Introduction
I. INTRODUCTION

Agriculture is the back bone of Indian economy. Livestock and fisheries are the promising sub-sector in agricultural sector which contributes about 29.9 per cent to the agricultural GDP and 6.29 per cent to total GDP of India as per the Government of India Report, 2005, besides providing employment to around 19 million people. The poultry sector, one of the important components of livestock sector, contributes nearly Rs. 260 billion to the national income of India by providing direct and indirect employment to over three million people in the country (Venkateshaiah et al. 2011). India stands as second largest egg producer in the world and fifth largest chicken meat producer in the world with about 60 billion eggs and 2.2 million metric tones of chicken meat, respectively. This production is achieved generally by commercial poultry operations, although a significant contribution comes from rural poultry as well (Mahesh and Rajeswara Rao, 2011).

In spite of spectacular growth, poultry production during past four decades has come a long way and is recognized as an important segment of the Indian agriculture. Currently with annual growth estimates of 5 to 7 per cent for the egg laying stock and 10 to 12 per cent for broiler chickens, the Indian poultry has attained status of a fastest growing agribusiness with appreciable contribution to the national economy (Verma, 2010). The present yearly per capita availability of egg is 50 against the requirement of 102 eggs and yearly per capita requirement of meat is two kg as against 11kg per head (Panda, 2009). Therefore to meet the domestic requirement, there is a need for about two times increase in egg production and six times in meat production. If taken into account
the domestic requirement as well as India’s share of export market, there is existence of huge production gap of poultry products in the country.

Increase in population growth, changing lifestyle, shifting of food habits, rapid urbanization, increased per capita income, increased awareness on health, increase in size of young population, etc., are contributing towards more demand on poultry products. In the current market scenario, the poultry products are the cheapest source of animal protein of high biological value.

Escalating prices of poultry feed which alone accounts of 65 to 70% of the total production cost is detrimental to the growth of poultry sector. Over the last one year alone, the prices of crucial feedstuff like maize and soybean meal have almost doubled partly due to stagnation in maize production, its diversification to starch industry, forward trading in maize and export of soybean meal (Panda, 2009). This is threatening the poultry industry to run on a razor-blade and requires immediate attention. Hence, several attempts are being constantly made by the poultry producers and Nutritionists to seek the alternative feed resources for economic consequence.

Recently there is an increased emphasis in the use of aquatic plants in poultry rations because the protein and other nutrient content in them are comparable to certain leguminous plants. Aquatic plants offer relatively cheap alternative feedstuffs and have many potential uses such as human food, animal feed, compost and biofertilizers. Aquatic plant species accumulate secondary plant compounds and therefore offer greater potential than many other types of leaf protein sources for monogastric animals. Among the aquatic plants floating fern, *Azolla pinnata* is a good source of protein and it contains
almost all essential amino acids, minerals such as iron, calcium, magnesium, potassium, phosphorus, manganese etc, apart from appreciable quantities of vitamin A precursor beta carotene and vitamin B\textsubscript{12}. It is capable of assimilating algae in its leaves. It is also found to contain probiotics and biopolymers (Kamalasanana Pillai et al., 2005). Thus, azolla appears to be a potential source of nutrients.

The water fern Azolla, grows in association with the blue-green algae, Anabaena azollae, is considered to be the most promising because of the easiness of cultivation, high productivity and good nutritive value (Singh and Subudhi, 1978). Azolla is one of the plant resources with high biomass and protein production. Azolla pinnata was used as feedstuff in broiler chicken (Querubin et al., 1986a; Parthasarathy et al., 2002) and laying hens (Khatun, 1996). However, the results were inconsistent and there seems to be paucity of studies on the effect of dietary inclusion of Azolla on the production performance of the broilers and layers as well as its energetic worth for poultry.

The digestibility of feed with high fibre content is very poor in poultry due to lack of suitable digestive enzymes (cellulase, xylanase and pectinase) in gastrointestinal tract. Poultry being the monogastric, lacks fibre degrading enzymes and hence the use of exogenous enzymes facilitates the degradation of these polymers, thereby, making available nutrients which would otherwise get excreted (Saxena et al., 2006).

In view of the above facts, experiments were undertaken to determine the metabolizable energy of dried Azolla and to study the effect of inclusion of dried Azolla as a feed ingredient on growth performance of broilers and egg production performance of layers with the following objectives:
1. To compare and evaluate different varieties of Azolla by chemical method.

2. To determine the metabolizability of energy and other nutrients of the selected and sun dried Azolla in broilers and layers.

3. To assess the effect of inclusion of sun dried Azolla (*Azolla pinnata*) at different levels on the growth performance in broilers.

4. To determine the effect of inclusion of sun dried Azolla at different levels on production performance and egg characteristics in layers.

5. To identify suitable biotechnological tool such as the specific enzyme supplementation to improve nutritive value of Azolla.