**CHAPTER I**

**INTRODUCTION**

*Aspergillus fumigatus* is considered as a major respiratory pathogen in birds. This filamentous fungus was first found in the lungs of a bustard (*Otis tarda*) in 1863 by Fresenius. Other species like *A. flavus*, *A. niger*, *A. nidulans,* and *A.* *terreus* may also be isolated from avian cases of aspergillosis (sometimes in mixed infections) but much less frequently than *A. fumigatus* (Martin *et al.*, 2007; Kunkle 2003; Akan *et al.,* 2002).

Active fungal proliferation and sporulation of *A. fumigatus* on organic material produce large amounts of airborne small-sized conidia that are easily dispersed in air, then potentially inhaled and deposited deep in the respiratory tract. Susceptible hosts will develop polymorphic clinical forms in relation to either localized or disseminated lesions (Reydig, 2005; Tell, 2005; Phalen, 2000).

Infection by *Aspergillus* sp*.* has been reported in almost all domesticated avian species and production types: layer cockerels, pullets (Steinlage *et al.,* 2003), broiler breeders and growers of chicken (Zafra *et al.,* 2008) or turkey poults (Dyar *et al.,* 1984), common duck breeders, goslings, ostriches, Japanese quails or pigeons. In spontaneous outbreaks, mortality ranged between 4.5% and 90%, whereas age of diseased birds varied from 3 days to 20 weeks (Singh *et al.,* 2009; Zafra *et al.,* 2008; Cortes *et al.,* 2005; Islam *et al.,* 2003). Beside direct losses related to mortality, feed conversion and growth rate in recovering birds remain poor. Indeed, airsacculitis is a major reason for carcass condemnation at slaughter inspection.

Acute aspergillosis generally occurs in young birds resulting in high morbidity and mortality. Clinical signs include dyspnoea, gasping, hyperpnoea with panting, nonproductive coughing, wheezing, cyanosis and sometimes nasal discharge. The chronic form is sporadic (Jones and Orosz, 2000; Latge, 1999). It causes lesser mortality and generally affects older birds, especially breeders in poultry. In chronic form, dyspnoea, depression, dehydration, and emaciation are observed. Nervous system involvement causes ataxia, tremor, opisthotonos, lateral recumbency, torticollis, seizures, convulsions, lameness, and hind limb paresis (Jensen *et al.,* 1997).

Aflatoxins (AFs) are secondary metabolites produced by these fungi namely *Aspergillus, A. flavus* and *A. parasiticus.* Four types of aflatoxins are recorded: AFB1, AFB2, AFG1 and AFG2 (Pier, 1992) which can occur as natural contaminants of poultry feed (Leeson *et al.,* 1995, Oguz 1997).

The liver is the main target organ in aflatoxicosis in birds (Smith and Hamilton, 1970) and produces important changes in hepatic metabolism (Tung *et al.,* 1972). It may be a cause of the fatty liver; an enlarged, yellowish and friable liver. After the hepatic lesion, decreasing serum protein, albumin, total cholesterol (Oguz *et al.,* 2000a), uric acid (Kubena *et al.,* 1998; Kececi *et al.,* 1998), and increased hepatic enzyme activities such as AST and ALT (Amer *et al.,* 1998, Santurio *et al.,* 1999) can be used for diagnosis of aflatoxicosis or aspergillosis.

Physical, chemical and biological methods have been investigated in order to prevent the growth of aflatoxin producing fungi and to eliminate or reduce the levels of aflatoxins. One of the most effective ways to control the problems is to prevent the growth of fungi. Extracts and powders of various spices, herbs and essential oils have been reported to have antifungal activity against aflatoxin producing fungi and some of them inhibit aflatoxin formation (Thanaboripat *et al.,* 2004, Thanaboripat *et al.,* 2000; Thanaboripat, 2003). Many essential oils have also been reported as effective inhibitors of fungal growth and aflatoxin production (Razzaghi-Abyaneh *et al.,* 2008; Mahmoud, 1994).

As per context, the objectives of this research is

1. To determine the changes in biochemical parameters which indicating hepatic damage, in aspergillosis affected birds.
2. To evaluate the biochemical parameters and enzyme activity after the treatment through dietary plant extract (Onion, Garlic, Neem, Tulsi), 0.1% CuSO4 and Nystatin Sulphate.
3. To assess the productive performance of treated birds.