INTRODUCTION

1. INTRODUCTION

Poultry production is an important part of agriculture and contributes very large quantities of animal protein for human consumption. During the last decade, poultry production in developing countries had increased proportionally more than among developed nations **(FAO, 1991)**. However, the expansion in poultry production in most developing countries is severely hampered by shortages of suitable feed ingredients. Often there are constraints on the import of animal feedstuffs due to shortages of foreign exchange. Coupled with the growing demand for the high quality animal protein that poultry provide, there is also competition for foods which are suitable for both human and farm animal consumption. Increasing human and livestock populations are intensifying the need to develop additional sources of supply. Aquatic weeds can offer a fairly cheap alternative feedstuff for large livestock and poultry in most developing countries.

Water hyacinth (Eichhornia crassipes), a water weed, has been a major ecological and economical problem both in the tropics and subtropics **(NAS, 1976)**. Providing suitable conditions of temperature between 28-30°C and pH 4-8, water hyacinth in the tropics could double its population every seven days to yield an annual productivity of 930-2900 t/ha **(Lareo and Bressani, 1982)**. The plant has been used as animal feed in rations of sheep **(Baldwin et al, 1975 and El-Serafy et al, 1979)** buffaloes **(El-Serafy et al, 1981)**, cattle **(Reddy and Reddy, 1979 and Reza and Khan, 1981)**, laying hens **(Hamdy et al., 1978)** and broiler chicks **(Khalil et al., 1975 and Grandi et al, 1984)**. Nevertheless, possible utilization of the biomass as a feed for poultry needs to be investigated further.

Several attempts has been made to use agro-industrial by- products to provide unconventional dietary ingredients as well as to reduce pollution. Nearly, one third of the annual total production from vegetables and fruits in Egypt could be considered as waste **(Nour et al, 1980)** However, due to the relatively inefficient digestibility of fiberous feedstuffs by non-ruminants, feeding many of these waste residues have been widely used in ruminant feedstuffs, and their use, particularly in poultry feeding, has been limited.

The nutritive value of dried pea by-product has been investigated for feeding chickens **(Khirwar et al, 1980 and Paliwal et al., 1980)**, rabbits **(Grandi and Angelis, 1983 and Ghazalah and El-Shahat, 1994)** and ducks **(Zeweil et al, 1990)**.

During the processing of oranges, a lot of by-products are produced such as pectin, citric acid, citrus seed oils, essential oils, citrus vinegar, marmalades and solid waste as peel, rag (internal tissue and seeds). This soild waste after a proper processing will give a citrus waste feedstuff which was estimated to be about 10 million tones per year on a world basis **(El-Boushy and Vanderpol, 1994)**. The feeding value of dried citrus pulp for chickens was reported by **Ewing (1963), El-Alaily(1974) and El-Moghazy and El-Boushy (1982)**.

The present study aimed to study and evaluate the effect of dietary whole water hyacinth, water hyacinth leaves, pea by-product and citrus pulp levels on the performance of broiler chicks.