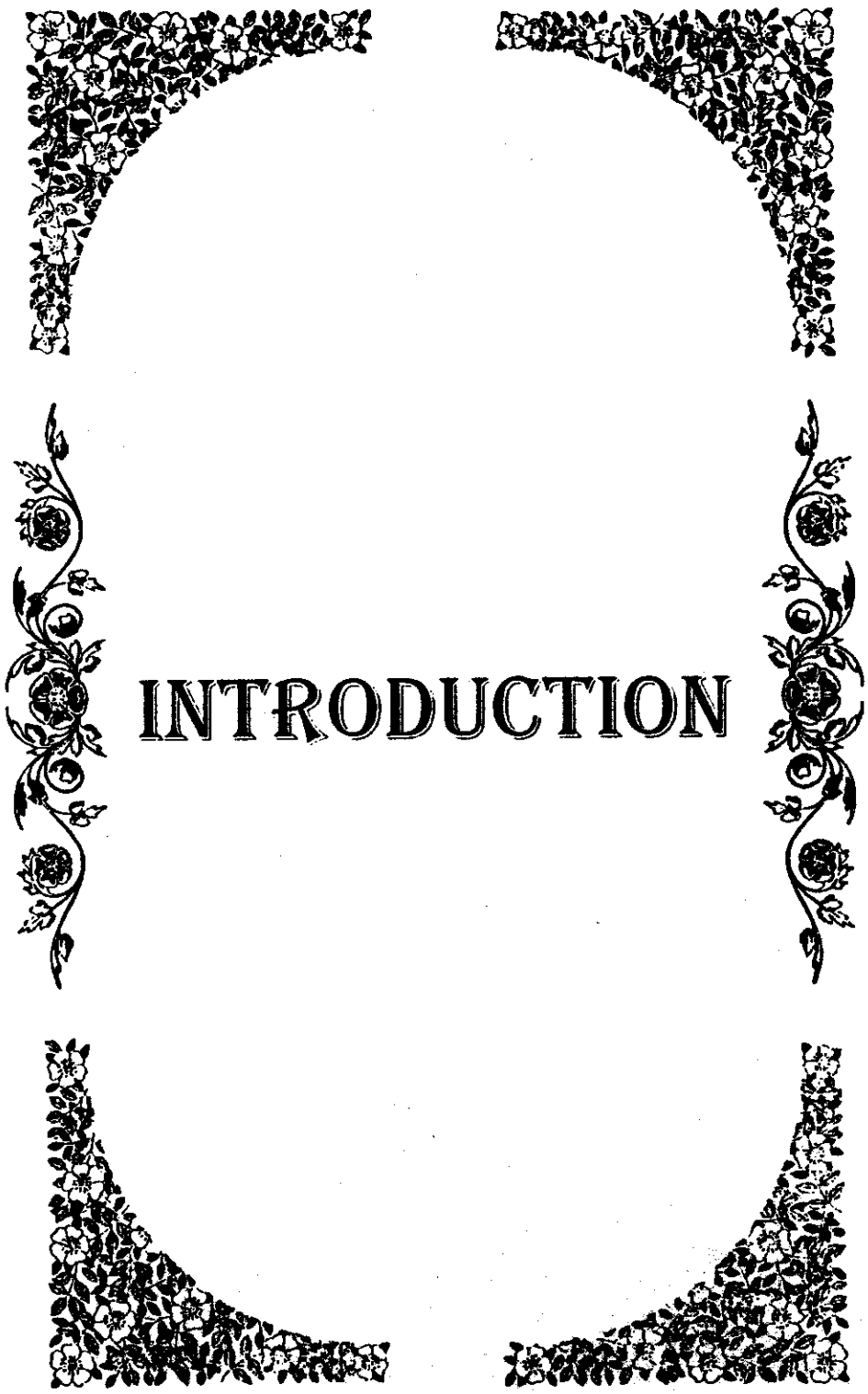

INTRODUCTION

1- INTRODUCTION

The shortage and continuous rise in the cost of animal products, especially in developing countries, have promoted food scientists, technologists and nutritionists to search for alternative source of food. Sunflower (*Helianthus annuus*) is one of fastest developing oilseed crops and ranks second in importance as a world source of vegetable oil. The fibrous by-product after extraction of oil (defatted meal) is utilized primarily as protein supplement in livestock rations.

However, the flour obtained after fat extraction of dehulled seed has potential as protein concentrate for human nutrition. Sunflower proteins are deficient in lysine but contain adequate levels of other essential amino acids and there are no known toxic constituents and antinutritional factors in sunflower meal, **Sosulski (1979 b).**

In addition to the hulls, sunflower meals contain high levels of phenolic compounds and simple reducing sugars which may contribute dark colors to processed and cooked foods. But its use in the human diet is limited due to the presence of chlorogenic acid. This phenol darkens upon oxidation can impair the acceptability of sunflower products, **Sripad and Rao (1987).**

Sunflower proteins had an excellent amino acid balance except for low lysine content and in feeding trials with rats, showed high protein efficiency ratios when blended with legume or meat proteins, **Sosulski and Fleming (1979).**

It is known that these seeds are important source of energy and proteins. However, the preparation of sunflower protein isolates for food products is undesirable to the presence of components known as antinutritional factors. These factors include phytic acid which is found in sunflower seeds, and due to its chelating property it can decrease the bioavailability of essential elements such as calcium, iron, magnesium and zinc **Nolan and Duffin (1987).**

Polyphenolic compounds precipitate protein from aqueous solutions. The formation of tannin complex with dietary proteins and digestive enzyme may interpret to low digestibility and decreasing the nutritional value of sunflower proteins. Also, the unhydrolyzed oligosaccharides puss into the large intestine, where they are fermented anaerobically to produce carbon dioxide, hydrogen and methane, **El-Morsi (1997).**

The aims of this investigation is to study the chemical composition of sunflower seeds and meal. Also, to study the removal of polyphenolic substances from sunflower (seeds, kernels and by-products) by using organic solvents either in the presence or absence of reducing agents in acidic and alkaline medium. The produced protein concentrate and isolate were evaluated according to its iso-electric point, molecular weights of the poly-peptide chains (subunits), the amino acids content, phytic acid, trypsin inhibitor and in-vitro proteins digestibility index.