

STUDY THE EFFECT OF HYLOCEREUS POLYRHIZUS SOME ANTIOXIDANT FACTORS IN CHRONIC KIDNEY DISEASE PATIENTS

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Abstract: The current work was aimed to study the effect of Hylocereus polyrhizus some antioxidant factors in CKD patients and healthy persons. An overall total of (80) CKD patients were included in this study. The patients were between the ages of 20 and 60. Each patient's case information sheet was compiled with information on their name, age, sex, marital status, place of residence, history of chronic diseases, history of drug use, history of smoking, and type of operation. These patients were hospitalized to Kirkuk, Iraq's Kirkuk Teaching Hospital between April and July 2022. 50 healthy individuals served as the control group in this experiment. testing for a few biological elements. The analysis of the peel extract from H. polyrhizus revealed the presence of saponin, flavonoid, tannin, polyphenol, alkaloid, quinone, and terpenoid compounds. Total antioxidant capacity level in male and female were showed significant ($P \leq 0.05$) reduced in comparison to the heath group. After using dragon fruits extract, Total antioxidant capacity level were improved and there was non-significant ($P \leq 0.05$) changes in comparison to the heath group. Total oxidant status level in male and female were showed significant ($P < 0.05$) elevated in comparison to the heath group. After using dragon fruits extract, Total oxidant status level (951.8 ± 57.4) were improved and there was non-significant ($P \leq 0.05$) changes in comparison to the heath group. Based on the results of the current study, it was found that dragon fruits extract has an effective role as an antioxidant.

Keywords: chronic kidney disease, Total oxidant status, Total antioxidant capacity, Dragon fruits



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Introduction

About 10% of the population is affected by Chronic kidney disease (CKD), which is defined as albuminuria and/or a decreased GFR [1]. The prevalence is significantly higher in the elderly and in people with comorbid diabetes or cardiovascular disease (CVD) [2]. End-stage renal disease, also known as renal failure, is the final stage of the disease progression and calls for dialysis or kidney transplantation as renal replacement therapy. Even in the early stages of the disease, CKD patients are significantly more likely to have morbidity from CVD, malnutrition, inflammation, mental health issues, and other comorbidities, all of which contribute to high hospitalization rates and elevated mortality risk [3-4]. The most commonly used kidney function indicator is the GFR, which evaluates that however much primary urine is isolated from plasma via the glomeruli. This equates to approximately 180 litres per day for a regular person [5]. More over one million persons worldwide

were estimated to be getting RRT as of 2006, according to US Renal Data System, an increase of nearly 30% over the preceding five years [6]. The fruit of many various tropical climbing plants, family Cactaceae, is known as dragon fruit or pitaya. The pitaya is a tropical fruit native to North, Central, and South America, but it is now grown commercially due to its low cultivation requirements, strong tolerance for drought, ease of adaptation to high light and temperature levels, a broad variety of tolerance to various soil salinities, and benefits to people's health [7-8]. Over 20 tropical and subtropical nations, cultivate it for commercial purposes [8]. The beneficial, non-nutritive plant compounds are known as phytochemicals [9]. These are plant secondary metabolites that may have health advantages [10]. The identification of the phytochemical constituents presents in dragon fruit as well as the possible health benefits of these components have attracted more attention in recent years. From all parts of the pitaya, bioactive compounds such as polyphenols, steroids, saponins, tannins, and other active compounds and vitamins can be extracted [11-12]. so the current work was aimed to study the effect of *Hylocereus polyrhizus* some antioxidant factors (TOS and TAC) and Lactic Dehydrogenase in CKD patients and healthy persons.

Methods

Extraction of dragon fruits

5gm of powdered dragon fruit was mixed with 120 ml of each ammonium oxalate concentration (0.5, 1, and 2%) and heated at 90 °C for 1hrs., to get a pH of 4.9. The extractions were filtered through nylon fabric, and the pectin was then coagulated with absolute ethanone at a ratio of 1:1 (w/v) and refrigerated for 60 minutes. The pectin was then dried in the oven at 50 °C, filtered using filter paper referred to as No. 4, and stored in a plastic bag. Phytochemical Screening was performed on the extract to detect some of the active compounds in the plant, including: Resins, Tannins, Glycosides Test, Terpenoids, Phenolic Test, Alkaloids, Saponins, and Steroids.

Patients

An overall total of (80) CKD patients were included in this study. The patients were between the ages of 20 and 60. Each patient's case information sheet was compiled with information on their name, age, sex, marital status, place of residence, history of chronic diseases, history of drug use, history of smoking, and type of operation. These patients were hospitalized to Kirkuk, Iraq's Al-Jumhuri Hospital between April and July 2022. 50 healthy individuals served as the control group in this experiment. samples were taken from healthy adults between the ages of 20 and 60. testing several biochemical variables and dividing the results as follows:

- ❖ Group 1: contains persons who do not have any disease and are tested for biochemical parameters.
- ❖ Group 2: Individuals with CKD are included, as is an investigation of biochemical parameters.
- ❖ Group 3: includes CKD patients and an investigation of oxidative model parameters after consumption of dragon fruits.

Measurements

- ❖ **Total antioxidant status (TAS):** ELISA Kit (SUNLONG, China) assays **TAS** concentration in human serum and plasma using Sandwich-ELISA.
- ❖ **Total oxidant status (TOS):** TOS ELISA Kit (SUNLONG, China) assays **TOS** concentration in human serum and plasma using Sandwich-ELISA.

Statistical analysis

Version 18 of the SPSS application (Statistical Package for Social Science) was used to code

and enter the data onto a computer for statistical analysis. Every data point was organized based on frequency, and the Chi-square test was used to examine correlations between variables. A p-value of less than 0.05 was deemed significant.

Results and Discussion

Phytochemical screening of *H. polyrhizus*

Table 4.1 shows that *H. polyrhizus* peel aqueous extracts contents different compounds as antioxidant compounds.

Table 4.1. Phytochemistry of *H. polyrhizus* peel extract

Chemical Substance	Result
Flavonoids	+
Steroids	-
Saponins	+
Polyphenol	+
Alkaloids	+
Terpenoids	+
Tannins	+
Quinone	+

Determination of Antioxidant Activity

The evaluation of dragon fruit's antioxidant activity is crucial because it provides a benchmark for the fruit's quality and antioxidant content when it comes to use as a herbal medication for health. Because the DPPH method uses the free radical 2,2-Diphenyl-1-picrylhydrazyl to evaluate antioxidant capacity, it is quick, easy, and reasonably priced (DPPH). The ability of compounds to behave as hydrogen donors, in addition to the antioxidant activity of food, are routinely tested using the DPPH method. It has recently been used to assess antioxidants in complex biological systems. The DPPH method works with both solid and liquid samples and analyzes the sample's overall antioxidant capacity rather than concentrating on any one specific antioxidant component. The red dragon fruit peel kept its promise to halt the spread of melanoma cells.

Kidney functions

Creatinine levels

The results of the current investigation showed notable variations between the groups examined. In contrast, when compared to the control group (0.73 ± 0.38), males' creatinine levels (9.47 ± 1.42) considerably rose ($P < 0.05$). Additionally, as indicated in the table (2), females' creatinine levels (6.28 ± 1.75) significantly increased ($P < 0.05$) in comparison to the control group ().

Table (2): Creatinine level in studied groups

Parameter \ Gender	Control	Patients	
		Male	Female
S. creatinine	0.73 ± 0.38	$9.47 \pm 1.42^*$	$6.28 \pm 1.75^*$

P-Value	0.006*
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Urea levels

The current study's findings revealed significant differences between the groups studied. In contrast, male urea levels (189.2 ± 35.42) increased significantly ($P < 0.05$) when compared to the control group (29.03 ± 4.48). In addition, urea levels in females (142.27 ± 42.11) increased significantly ($P < 0.05$) when compared to the control group, as shown in the table (3).

Table (3): Urea level in studied groups

Parameter \ Gender	Control	Patients	
		Male	Female
S. urea	29.03 ± 4.48	$189.2 \pm 35.42^*$	142.27 ± 42.11^b
P-Value	0.028*		

The kidneys are known to be stressed by leafy greens and meat, which raises serum urea and serum creatinine [13]. Additionally, it was found that middle-aged men are more prone to CKD. Investigating the molecular cause of this interaction is necessary to come up with a workable solution [14]. Chronic renal failure causes the glomerular filtration rate (GFR) to gradually decline, which leads to an accumulation of urea, creatinine, and other substances in the blood. The report's findings showed that men were more affected than women and that the sick population had significantly higher levels of creatinine than the control group. This result is in line with that of Al-Rawi et al. [15], who found that the average blood creatinine concentration of the control group was 0.88 mg/dl, whereas those with chronic renal disease had much higher values (7.643 mg/dl). The high levels of creatinine found in the serum of patients with chronic renal illness may be explained by the fact that creatinine is one of the metabolic waste products that is regularly eliminated by diuresis. There is an inverse relationship between the rate of glomerular filtration and the level of creatinine in blood serum; a slight decrease in the rate of glomerular filtration results in an increase in the level of creatinine in the [2].

Antioxidant factors

Total antioxidant capacity (TAC)

The current study's findings revealed significant differences between the groups studied. TAC levels in males (589.9 ± 108.3) were significantly ($P < 0.05$) lower than in the control group (1094.7 ± 83.5). TAC levels in females (731.6 ± 78.1) were also significantly lower ($P < 0.05$) than in the control group. TAC level (971.8 ± 57.4) improved after using dragon fruits extract, and there were non-significant ($P < 0.05$) changes compared to the control group, as shown in the table (4).

Table (4): TAC level in studied groups

Parameter \ Gender	Control	Patients		Treated group
		Male	Female	
TAC (umol/l)	1094.7 ± 83.5	$589.9 \pm 108.3^*$	$731.6 \pm 78.1^*$	971.8 ± 57.4
P-Value	0.031			

Total oxidant status (TOS)

The current study's findings revealed significant differences between the groups studied. In contrast,

male TOS levels (6.81 ± 1.37) increased significantly ($P0.05$) when compared to the control group (1.37 ± 0.42). In addition, the TOS level in females (6.15 ± 1.52) increased significantly ($P0.05$) when compared to the control group. TOS levels (2.17 ± 0.83) improved after using dragon fruit extract, and there were non-significant ($P0.05$) changes compared to the control group, as shown in the table (5).

Table (5): TOS level in studied groups

Parameter \ Gender	Control	Patients		Treated group
		Male	Female	
TOS (umol/l)	1.37 ± 0.42	$6.81 \pm 1.37^*$	$6.15 \pm 1.52^*$	2.17 ± 0.83
P-Value	0.028			

The condition of oxidative stress in the disease of renal failure has been examined in a number of research. In the current study, it was discovered that the total oxidative stress status in the sera of RF patients is significantly elevated. The significant increase in TOS levels in the sera of CRF patients when compared to ARF patients highlights the critical part renal impairment plays in the oxidative stress development. The findings corroborated those of Himmelfarb et al. [16] who found that patients with ARF had a considerable rise in plasma protein-thiol oxidation, a symptom of oxidative stress. In another study, Ushanthika et al. found that patients with CRF had significantly higher plasma levels of malondialdehyde (MDA), which is an end product of lipid peroxidation caused by ROS. They also noted significantly lower levels of SOD activity, which led to the prolonged effects of ROS and lower antioxidant capacity, which led to the development of oxidative stress [17]. ROS affects body cells, especially inflammatory ones, which are common in both acute and CKD [18]. Pro- and anti-inflammatory cytokine gene polymorphisms may have a major impact on the control of host inflammatory responses and may also raise morbidity and mortality in ARF patients [19]. Ascorbic acid and tocopherol, which function as free radical scavengers and ROS, as well as other phenolic, flavonoid, and vitamin compounds, are said to play a protective role that was observed in these groups. These compounds work to inhibit oxidative damage and prevent fat peroxidation [20-21]. Because of their bioactive ingredients, which include fatty acids, amino acids, polyphenols, flavonoids, carotenoids, beta-cyanine, and betalanine, extracts are thought to have antioxidant action. These materials have the ability to provide free radicals a hydrogen atom, halting their harmful effects on tissue. Lipid peroxidation is so inhibited, oxidative damage to cell membranes is prevented, and the mechanism for repairing cell damage is reinforced. (Liaotrakoon concurred in reference [22]).

Conclusion

Based on the results of the current study, it was found that dragon fruits extract has an effective role as an antioxidant, as it appears effective in increasing the total antioxidant capacity in patients with chronic kidney disease.

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