

A Comparative Study of Nutraceutical Values of Ziziphus Spina Christi (Sidr) from the Origin of Fujairah, UAE, with Same Specie from Different Origin and Leafy Vegetables

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Abstract: ***Background:** Ziziphus Spina Christi is a native plant that grows in tropical regions, especially in the Middle East. Also, it spread widely in the Emirates of Fujairah. Ziziphus Spina Christi provides health benefits due to carrying a large amount of magnesium, iron, and calcium. **Methods:** The nutritional and mineral assessment has been done by international standard technologies (Association of Official Analytical Chemists, AOAC 2001.11, AOAC 920.39, AOAC 962.29, AOAC 942.05). **Results:** This study was carried out to determine the benefits of Ziziphus Spina Christi as a potential source of vital nutrients and minerals. The proximate mineral concentration analysis of the selected leafy vegetables has a low quantity of mineral contents compared to the Ziziphus Spina Christi. **Conclusion:** The study concluded the significant nutraceutical importance of Ziziphus Spina Christi from the origin of Fujairah, UAE. It's nutritional and mineral potential is far higher than the leafy vegetables used in daily life. The comparison analysis depicts an interesting fact of involvement of the environmental condition with the nutritional potential of the plants. The Ziziphus Spina Christi from the Fujairah origin has higher nutritional and mineral values than the same plant species from the origin of Nigeria. Moreover, it is an agro-economically favorable plant which can be used as high calcium, phosphorous, potassium and magnesium diet and dietary supplement.*

Keywords: Ziziphus SpinaChristi, sidr, native, Fujairah, leafy vegetables, public health, minerals, environment

1. Introduction

Fujairah is fifth largest emirates in United Arab Emirates and bears harsh environmental conditions including high temperature, soil salinity, low humidity and water scarcity for irrigation. Such harsh conditions give opportunities to unique kind of plants to grow and provide for required agricultural needs. Ziziphus Spina Christi is one of the native plants from the origin of Fujairah, locally known as Sidr. It is a multipurpose plant belonging to the botanical RHAMNACEAE family. Moreover, Sidr is a medicinal plant with many traditional uses since it has a higher content of minerals, vitamins, and proteins. Sidr has shown medicinal properties and hence been used to treat several illnesses, including liver complaints, insomnia, diabetes, obesity, fever, urinary troubles, digestive disorders, diarrhea, anemia, loss of appetite, etc (Waggas and Al-Hasani 2010).



Figure 1: The tree of Ziziphus spina Christi

Ziziphus spina Christi has also a honey plant where local bees are getting nectar from this plant for honey production. It is a tall tree, and it is growing up to a height of 20 meters and approximately 60 centimeters of a diameter (Jinous and Elaheh 2012). It has a light gray cracked bark and scaly. Its sprouts are white, flexible, and drooping its trunk is twisted and has a thick crown. Its thorns are in pairs, one curled and the other straight (Figure 1).

The leaves of Ziziphus spina Christi plant are ovate-lanceolate with an acute or obtuse apex. They are glabrous on their top surfaces and delicately pubescent (Figure 2).



Figure 2: Leaves of Ziziphus spina Christi

Vegetables are an essential part of the human diet. It is considered an important source of many nutrients, including protein, vitamins, iron, and calcium which have significant positive benefits on human health. Spinacia oleracea known

as Spinach is one of the economically important leafy vegetables growing in many countries. It is containing many nutrients while the calories are low. Dark leafy vegetables are essential for maintaining healthy skin, hair, and bones. Additionally, they provide a lot of vitamins and minerals. One of the spinach's potential health benefits is that it can decrease the risk of cancer (Correll et al. 1994). Lactuca or Lettuce is a popular leafy vegetable that is essential to the human diet and nutrition. Crisphead lettuce is substantially lower in nutrients compared to leaf and romaine types (Mou 2009). The decreased nutritional value of Crisphead lettuce is caused by the enclosing of its leaves in a head structure. Lettuce contains few calories, fat, and salt. It is high in fiber, iron, folate, and vitamin C (Kim et al. 2016).

This study is based on the comparison of nutraceutical values of the Ziziphus spina Christi with Spinacia oleracea and Lactuca to understand and elucidate the potential of this specific plant regarding healthy human and cattle diet. Our analysis can provide a foundation for the suggestive dietary supplements from Ziziphus spina Christi.

2. Material and Methods

Sample collection:

The leaves of Ziziphus spina Christi were collected from Al Taibah Farm, Fujairah. The sample weighs about 500g and kept in sterile Plastic Packaging.

Sample preparation for nutrient and chemical composition analysis:

The analytical grade, high quality chemicals has been used in this experiment to find nutrient, minerals, and heavy metals. Proximate analysis for chemical components; Dry Matter, crude protein, Crude Fat, crude fiber, ash, TDN, total sugars and Mineral analysis were determined by international standard procedures as mentioned in (AlDahmani et al. 2022).

3. Results

The nutritional composition of the Ziziphus Spina Christi plant found in this study as shown in (Table 1), reported that

the values for dry matter, crude protein, crude fat, crude fiber, ash, total sugar, and TDN from a sample from United Arab Emirates (Fujairah), were about 75.92%, 6.08%, <0.1%, 16.82%, 4.38%, 2.11%, 73.15%, respectively.

The macro-minerals concentrations of the Ziziphus Spina Christi and some selected leafy vegetables such as Calcium (Ca), Phosphorus (P), Sodium (Na), Potassium (K), Zinc (Zn), Copper (Cu), Manganese (Mn), Selenium (Se) and Magnesium (Mg) has been listed in (Table 2). The analysis indicates the amount of Calcium is about 444.26 mg/100g in the Ziziphus Spina Christi plant while in lettuce and spinach it is approximately 3.38 mg/100g and 8.802 mg/100g, respectively (Table 2; Figure 3). Similarly, the Ziziphus Spina Christi showed higher amount of P, K, Mg as well with values 171.49, 109.95, and 139.29 mg/100g, respectively. While the lowest level of minerals is recorded for spinach, valued 18.25, 6.4 and 8.7 mg/100g and Lettuce valued 31.75, 6.26, and 2.86 mg/100g, respectively.

Table 1: Proximate (%) Nutritional composition of Ziziphus Spina Christi

Nutrients	Ziziphus Spina Christi
Dry matter	75.92
Crude Protein	6.08
Crude Fat	< 0.1
Crude Fiber	16.82
Ash	4.38
Total Sugar	2.11
TDN	73.15

Table 2: Mineral concentration (mg/100g) of Ziziphus Spina Christi and some selected leafy vegetables

Minerals	Ziziphus Spina Christi	Lettuce	Spinach
Calcium	444.26	3.38	8.802
Phosphorus	171.49	31.75	18.25
Sodium	41.30	-	-
Potassium	109.95	6.26	6.405
Zinc	1.13	-	-
Copper	0.44	-	-
Manganese	1.77	-	-
Selenium	< 0.1	-	-
Magnesium	139.29	2.86	8.74

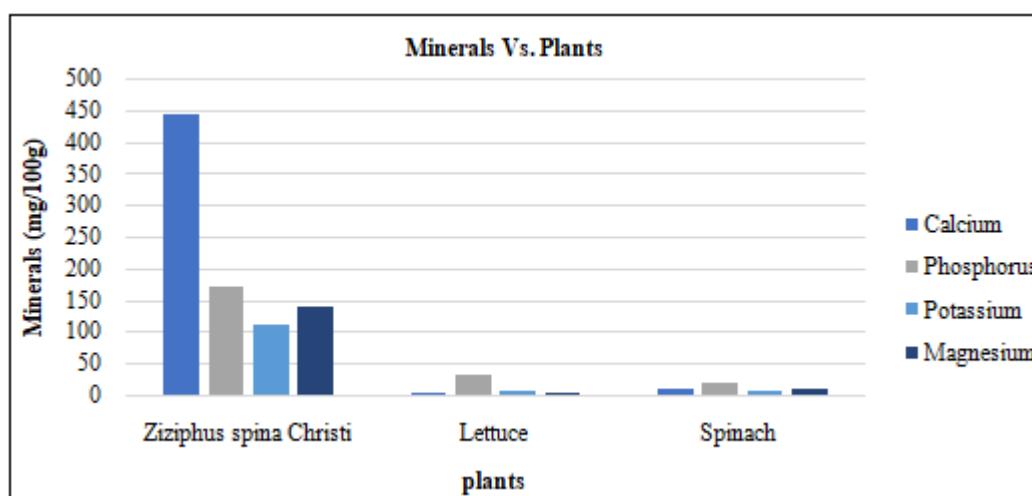


Figure 3: Mineral concentration of Ziziphus spina Christi compared with two Vegetables which are lettuce and spinach. The chart illustrates that the Ziziphus spina Christi contains higher mineral values.

4. Discussion

The results have shown that the *Ziziphus Spina Christi* is far rich in nutritional and macro-minerals than the mostly used leafy vegetables including spinach and lettuce. The comparison analysis in this study depicts an interesting fact of involvement of the environmental condition with the nutritional potential of the plants. The Nigerian *Ziziphus Spina Christi* showed different nutritional values than the plant from UAE origin with crude ash value was about 15.22%, crude fiber 6.45% and crude protein be 11.12%. (Abubakar 2021). Similarly, mineral composition of the Nigerian *Ziziphus Spina Christi* has about 256.15, 91.60, 3.37, 3.13, 5.99, 2.37, and 9.25 mg/100g of Potassium, Sodium, Calcium, Phosphorus, Magnesium, Copper, and Zinc respectively. The Results showed that the studied plant *Ziziphus Spina Christi* from UAE origin has significantly higher macro-mineral composition than the Nigerian plant. Interestingly, the minerals analysis depicts the differences in the mineral composition of leafy vegetables from different origin. For instance, the value of Calcium in spinach from UAE origin is around 8.802 mg/100g, while the Indian spinach (*basella alba*) has around 61.19 mg/100g of it (Correll et al. 1994).

5. Conclusion

The key findings emerged in our investigation are that the *Ziziphus Spina Christi* is a rich source of nutrients and had a high amount content of minerals compared to the leafy vegetables used in this study. It is an agro-economically favorable plant which can be used as high calcium, phosphorous, potassium and magnesium diet and dietary supplement. Moreover, it is extremely healthy and linked to numerous health benefits. Moreover, the *Ziziphus Spina Christi* from the origin of UAE has more nutritional and mineral values than the plants from other origin which support the importance of UAE's natural environmental condition and soil quality.

Disclaimer

None

Conflicts of interest

The authors declare that they have no conflict of interests.

Author Contribution

HAAA involved in the experimental work and drafting the manuscript. SBM carried out the design of the overall project and prepared final manuscript and FLR participated in the overall design of the project and manuscript proofread.

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