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Assessment of Proximate and Phytochemical Composition for Evaluation of Nutritive Values of Some Plant Foods Obtained from Iran and India

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1. Introduction

The green Revolution and subsequent efforts through the application of science and technology for increasing food production in India have brought self-reliance in food. The impetus given by the Government, State Agricultural Universities, State departments of Agricultural and other organizations through the evolution and introduction of numerous hybrid varieties of cereals, legumes, fruits and vegetables and improved management practices have resulted increased food production. However, the nation still faces the problem of the use of improper methods for the storage of food stuffs, leading to great wastage of the food produced. Such loses in the food front aggravate the existing syndromes of under nutrition and malnutrition.

Fruits and vegetables, which are among the perishable commodities, are important ingredients in the human dietaries. Due to their high nutritive value, they make significant nutritional contribution to human well-being. The perishable fruits and vegetables are available as seasonal surpluses during certain parts of the year in different regions and are wasted in large quantities due to absence of facilities and know-low for proper handling, distribution, marketing and storage. Furthermore, massive amounts of the perishable fruits and vegetables, produced during a particular season result in a glut in the market and become scarce during other seasons. Neither can they all be consumed in fresh condition nor sold at economically viable prices.

In developing countries agriculture is the mainstay of the economy. As such, it should be no surprise that agricultural industries and related activities can account for a considerable proportion of their output. Of the various types of activities that can be termed as agriculturally based, fruits and vegetables processing are among the most important. Therefore, fruits and vegetables processing has been engaging the attention of planners and policy makers as it can contribute to the economic development of rural population. The utilization of resources both material and human is one of the ways of improving the economic status of family.All forms of preserved fruits are in the reach of only the urban elite, and the rural masses who produce more than 90% of theses fruits and vegetables are usually deprived of their usage.

India has made a fairly good progress on the Horticulture Map of the world with a total annual production of Fruits and Vegetables touching over 131 Million Tonnes during 1998-99. Today, India is the second largest producer of the Fruits (44 Million Tones) and vegetables(87.5 Million Tones) as mentioned in Indian Horticulture Database-2000 published by National Horticulture Board. Our share in the world production is about 10.1 per cent in fruits and 14.4 per cent in vegetables. The Horticulture crops cover about 8 per cent of the total area contributing about 20 per cent of the gross agricultural output in the country. India produces 41.7% of the world mangoes. 25.7% of the bananas and 13.6 per cent of the world onion. However, the productivity of fruits and vegetables grown in the country is low as compared to the developed countries. The overall productivity of fruits is 11.8 tonnes per hac. And vegetables is 14.9 tonnes per hac.

Fruits		Vegetables	
Country	Production (tones per hac)	Country	Production (tones per hac)
WORLD	434703	WORLD	606053
INDIA	44042	INDIA	87536
CHINA	53926	CHINA	237136
BRAZIL	37179	USA	34924
USA	31494	TURKEY	21743
ITALY	17676	ITALY	14501
SPAIN	13323	JAPAN	13629
MEXICO	12342	IRAN	12751
FRANCE	10863	EGYPT	12379
TURKEY	10263	RUSSIAN	12098
PHILIPPINES	10160	SPAIN	11496

Table 1. Major World Producers of Fruits and Vegetables(1998-1999)*

Through India is the second largest producer of fruits and vegetables in the world, out per capita consumption of fruits and vegetables for over one billion population is very low. More than 25 per cent of fruits and vegetables production is unfortunately wasted due to inadequate facilities for processing. Despite such a large production, their processing is yet to be developed properly. The processing includes pre-processing of fruits and vegetables before these are fit to be used for final conversation into processed foods. Delay in the use of harvested food takes away its freshness, palatability, appeal and nutritive value. Tropical fruits are luscious, juicy and pulpy. They can not be plucked early, cold-stored or subjected to controlled and long drawn out process as is possible in the case of fruits grown in temperate or cold regions. They are harvested at optimum maturity and processed or consumed promptly as they ripen because they require special attention and techniques. The Food preservation and processing industry has now become more of a necessity than being a luxury. It has an important role in the conservation and better utilization of fruits and vegetables. In order to avoid the glut and utilize the surplus during the season, it is necessary to employ modern methods to extend storage life for better distribution and also processing techniques to preserve them for utilization in the off season on both large scale and small scale.

Both established and planned fruit and vegetable processing projects aim at solving a very clearly identified development problem. This is that due to insufficient demand, weak infrastructure, poor transportation and perishable nature of the crops, the grower sustains substantial losses. During the post-harvest glut, the loss is considerable and often some of the produce has to be fed to animals or allowed to rot. Food processing, therefore, refers to the application of techniques to foods in a systematic manner for preventing losses through preservation, processing, packaging, storage and distribution, ultimately to ensure greater availability of a wide variety of foods which would help to improve the food intake and nutritional standards during the period of low availability.

2. Nutritional values of fruits and vegetables

The recommendation that the diet contain four servings fruits and vegetables does not emphasize the choices to be made within this group. Because foods in this group are so diverse in nutritional value, nutrition education programs promote the use of one serving of a citrus fruit or another fruit or vegetable high in ascorbic acid every day and a serving of dark green, yellow, or orange vegetables as a sources of vitamin A every other day. Because of the low caloric content of this group of foods, the INQ for vitamin C,A, and iron usually exceeds. In addition, valuable amounts of folacin, magnesium, and calcium will be contributed. In the vegetables and fruits, the amount of vitamin C present differs with the variety, the degree of maturity, the season, climatic conditions, the length and conditions of storage, ands the part of the plant used. The loss of nutrients in fruits and vegetables begins right after harvest and may be especially rapid in the first few hours. In addition to losses caused by oxidation, further loss can be attributed to the removal of parts of the plant during preparation to make the product moiré palatable. Since relatively few of the few of the dark green or yellow fruits and vegetables that are rich sources of carotene are popular or inexpensive items in the diet, a realistic approach to a food guide suggests the use of these every other day. this is additionally justified because of the stability of vitamin A and carotene and because foods that are rich sources usually provide more than the day's allowance in one serving. Thus a daily intake of foods high in vitamin A value, although desirable, id not absolutely necessary. The vitamin A value of typical dark green and yellow vegetables varies with the degree of pigmentation. Aside from the unique contribution of carotene and vitamin C, the fruits and vegetables group contributes about 25% of the day,s intake of iron. The amount of iron varies with the foods and parts chosen: iron content is higher in leaves than in stems, fruits, or underground portions. The absorption of iron from fruits and vegetables is less than 5%, primarily because of the high cellulose and phytic acid found in most vegetables. On the other hand, the vitamin C found in many fruits enhances iron absorption. The trace mineral content of fruits and vegetables depends on the amount present in the soil in which the plant was grown. The diverse geographical sources of fruits and vegetables and modern systems of transporting produce to market reduce the chance of a low intake. Calcium intake from fruits and vegetables is small compared to that from the milk group but will assume more importance if milk intake is low. If peas or beans are chosen , a rich source of thiamin is provided, and if dark green leafy vegetables such as spinach are used, riboflavin intake will be high.

Generally fruits and vegetables are poor sources of protein, and that present is of low biological value because of a lack of some essential amino acids. Roots and tubers contain

2% protein and 20% carbohydrates, whereas legumes such as pea and beans have 4% protein and 13% carbohydrate.

The energy contribution of the fruit and vegetable group is generally low because of the high proportion of cellulose and water and low fat content. Immature seeds, such as peas and beans, and starchy tubers, such as potatoes, contribute two to eight times as many calories per serving as do celery , carrots, spinach, and cabbage, which are high in cellulose and water but low in starch. One must remember, however, that the caloric contribution of a fruit or vegetable dish may be double or triple that of the basic food alone, depending on the way it is prepared. Another important nutritional benefit from the use of fruits and vegetables is the bulk provided by fiber. This promotes normal gastrointestinal motility and greatly facilitates the passage of food through the digestive tract, helping to prevent constipation. Recent evidence that low dietary fiber may be responsible for the increasing incidence of diverticulosis and that it may be associated with cancer of the colon is further reason to use fruits and vegetables.

Millions of people in many developing countries do not have enough food to meet their daily requirements and a further more people are deficient in one or more micronutrients (FAO 2004).Thus, in most cases rural communities depend on wild resources including wild edible plants to meet their food needs in periods of food crisis. we introduce plants selected for present investigation, from nutritive values point of view. Plant species selected were: *Alocacia indica Sch.,Asparagus officinalis DC., Chlorophytum comosum Linn., Cordia Myxa Roxb., Eulophia Ochreata Lindl., Momordica dioicia Roxb., Portulaca oleracia Linn. and Solanum indicum Linn.* It contains importance of selected food plants, their necessity of utilization and the occurrence in natural conditions in south regions of Iran and Maharashtra state such as around of Pune in India.

Selected wild edible plants were collected from various localities of Maharashtra(India) and Iran. Three wild edible plants were collected from India to names of *Alocacia indica, Momordica dioica* and *Eulophia ochreata* in September 2006. Five wild edible plants were collected from Iran to names *Asparagus officinalis, Chlorophytum comosum, Codia myxa, Portulaca oleracia* and *Solanum indicum* collected from Iran in October 2006 and April 2007. Efforts made to collect these plants in flowering and fruiting conditions for the correct botanical identification. Healthy and disease free edible plant part/s selected and dried them under shade so as to prevent the decomposition of chemical compounds present in them. All the dried material powdered in blander for further study.

3. Materials and methods

3.1 Plant material

Plant foods such as Cordia myxa R. fruit ,Alocacia indica S. Stem، Asparagus officinalis DC. Stem ، Momordica dioicia R. fruit، Eulophia ochreata L. tubers، Solanum indicum L. leaves، Portulaca oleracia L. Leaves and Stem، Chlorophytum comosum L. root tubers used as experimental material were collected from farm lands in Agricultural Research Central of Dezful , Khuzestan province, Iran and around Pune, India in October 2007. The collected plant material was placed in a polyethylene bag to prevent loss of moisture during transportation to the laboratory. Taxonomic identification of the plant was carried out at the Botany unit, Ramin Agricultural University, Ahvaz. Iran.

4. Preparation of the plant material for chemical analyses

These fruits or vegetables were washed with distilled water and dried at room temperature to remove residual moisture, then placed in paper envelope and oven-dried at 55°C for 24 hours (Abuye, Urga., Knapp, Selmar, Omwega, Imungi, & Winterhalter 2003). The dried fruit were ground into powder using pestle and mortar, and sieved through 20-mesh sieve. The edible plant powder was used for the nutrients analyses.

5. Proximate analysis

The methods recommended by the Association of Official Analytical Chemists (AOAC) were used to determine ash (#942.05), crude lipid (#920.39), crude fibre (#962.09) and nitrogen content (#984.13)(AOAC 1990).

6. Determination of crude lipid and crude fibre content

Two grams of dried fruit or vegetable were weighed in a porous thimble of a Soxhlet apparatus, with its mouthed cotton wool plugged. The thimble was placed in an extraction chamber which was suspended above a pre-weighed receiving flask containing petroleum ether (b.p. 40-60°C). The flask was heated on a heating mantle for eight hours to extract the crude lipid. After the extraction, the thimble was removed from the Soxhlet apparatus and the solvent distilled off. The flask containing the crude lipid was heated in the oven at 100°C for 30 minutes to evaporate the solvent, then cooled in a dessicator, and reweighed. The difference in weight was expressed as percentage crude lipid content.

Crude fibre was estimated by acid-base digestion with 1.25% H_2SO_4 (prepared by diluting 7.2 ml of 94% conc. acid of specific gravity 1.835g ml-1 per 1000 ml distilled water) and 1.25% NaOH (12.5 g per 1000 ml distilled water) solutions. The residue after crude lipid extraction was put into a 600 ml beaker and 200 ml of boiling 1.25% H_2SO_4 added. The contents were boiled for 30 minutes, cooled, filtered through a filter paper and the residue washed three times with 50 ml aliquots of boiling water. The washed residue was returned to the original beaker and further digested by boiling in 200 ml of 1.25% NaOH for 30 minutes. The digest was filtered to obtain the residue. This was washed three times with 50 ml aliquots of boiling water and finally with 25 ml ethanol. The washed residue was dried in an oven at 130°C to constant weight and cooled in a dessicator. The residue was scraped into a pre–weighed porcelain crucible, weighed, ashed at 550°C for two hours, cooled in a dessicator and reweighed. Crude fibre content was expressed as percentage loss in weight on ignition, AOAC (1990).

7. Determination of nitrogen content and estimation of crude protein

Macro–Kjeldahl method was used to determine the nitrogen content of the stem. 2g of dried stem were digested in a 100 ml Kjeldahl digestion flask by boiling with 10 ml of concentrated tetraoxosulphate (VI) acid and a Kjeldahl digestion tablet (a catalyst) until the mixture was clear. The digest was filtered into a 100 ml volumetric flask and the solution made up to 100 ml with distilled water. Ammonia in the digest was steam distilled from 10 ml of the digest to which had been added 20 ml of 45% sodium hydroxide solution. The ammonia liberated was collected in 50 ml of 20% boric acid solution containing a mixed

indicator. Ammonia was estimated by titrating with standard 0.01 mol L-1 HCl solution. Blank determination was carried out in a similar manner. Crude protein was estimated by multiplying the value obtained for percentage nitrogen content by a factor of 6.25, AOAC(1990).

8. Estimation of carbohydrates and energy values

Available carbohydrate was estimated by difference, by subtracting the total sum of percent crude protein, crude lipid, crude fibre and ash from 100% DW of the fruit The plant calorific value (in kJ) was estimated by multiplying the percentages of crude protein, crude lipid and carbohydrate by the factors 16.7, 37.7 and 16.7 respectively, AOAC(1990).

9. Mineral analysis

The mineral elements Na, K, Ca, Fe, and Zn were determined on 0.3g fruits powder by the methods of Funtua, ,Funtua and Trace (1999); Funtua (2004). using Energy Dispersive X-ray Fluorescence (EDXRF) transmission emission spectrometer carrying an annuar 25 mCi 109Cd isotopic excitation source that emits Ag-K X-ray (22.1 keV) and a Mo X-ray tube (50KV, 5mA) with thick foil of pure Mo used as target material for absorption correction. The system had a Canberra Si (Li) detector with a resolution of 170eV at 5.9keV line and was coupled to a computer controlled ADCCard (Trump 8K). Measurements were carried out in duplicate. Na was analyzed after wet digestion of one gr. of the fruits powder with nitric/perchloric/sulphuric acid (9:2:1 v/v/v) mixture. Sodium was analyzed with a Corning 400 flame photometer,AOAC (1990).

Proximate analyses were performed in triplicate according to standard methods 44-19, 46-13, 30-25 and 08-16 of the AACC (1984), using a Goldfisch (Labconco Corp., Kansas City, MO) apparatus for fat extraction with hexane and total lipid extraction with methanol:chloroform (2:1, v/v), and a nitrogen to protein conversion factor of 6.25. Total carbohydrate content was determined by the phenol-sulfuric acid method described by Dubois et al. (1956), using raffinose as a standard. Low molecular weight sugars were analyzed by high resolution gas chromatography (Karoutis et al., 1992). Total starch was determined as glucose after hydrolysis of starch with amyloglucosidase (1,600 activity unit/g, from Rhizopus) (Sigma-Aldrich Canada Ltd., Oakville, ON). The reaction of the resultant glucose with *o*-toluidine was then colourimetrically measured (Chiang and Johnson, 1977). Total dietary fibre (TDF) was determined according to the AOAC (1985) procedure using Sigma total dietary fibre assay kit TDF-C10 (Sigma Chemical Co., St. Louis, MO). Colour was evaluated with a HunterLab Colour Difference Meter (Colour QUEST, Hunter Associates Laboratory, Inc., Reston, VA) equipped with Illuminant D65

10. Analysis of antinutritional factors

Trypsin inhibitor activity (TIA) was determined by a modification of the procedure of Kakade et al. (1974) as described by Smith et al. (1980) and Hamerstrand et al. (1981). All samples were defatted at room temperature (approximately 23^{o}C) for 9 h using a wrist-action shaker with three solvent replacements in order to avoid any destructive effect of heat on the TIA of the samples.

Total phenolic assay: phenolic compounds were analyzed accordance standard method.

Samples	Protein (%)	Fat(%)	Total Ash(%)	Fiber %	Fructose g/100g	Glucose g/100g	Sucrose g/100g	Starch g/100g	Total sugarg/ 100g
Alocacia indica Sch	5.7	3.29	7.3	11.05	8.06	2.1	2.09	60.41	72.66
Asparagus officinalis DC	32.69	3.44	10.7	18.5	6.86	1.53	N.D	26.28	34.67
Portulaca oleracia Linn	23.47	5.26	22.6	8.0	0.86	0.01	N.D	39.8	40.67
Momordica dioicia Roxb	19.38	4.7	6.7	21.3	3.97	1.47	0.23	42.25	47.92
Eulophia ochreata Lindl	5.44	3.25	9.1	22.9	1.62	1.48	0.46	55.75	59.31
Solanum indicum Linn	12.85	13.76	11.0	23.9	5.21	3.19	0.59	29.5	38.49
Cordia myxa Roxb	8.32	2.2	6.7	25.7	9.38	12.75	29.09	5.86	57.08
Chlorophytum comosum Linn	4.54	2.0	10.38	17.24	7.82	3.41	3.07	51.54	65.84

Table 2. Amounts of protein, fat, ash, fiber, fructose, glucose, sucrose and starch of eight edible plants obtained from India and Iran.

Samples	Phytic acid mg/100g	Trypsin Inhibator (TIU/g)
Alocacia indica Sch	312.4	7.9
Asparagus officinalis DC	340.8	0.8
Portulaca oleracia Linn	823.6	16.9
Momordica dioicia Roxb	284.2	9.3
Eulophia ochreata Lindl	255.6	3.1
Solanum indicum Linn	695.8	10.6
Cordia myxa Roxb	248.0	1.39
Chlorophytum comosum Linn	468.8	4.7

Table 3. Total Phytic acid inhibitor compound and amount of Tripsin inhibitor of eight edible plants obtained from India and Iran.

Samples	Total phenolic compound mg/g	Vitamin E mg/100g
Alocacia indica Sch	0.87	N.D
Asparagus officinalis DC	3.17	6.56
Portulaca oleracia Linn	5.86	11.6
Momordica dioicia Roxb	3.69	4.5
Eulophia ochreata Lindl	2.43	6.32
Solanum indicum Linn	7.02	N.D
Cordia myxa Roxb	4.02	2.2
Chlorophytum comosum Linn	1.36	N.D

Table 4. Total phenolic compound(Antioxidant) and amount of Vitamin E(Antioxidant) of eight edible plants obtained from India and Iran.

Samples	Total Ash(%)	Sodium (Na) mg/g	Potassium(K) mg/g	Calcium(Ca) mg/g	Fe mg/g	Zn mg/g
Alocacia indica Sch.	7.3	4.4	3.4	0.88	0.48	1.21
Asparagus officinalis DC.	10.7	1.84	10.94	0.67	0.19	2.60
Portulaca oleracia Linn.	22.6	7.17	14.71	18.71	0.48	3.02
Momordica dioicia Roxb.	6.7	1.51	8.25	0.46	0.14	1.34
Eulophia ochreata Lindl.	9.1	1.62	4.63	7.37	5.04	3.83
Solanum indicum Linn.	11.0	1.51	8.32	4.48	10.56	0.95
Cordia myxa Roxb.	6.7	1.62	7.83	0.46	0.51	0.35
Chlorophytum comosum Linn.	10.38	3.95	4.29	13.14	1.89	0.76

Table 5. Amounts of macro and trace elements and ash of eight edible plants obtained from Iran and India

Many studies have been done by various research workers all over the world by selecting one or more plants particularly leaves, fruits, roots, stem, food plants and so on but rarely by selecting a particular family. In this investigation work seven families *(Araceae, Liliaceae, Boraginaceae, Orchidaceae, Cucurbitaceae, Portulacaceae* and *Solanaceae*) are selected.
Plant species selected were: Alocacia indica Sch.,Asparagus officinalis DC., Chlorophytum comosum Linn., Cordia Myxa Roxb., Eulophia Ochreata Lindl., Momordica dioicia Roxb., Portulaca oleracia Linn. and Solanum indicum Linn.Total ash values of eight samples of Alocacia indica Sch., Asparagus officinalis DC Chlorophytum comosum Linn.,Cordia myxa Roxb., Eulophia ochreata Lindl., Momordica dioicia Roxb., Portulaca oleracia Linn. and Solanum indicum Linn. were obtained 7.3%, 10.7%,10.38%, 6.7%, 9.1%, 6.7%, 22.6% and 11.0% respectively.The most of ash value and the least of ash value were for Portulaca oleracia Linn.and Momodica dioicia Roxb.or Cordia myxa Roxb. respectively. The ash medium value was obtained for Eulophia ochreata Lindl.(9.1%), If ash value in sample is more than others, it's mineral values is more than others. If mineral values to be high it is observe that plant have high nutritional value, because these mineral compounds are same mineral compounds of human body if theses edible plants is consumed by human in normal conditions. Minerals in the diet are required for proper growth and good health. Those needed in macro, or major quantities are calcium, phosphorus, magnesium, potassium, sulfur, sodium, and chlorine, and those needed in micro(trace) amounts are iron, iodine, copper, cobalt, chromium, manganese, selenium, zinc, fluorine, and molybdenum. The cruciferous and many other vegetables are excellent sources of minerals, particularly of calcium, phosphorus, magnesium, potassium, iron, sodium, and most of these minerals are present in the available form. The trace mineral content of fruits and vegetables depends on the amount present in the soil in which the plant was grown. The diverse geographical sources of fruits and vegetables and modern systems of transporting produce to market reduce the chance of a low intake. Calcium intake from fruits and

vegetables is small compared to that from the milk group but will assume more importance if milk intake is low. Vitamins and minerals present in the diet are necessary for normal growth and metabolism and influence the utilization of other nutrients such as protein. The deficiency of essential vitamins or minerals leads to several physiological disorders and diseases, slowed growth, and lack of deposition of proteins in tissues. An adequate supply of B- complex vitamins is necessary for critical protein utilization. The deficiency of minerals such as potassium, phosphorus, sodium, calcium, and magnesium also influences the capacity of the body to utilize amino acids and proteins.

Sodium values of eight samples above in this study in order to mg/g were obtained 4.4, 1.84, 3.95, 1.62, 1.62, 1.51, 7.17and1.51 respectively. *Portulaca oleracia Linn.*contains the highest value of sodium and *Momordica dioicia Roxb.*,or *Solanum indicum Linn.*contain the least values of sodium. *Alocacia indica Sch.* Contains sodium medium value(4.4mg/g).

Potassium values of eight samples above in this research in order to mg/g were obtained 3.4,10.94,4.29,7.83,4.63,8.25,14.71and 8.32 respectively. *Portulaca oleracia Linn*. contains the highest potassium value and *Alocacia indica Sch*.contains the least potassium value. *Cordia Myxa Roxb*. contains potassium medium value(7.83mg/g).

Calcium values of the samples above in order to mg/g were obtained 0.88, 0.67, 13.14, 0.46, 7.37,0.46, 18.17 and 4.48 respectively. *Portulaca oleracia Linn.*contains the highest calcium value and *Momordica dioicia Roxb.*or *Cordia myxa Roxb*. Contain the least calcium value. *Eulophia ochreata Lindl*. contains calcium medium value (7.37mg/g).

Iron values of eight samples in this research in order to mg/g were obtained 0.48, 0.19, 1.89, 0.51, 5.04, 0.14, 0.48 and 1.56 respectively. *Eulophia ochreata Lind*l. Contains highest iron value and *Momordica dioicia Roxb* contains the least iron value. *Chlorophytum comosum Linn*. contains iron medium value (1.89mg/g).

Zinc values of the samples above in this study in order to mg/g were obtained 1.21,2.60, 0.76, 0.35, 3.83, 1.34, 3.02 and 0.95 respectively. *Eulophia ochreata Lindl*. contains the highest zinc value and *Cordia myxa Roxb*. Contains the least zinc value. *Asparagus officinalis DC*. contains zinc medium value (2.60mg/g).

Therefore, it is observed that *Portulaca oleracia Linn*. contains the high value of macro-elements such as sodium, potassium, calcium and especially it have high ash value in comparison with others plants in this research. Therefore, *Portulaca oleracia Linn* has high nutritional value from standpoint of macro-elements. Because *Eulophia ochreata Lindl*. contains highest micro-elements such as iron and zinc in comparison with others plants in this study, it has high nutritional value from view of point of above trace(micro) elements. *Momordica dioicia Roxb. or Cordia myxa Roxb* have the minimum nutritional value, because they contain the least ash values and *Momordica dioicia Roxb*. has the least value of sodium and calcium, but *Cordia myxa Roxb*. has the least value of zinc. *Alocacia indica Sch.,Asparagus officinalis DC., Chlorophytum comosum Linn., Cordia Myxa Roxb., Eulophia Ochreata Lindl.*have nutritional medium values.

Protein, Fat, and calorie values of eight samples in this research were compared, it is observed that *Asparagus*(32.69%) and *Portulaca* (23.47%)have the highest protein values respectively, *Chlorophytum*(4.54%), *Eulophia*(5.44%) and *Alocacia*(5.7%) have the least protein values. *Momordica*(19.38%) have protein medium value.

Solanum(13.76%) has the highest Fat value and *Chlorophytum*(2%) has the least Fat value. *Portulaca*(5.26%) Fat value was approximately medium and the others samples have low fat values.

Momordica(with 4125/83Kcal/Kg) and *Cordia* (with 4067/94 Kcal/Kg) have the highest calorie values and *Portulaca*(with 2913/82 Kcal/Kg)has the least calorie value and the others samples have calorie medium values(with 3514/4Kcal/Kg- 3647/23Kcal/Kg). Therefore, *Asparagus* and *Portulaca* have the highest nutritional value from standpoint of proteins.

Plants such as vegetables and fruits have satisfactory edible proteins with high quality so that we can use them in food industries and as nutrition. Total proteins and nitrogen is related to Albumins, globulins, free Amino acids, enzymes, hormones, peptides and other nitrogen components. The most of these proteins have high nutritional values and contain all essential amino acids so that it is useful for our body cells and it is necessary that is consumed by human.

Total phenolic compounds of eight plants in this research were compared together, it is observed that *Solanum indicum Linn*.with 7.02mg/g has the highest phenolic compounds values and then *Portulaca oleracia Linn.* with 5.86mg/g contains high phenolic compounds. *Alocacia indica Sch.* with 0.87mg/g has the least phenolic compounds. *Cordia Myxa Roxb* with 4.02mg/g and *Momordica dioicia Roxb.* with 3.69mg/g and *Asparagus officinalis DC.* with 3.17mg/g contain phenolic compounds medium value.

Phytic acid contents of eight plants were compared in this research, it is reveal that *Portulaca oleracia Linn.* with 823.6mg/100g sample has maximum value and then *Solanum indicum* with 695.8 mg/100 g sample has high value and *Eulophia* with 255.6 mg/100g sample has minimum value and the others plants have less values.

Carbohydrates eight edible plants in this research were compared it is observed that fructose, glucose, sucrose and Fiber values of *Cordia myxa* Roxb. were 9.38%, 12.75%, 29.09% and 25.7% the highest values respectively, but it's starch (with 5.86%)value was the least value. Fructose, glucose, sucrose and fiber values of *Portulaca Oleracia* Linn. were the least values with values of 0.86%,0.01%, N.D.(Not detected) and 8% respectively, but it's starch value(with39.8%) was high. Starch value of *Alocacia indica* Sch. was maximum with 60.41%.*Alocacia indica* Sch. and *Asparagus officinalis* D.C. have maximum and minimum total carbohydrates with values of 72.66% and 34.67% respectively. Therefore energy value of obtained from total carbohydrates value in *Alocacia indica* Sch. was the highest value but energy values obtained from it's protein and fat were very low. Energy values of obtained from fat and protein in *Solanum indicum* and *Asparagus officinalis* D.C. were the highest values with 123.84kcal/100g and 130.76kcal/100g respectively.

Total energy values obtained from fat, protein and sugars in *Alocacia indica* Sch. and *Cordia myxa* Roxb.were 343.05kcal/100g and 281.4kcal/100g , the highest and the least values respectively.

Total sugar amounts of *Cordia* and *Asparagus* plants were compared with results of other researcher, it is showed that Parmar, C et, al (1982) reported that reducing and non-reducing sugars amounts in *Cordia* were 3.41% and 0.08 % respectively and Duke. J.A et al(1985) reported that carbohydrate and fiber values in *Asparagus* was 5% and 0.7% respectively. These comparison showed that sugar amounts of both plants in our research were very higher than them research results.

Trypsin inhibitor amounts of samples in this thesis is compared, it is observed that *portulaca* have the highest value(16.9TIU/g) and *Asparagus* have the least value(0.8TIU/g). *Solanum, Momordica* and *Alocacia* contain the high values of trypsin inhibitor respectively. trypsin inhibitor high values of samples are not relation with them protein high values. Asparagus have the most value of protein and the least value of this anti-nutrient(trypsin inhibitor).

Samples vitamin E amounts were compared, it is observed that *portulaca* have highest value (11.5 mg/100g), but vitamin E in *Solanum, Chlorophytum* and *Alocacia* are not detected. *Portulaca* have highest values phenolic compounds and vitamin E, therefore this plant have the highest antioxidant property. The antioxidant property give to plant high shelf-life then high consumption capacity in between of people, therefore this plant have high nutritional value.

There is currently much interest in phytochemicals as bioactive components of food. The roles of fruit, vegetables in disease prevention have been attributed, in part, to the antioxidant properties of their constituent polyphenols (vitamins E and C, and the carotenoids). Recent studies have shown that many dietary polyphenolic constituents derived from plants are more effective antioxidants *in vitro* than vitamins E or C, and thus might contribute significantly to the protective effects *in vivo*. It is now possible to establish the antioxidant activities of plant-derived flavonoids in the aqueous and lipophilic phases, and to assess the extent to which the total antioxidant potentials of wine and tea can be accounted for by the activities of individual polyphenols. because phenolic compounds have Antioxidant properties and to prevent from damage of plant tissues and all compounds that contain double bonds and aromatic structures especially to prevent from decomposition of fatty acids, vitamins, amino acids, flavours, and pigments in plants, therefore, *Solanum indicum Linn*. and then *Cordia Myxa Roxb* and *Momordica dioicia Roxb*. and *Asparagus officinalis DC*.have high nutritional values, because the most of them nutrients will be protected in harvest and post-harvest and in them storage during.

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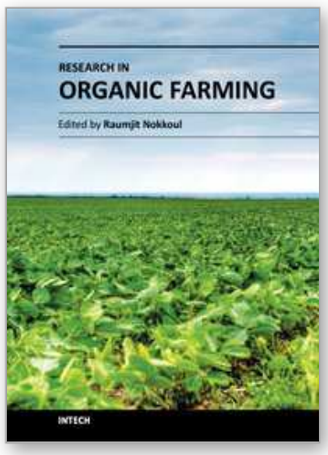

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This book has emerged as a consequence of the difficulties we experienced in finding information when we first started researching. The goal was to produce a book where as many existing studies as possible could be presented in a single volume, making it easy for the reader to compare methods, results and conclusions. As a result, studies from countries such as Thailand, Spain, Sweden, Lithuania, Czech, Mexico, etc. have been brought together as individual chapters, and references to studies from other countries have been included in the overview chapters where possible. We believe that this opportunity to compare results from different countries will open a new perspective on the subject, allowing the typical characteristics of Organic Agriculture and Organic Food to be seen more clearly. Finally, we would like to thank the contributing authors and the staff at InTech for their efforts and cooperation during the course of publication. I sincerely hope that this book will help researchers and students all over the world to reach new results in the field of Organic Agriculture and Organic Food.

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