population and characteristics *Aspergillus chevalieri* in finished poultry feed were investigated. The aim was to isolate and enumerate *Aspergillus chevalieri* from finished poultry feed. Thirteen samples poultry feed of chick starter, broiler and layer, sold by retailers in traditional markets were collected. Moisture content of the feeds was determined by oven dried method. Fungal population was analyzed using dichloran 18% glycerol agar (DG18) medium. All fungal colonies were isolated and incubated in potato dextrose agar slants (7 days, 29 °C). Morphological characteristics were observed. Results showed that chick starter has the highest moisture content (10%) and the most infected by *Aspergillus chevalieri* (31.33×10^4 cfu g^{-1}) followed by broiler (0.33×10^3 cfu g^{-1}) and none in layer.

1 INTRODUCTION

The occurence of fungal infection on poultry feed in tropical countries become the primary cause deterioration during storage. High rainfall and relative humidity promote improper stored feed absorb water favour from the environment. This process leads to an increase moisture content exceeds critical value for fungal growth and it may contaminated by mycotoxins (JECFA, 1998). Maize, soybean, rice bran, peanut and by product that major of the component are susceptible infected by molds (Okoly et al. 2007; Okun et al. 2015). Among fungal genera, *Aspergillus, Fusarium*, *Rhizopus*, *Penicillium* and *Mucor* were the most common found contaminating in poultry feed (Krnjaja et al. 2008; Kana et al. 2013; Nemati et al. 2014; Kehinde et al. 2014). Infection of the molds deteriorate feeds and reduce its nutritional componds. As xerophilic fungi, *A. chevaliery* is able to grow on low water activity. The presence of *A.chevalieri* on poultry feed might occur when the fungus colonize the raw materials during harvesting, grow in it during postharvest handlings such as drying, transportation and storage. The objective of this research was designed to survey *Aspergillus chevalieri* infection and isolated from finished poultry feed (chick stater feed, broiler and layer feed) sold by retailers in traditional markets.

2 MATERIALS AND METHODS

2.1 Sample Collection

A total of 13 composite samples of finished poultry feed: chick starter, broiler and layer, were collected (500 g each sample) during the dry season (months of May and June 2018) from different retailers in Medan, North Sumatera, Indonesia. Each sample was packed separately in sterilized polythylene bag and stored (-4 °C) in refrigerator for further use.

2.2 Fungal Population and Identification

Population of *A. chevalieri* was determined by dilution method in dichloran 18% glycerol agar (DG18 medium) according to Pitt and Hocking (2009). Twenty five gram of each sample in 500 mL erlenmeyer was diluted in 250 mL sterilized distilled water. The suspension was homogenized using shaker (Gallenkamp SG92-02-311, England) 100 rpm for 2 minutes. Four dilutions, 10^{-1}, 10^{-2}, 10^{-3} and 10^{-4} were

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made. From the 10^{-3} or 10^{-4} dilution, 1 mL was transfered to petridish (diameter 9 cm) and pour plated in DG18 medium. Each sample was cultured triplicates. The plates were incubated at at 29±2ºC for 6 days. All colonies were counted as colony forming unit (cfu g^{-1}) of the sample and identified according to Pitt and Hocking (2009). Macroscopic and microscopic identification were conducted under Zeiss Prima Star 37081 light microscope, Gottingen, Germany.

2.3 Determination of Moisture Content

For determination of moisture content, every 50 g of sample was put on an aluminum foil dish and dried in an oven at 130 ºC for 2 hours and reweighed (BSI, 1980). Three replicates were made for each sample.

3 RESULTS AND DISCUSSION

All finished poultry feed sold by retailers commonly packaged in polypropylene bag and stored in open air. Moisture content of the poultry feed are presented in Figure 1.

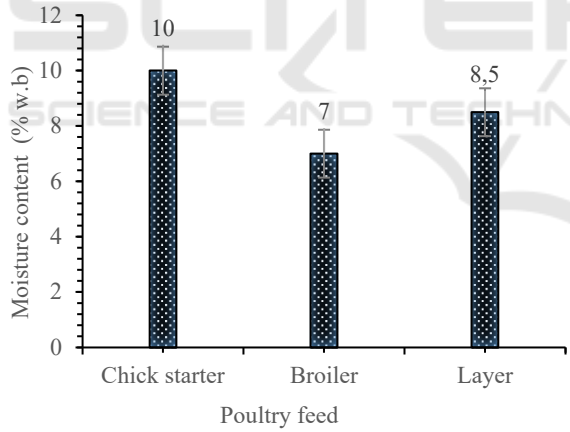

Figure 1: Moisture content (% wet basis) of finished poultry feed (chick starter, broiler and layer feed) collected from retailers at traditional markets in Medan, North Sumatera.

Chick starter has the highest moisture content (10%) followed by layer (8.5%) and broiler (7%). Feed moisture content determine *A. chevalieri* population. Most of the colony was found in chick starter (5.49 cfu g^{-1}) followed by broiler (2.52 cfu g^{-1}). None *A. chevalieri* was found on layer (Figure 2).

Previous study by Saleemi et al. (2010) and Sivakumar et al. (2014) reported that *Aspergillus* was the most common on poultry feed. The most prevalence of *A. chevalieri* on poultry feed was reported by Greco et al. (2014).

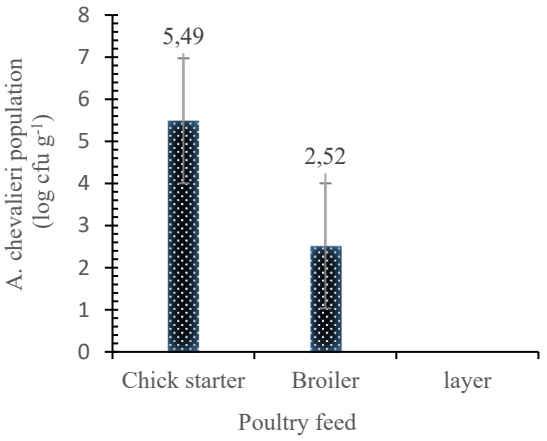

Figure 2: Fungal population (cfu g^{-1}) isolated from finished poultry feed (chick starter, broiler and layer) after 6 days incubation (29±2 °C) on dichloran 18% glycerol agar (DG18) medium.

Poultry feed raw materials such as corn, rice bran, peanut and soybean are vulnerable infected by *Aspergillus* [Okun et al. 2015; Krnjaja et al. 2008). We assumed the infection of the molds occurred on poultry raw materials during harvest and their population increase during storage.

4 CONCLUSION

All finished poultry feed sold by retailers in traditional markets were infected by *A. chevalieri*. The presence of the xerophilic mold potential deterioration on poultry feed during storage. Prevention fungal growth and deterioration were required during storage of the feed.

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