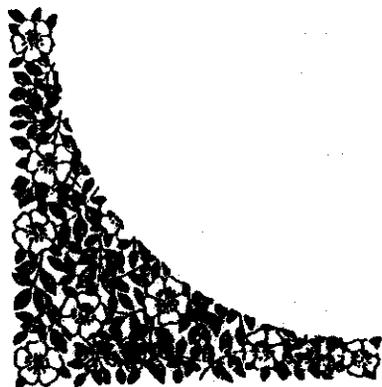


# SUMMARY



## 5- ENGLISH SUMMARY

Sunflower (*Helianthus annuus* L.) is the second largest oilseed crop as a world source of vegetable oil and characterized by protein with good nutritional qualities. Sunflower meal also represents protein source of great interest as a human food. Sunflower seed by- product meal were obtained from Misr Company for oils and soap, El- Badrashine branch. The chemical composition, removal of polyphenolic compounds and factors affecting its extraction and concentrated or isolated protein were studied in sunflower kernels (dehulled seed) and by-products.

The obtained results indicate that fat content is higher in sunflower kernels and seeds than in by-products since its ratios were 55.4, 41.85 and 5.45%, respectively. The dehulled sunflower meal (kernels) contain lower crude fiber content (9.3%) compared with the seeds (20.91%) and by-products (29.96%). The crude total protein was found to be higher in by-products 52.8% than in sunflower seeds and kernels (22.55 and 26.68%, respectively).

Total soluble sugars were 5.27, 0.50 and 3.22% and ash contents were 4.15, 4.04 and 6.45% in seed, kernels and by-product, respectively.

### **Removal of polyphenolic compounds**

Removal of polyphenolic compounds was carried out by using organic solvents as methanol, ethanol, acetone and butanol and by using reducing agents (salts) as sodium sulfite, ascorbate, and dithionate.

The optimum pH for the removal of polyphenolic compounds was 5.0 (most of polyphenolic compounds was soluble at this pH) and the optimum number of extraction was seven times.

#### **Chemical composition of protein concentrate after treatment by using several organic solvents and reducing salts**

The protein content of all samples was increased after treatments. It was found that sunflower kernels and by-products meals contain higher amounts of protein in both treatments compared with the content of sunflower seed meal. The increase of protein was due to the solubility of major amounts of soluble sugars especially when using the above solvents.

#### **Preparation of colorless protein :**

The maximum sunflower protein extraction was achieved at pH 10.0 and the percentage of extracted protein was 96.15 and 92.6% while at pH 5.0 (isoelectric point) extracted protein reached its lowest 25.2 and 18.2% for kernel and by-product meals.

#### **Effect of different treatments on the removal of polyphenol compounds from sunflower kernel and by- products meals**

Free and bound phenols in untreated kernel meal (control) were 2.29 and 1.58% and in by-product meal were 2.99 and 1.51%. The percentage of chlorogenic acid was 2.77 and 3.39%.

Chlorogenic acid represents about 70% of the total polyphenolic compounds (Free + bound).

**Determination of sunflower protein subunits molecular weight by using SDS-PAGE:**

The SDS-PAGE polypeptide patterns of the overall polypeptides in sunflower kernel and by-products together with protein standards showed that kernel protein had strong intensity bands than that of by-products in the all treatments.

Both kernels and by-product proteins dissociate in 11 subunits with molecular weights ranging from 95.49 to 14.12 K.D.

**Effect of different treatments on the removal of phytic acid and trypsin inhibitor activity from sunflower meals :**

Treating the kernel and by-products with different alkaline solutions were more effective in removing phytic acid and trypsin inhibitor (antinutritional factors) than in different acidic medium. Phytic acid percentage was 4.32 and 3.45 while, the amount of Trypsin inhibitor was 1.50 and 1.10 mg/g in kernels and by-product.

**Effect of different treatments on sunflower protein in-vitro digestibility:**

The protein digestibility index of untreated samples (control) was 80.47 and 78.46% in kernel and by- product. These values increased to 93.65 and 93.70% in the presence of NaOH.

**Effect of different treatments on the amino acid components:**

Glutamic and asparatic acids were the most abundant amino acids followed by argnine. Cystine and tryptophane were found in minimum quantities. Lysine was found to be the first limiting essential amino acids.

*ENGLISH SUMMARY* -----