



Original Research Article

## Study on the Trace Element and Some Properties of the Fruit Juice of Soursop and Their Effect on Liver Enzymes

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### ABSTRACT

The proximate analysis revealed that the fruit (soursop) sample is low in mineral element ASH (0.78) and richer in carbohydrate (21.53), protein ( 1.73), Fat ( 0.455) while fibre was (0.48), pH = 5.37 and was moisture (75.8) energy (97.135).The concentrations of trace elements in the fruit extract (juice) *Annona muricata L.* presented in Table.2 ,which shows , concentrations of (B , Zn , Fe) with (20.22 , 0.688 , 0.268) ppm , respectively and concentrations of (Mn,Cu) with (0.217,0.19) ppm , respectively , concentrations (pb,Cd,Ni,Co) with (0.13,0.0872,0.074,0.05) ppm and (Se) were very low (0.0001) ppm .The effect of juice on the liver enzymes (*invitro*) found activation AST, ALT and ALP.

**Keyword:** Trace elements; soursop; liver enzymes

### INTRODUCTION

Information on the nutrient composition of locally available foods especially fruits is of immense importance because of the need to supply foods according to their nutritive values to the people. Dietary supplements are now made using different fruits, vegetables and also herbs in order to provide natural curative as well as preventive methods for combating diseases and poor health. For Iraq, as it is for other developing countries, there exists very

limited information on the nutritive value of its many natural foods especially it's wild and underutilized fruits so that these may be utilized for such purposes.

*Annona muricata L* commonly known as graviola or soursop, belongs to the family of Annonaceae. It is a typical tropical tree with heart shaped edible fruits and widely distributed in most of tropical countries [1]. The leaves are lanceolate with glossy and dark

green in colour had been traditionally used to treat headaches, hypertension, cough, asthma and used as antispasmodic, sedative and nerve for heart condition [2]. Previous reports over the years have demonstrated that the leaf, bark, root, stem, and fruit seed extracts of *Annona muricata* are anti-bacterial [3], antifungal and anti-malarial [5]. Its leaves extract were also found to possess antioxidant and molluscicidal properties [2]. Recently, it has also been reported to exhibit anti-inflammatory and analgesic effects [7]. Among the chemical constituents found in the leaf of *Annona muricata* are alkaloids [8], essential oils [9] and acetogenins [10]. Annonaceous acetogenins, from *Annona muricata* L were found to be a promising new anti-tumor and anticancer agent in numerous *in vitro* studies. These acetogenins demonstrated to be selectively toxic against various types of the cancerous cells without harming healthy cells [11]. Due to the presence of various medicinal properties, the present study was an endeavour to investigate the chemopreventive effect of *A. muricata* L leaves, if any on two-stage mouse skin papillomagenesis model.

Minerals serve a variety of functions. Some have only one function e.g. cobalt in vitamin B<sub>12</sub> and iodine in thyroxine. But others serve multiple functions ranging from acting as cofactors in enzyme reactions to stabilizing and contributing to the hardness of bone. Metal ions occur almost always bound to particular proteins where they often play a crucial part in maintaining the protein's three dimensional structure. If the protein happens to be an enzyme then the metal may be needed for catalytic activity. Several of the minerals influence the expression of genes encoding one or more proteins by regulating the transcription and translation of the gene [12].

## MATERIALS AND METHODS

### Collection and Preparation of samples

The (*Annona Muricata* L.) were collected from market of Baghdad, Iraq. The fruit were transported to the laboratory biochemistry in department of chemistry /College of Science /Al-Mustansiriyah University, washed, cleaned to remove all traces of dust and insects then Squeezed, filtrate, dried, weighed and placed in airtight bottles and stored to be used for extraction [13].

### Determination of Ash content

Dried leaves, 2g, were taken and heated at 900°C for 20 min. in muffle furnace until the material converted to white powder, after its cooling the percentage of ash content was determined [14].

### Determination of Physico-Chemical Properties

The physico-chemical properties of *A. muricata* were determined following the method described by A.O.A.C [15].

### Determination of trace element

10 ml were taken from fruit extract (juice) of *Annona muricata* L. and mixed with 10 drops of concentrated nitric acid and 2 ml of 60% perchloric acid in a conical flask, the mixture was kept for 24hrs covered with watch glass. The trace elements were determined [14] by (Shimadzu AA-670, Flame Atomic Absorption Spectrophotometer).

### Biochemical analyses

Human plasma was used to measure aspartate aminotransferase (AST), Alanine transaminase (ALT), and Alkaline phosphatase (ALP) as indicative parameters of hepatic function. The plasma activities of AST, ALT, ALP were estimated by commercially available kits using an autoanalyser (AST, ALT Randox kit, ALP Biomerieux kit) [16, 17].

## RESULTS AND DISCUSSION

The proximate analysis revealed that the fruit (soursop) sample is low in mineral element ASH (0.78%) and richer in carbohydrate (21.53%), protein (1.73), Fat (0.455) while fibre was (0.48), pH (5.37) and was moisture (75.8) and energy 97.135 as presented in Table 1.

**Table 1: Proximate Composition of *Annona muricata* L. Fruit**

Parameters	g/100g
Moisture %	75.8
Ash %	0.78
Crude Fibre %	0.48
Carbohydrate %	21.53
Protein %	1.73
Fat %	0.455
Energy	97.135
pH	5.37

The concentrations of trace elements in were *Annona muricata* L. presented in Table 2, which shows, concentrations of B, Zn, Fe with 20.22, 0.688, 0.268 ppm, respectively and concentrations of Mn, Cu with 0.217, 0.19 ppm, respectively, concentrations of Pb, Cd, Ni, Co with 0.13, 0.0872, 0.074, 0.05 ppm and Se were very low (0.0001 ppm).

**Table 2: The concentration of trace elements content of fruit juice of soursop.**

Trace elements	Symbol	Concentration (µg/ml)PPM
Boron	B	20.22
Zinc	Zn	0.688
Iron	Fe	0.264
Manganese	Mn	0.217
Copper	Cu	0.19
Lead	Pb	0.13
Cadmium	Cd	0.0872
Nikel	Ni	0.074
Cobalt	Co	0.05
Selenium	Se	0.0001

The juice was examined (*invitro*) for their effects on AST, ALT, and ALP. Our results (table

3) also are in a good agreement with that of several authors who have reported an increase in liver enzymes.

**Table 3: Effect of fruit juice of soursop on liver enzymes (*invitro*)**

Parameters	AST (U/L)	ALT (U/L)	ALP (U/L)
With out (soursop juice)	7	4	75.92
With (soursop juice)	89	17	134.97

Virtually all plants have one or more phytochemical resident in their leaf, stem, root, fruit and flowers. Fruit juice of *A. muricata* contains phytochemicals including tannins, flavonoids, saponins and alkaloids which are known to exhibit medicinal as well as physiological activities. Flavonoid is hydroxylated phenolic substances known to be synthesized by plants in response to microbial infection and they have been found to be anti-microbial substances against wide array of microorganisms' *invitro* [18]. They are also effective antioxidants and show strong anti-cancer activities [19]. The presence of these phytochemicals in *A. muricata* could be contributory to its antioxidant activity observed in this investigation. In the present experiment the order of increasing relative abundance of these phytochemical in the fruit juice of *A. muricata* is Glycoside, Saponin Alkaloid, Flavonoid, Total phenolic compounds [20].

In the fruit extract (juice) of *Annona Muricata*, the concentration of Boron was 20.22ppm, plenty of data supports the hypothesis that boron is an essential element and that it is involved in regulating parathormone action [21].

Zinc recorded a concentration of (0.688ppm). Zinc is the cofactor in more than 100 enzymatic reactions. Essential component of nuclear DNA

binding proteins; serves in the expression of genes for metallothioneins. Zinc deficiency causes a block in protein and nucleic acid synthesis. The immune system, the skin and the gastro-intestinal tract are the tissues of the body with the highest rate of protein synthesis [22].

The concentration of Fe was 0.264 ppm. Iron is the essential component of haemoglobin and the cytochromes. Serves in the expression of genes for receptors of ferritin, trans ferritin and metallothioneins [23].

Manganese is required for the synthesis of mucopolysaccharides through the enzymes polymerase and galacto-transferase. Essential cofactor in many enzymatic reactions. Deficiency of Mn in the body may lead to central nervous system (CNS) disorders [24].

The concentration of Mn was 0.217 ppm

Copper is the essential cofactor in several reactions concerning iron use, collagen synthesis, and suppression of free radicals. Also serves in the expression of genes for several enzymes [25]. The concentration of Cu in fruit extract of soursop was 0.19 ppm. Nickel essential trace element involved in the metabolism of several species of bacteria, archea, and plants. In these organisms, nickel is involved in enzymes that catalyze both non-redox (e.g., urease, glyoxalase I) and redox (e.g., hydrogenase, carbon monoxide dehydrogenase, superoxide dismutase) [26]. The concentration of Ni was 0.074ppm. The concentration of Co was 0.05ppm. Cobalt is known to play an important role in thyroid metabolism in humans and essential in the structure of vitamin B<sub>12</sub> [24].

Selenium has an important role as an essential component of glutathione peroxidase in which it provides the active site. This enzyme utilizes two molecules of reduced glutathione to reduce hydrogen peroxide and convert it to two molecules of water. It also catalyzes the reduction of fatty acid hydro peroxides to hydroxy acids in the tissues and thus helps to

protect the lipids of cell membranes from peroxidation. Selenium is thus important for maintaining membrane stability and for controlling free radical damage. Glutathione peroxidase is present in a wide variety of tissues and accounts for 90 per cent of the selenium in erythrocytes.

Absorption of selenium depends on the chemical form, the organic form being better absorbed than the inorganic. (Essential for enzyme reactions for glutathione and thyroxine) [27]. The concentration of Se in fruit extract of soursop was 0.0001ppm.

## CONCLUSION

The present study confirms that the juice of *Annona muricata L.* are to be used for food preservation or medical purposes, issues of safety and toxicity will need to be addressed, and these results will serve as a precursor for further research.

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