



Contents lists available at ScienceDirect

Materials Today: Proceedings

journal homepage: www.elsevier.com/locate/matpr

Addressing environmental and parasitic contamination problem of the water and sediments of the euphrates river by granular activated date (GAD) seeds and studying some physical and chemical properties in Al-Najaf governorate

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ARTICLE INFO

Article history:
Available online xxxx

Keywords:
Addressing environmental
Parasitic contamination
Physical and chemical
Activated date (GAD)
Chemical properties

ABSTRACT

In order to know the efficiency of sterilization in eliminating parasites and its suitability for environment measurements, samples of the water and sediments was taken from six stations the Euphrates River. The samples were transported in clean and sterile bottles to the laboratory. A sedimentation method was used for parasites. Ten species of parasites isolated from water of the six stations while isolated seven were exists in the sediments of these stations. The water and sediments of the station first were contaminated with parasites rate 25.8% and 13.7%, the water and sediments of the second station are contaminated with parasites rate 12.8% and 20.2%, the water and sediments of the third station are contaminated with parasites rate 4.2% and 18.2%, the water and sediments of the fourth station are contaminated with parasites rate 22.8% and 18%, the water and sediments of the fifth station are contaminated with parasites rate 12.0% and 5.4% and the water and sediments of the sixth station are contaminated with parasites rate 12.9% and 1.7%. *Giardia lamblia* rate 25.4% it is most found in water while *Trichomonas hominis* rate 18.4% It is most found in sediments. A result of the study shows significant difference between of the temperature of air and water in all study stations, the air temperature ranged (40.10–15.2°C) and the water temperature between (26.3–9.4°C) while PH was (9.89–7.5), recorded electrical conductivity (5745–2515 $\mu\text{s}/\text{cm}$) and salinity was (4.80–1.56 g/cm) the river's water was of low salinity also dissolved oxygen was (12.9–6.2 mg/L).

Date seed used as granular by activated carbon used for purification and remove parasite from water filter and waste water treatment.

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1. Introduction

Water plays a part in the transmission and propagation of many pathogens, as it carries various microorganisms such as bacteria, parasites, and viruses. These causes reach the water through human and animal excrement that pollute them and are the most common method of transmitting diseases to humans [1]. Parasitic

diseases zoonotic are transited to humans by ingest environment firm trans missive cysts, oocysts, egg, and larva stages there is a direct connection between the spread of parasitic injury and water sterilization [2]. It was ensured that the *Giardia lamblia*, *Entamoeba histolytica* and *Cryptosporidium* not crusher by red tape doses of sterile materials in drink water [3]. According to the [4] accounts for diarrheal disease was estimate 4.1% of the full daily global charged the disease was rating 88% of onus had due to unsafe water outfit, cleansing and hygienic and are essentially in the children. Figs. 1–4

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<https://doi.org/10.1016/j.matpr.2021.07.345>

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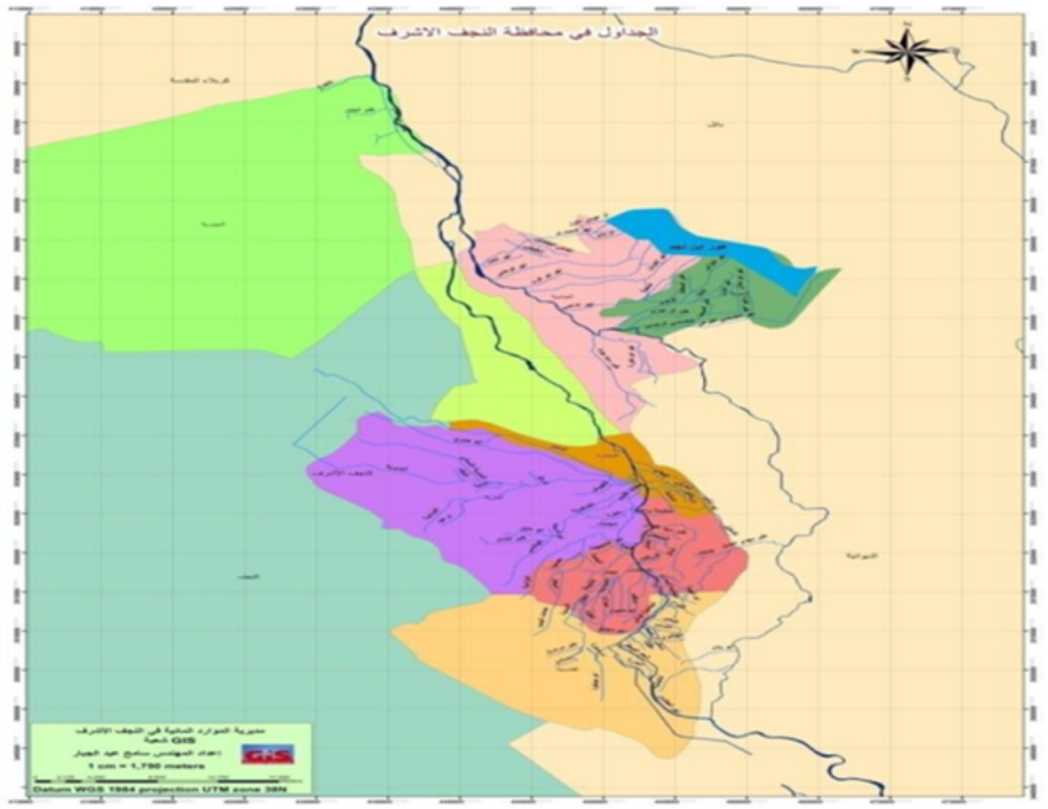


Fig 1. Map of Study Area.

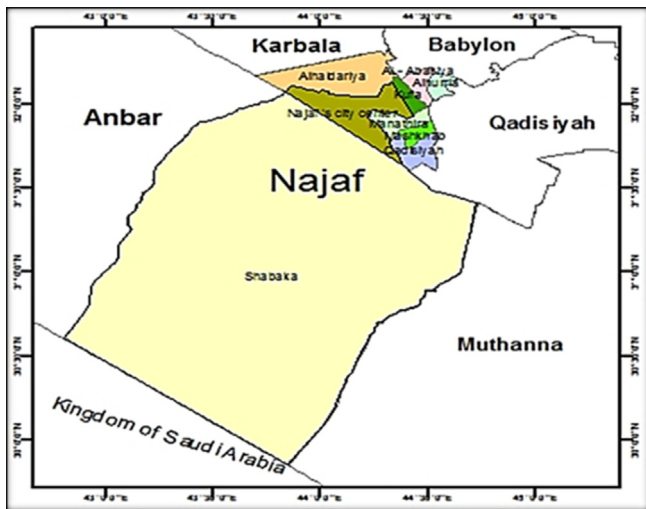


Fig.2. Study sites in Al-Najaf Governorate.



Fig.3. Experimental device for preparing activated carbon.



Fig.4. Carbon resulting from the activation of date seeds.

Physical and chemical characters have a major role of the effect on parasites, where temperature have a part in the chemical reactions of the waterish environment through its effect on metabolism and their ability to compete [5]. These characteristics are also used as a criterion for evaluating the quality of water and thus determining its suitability for different uses. It is found that temperatures affect the water components through their effect on taste, smell, and dissolution of gases [6]. Conductivity is an important factor because it gives signal of the concentration of resolved salts in raw water and wastewater. In a study of the waters of the Kufa river, it indicated that the drainage of sewage had a clear

effect in raising the value of electrical conductivity and indicates the high values of electrical conductivity to the increase in the number of dissolved salts that affect the quality and taste of the

water [7]. The pH is one of the factors affecting parasites because most of the metabolic activities depend on the pH, and the solubility of the elements in the water depends on the low pH and in the pH is increased, carbonates and then oxides are formed, which can settle at the bottom as an insoluble sediment [8]. Dissolved oxygen is most paramount measurements used to evaluate water goodness, as it thought the physical and biological operation supporting in water [9]. As in study that bahr al-najaf is one of the most interesting environments plays an active role in the growth of al-najaf city, since it was an easy water route to become the most agricultural territory contain heavy metal whatever metallic factors that has a relatively high density and toxicity [10]. Due to the lack of interest in water and its pollution with industrial and household pollutants, and the use of river water directly for drinking, therefore, the current study followed activated carbon technique, the activated carbon of date seeds is used as a filter intermediate for automotive haggard gases and as adsorbent for toxic inorganic and organic compounds [11]. The date palm or *Phoenix dactylifera* L. is belong of family the Arecaceae, the regional distribution about 60 million Date trees exists in Iraq, Bahrain, Oman, Saudi Arabia, Pakistan and Yemen [12]. Carbon absorption has many applications in removed contamination like colored water flow and in industrial operations as shed cleans ground water treatment and drink water purification. Also, an application area was restricting due to its rise cost [13]. Converting residues from agricultural through products to activated carbon will addition economic amount help decrease cost and waste elimination and very importantly supply a cheap alternative to present trade activated carbon [14].

This study aims to find out the efficiency of sterilization in eliminating parasites and its suitability for environmental measurements by treating date seeds as a filling material in activated carbon filters to adsorb parasites and get rid of unwanted properties [46–50].

2. Materials and methods

2.1. Study region

Euphrates river branches in Alkifl sub-district of Babel governorate into two branches: the Abbasia river and the Kufa River, and continues in the Abbasia, Hurriya and Levantine sub-districts until the euphrates river connects in the shanafiyah district to feed the agricultural and residential areas [15]. The water is major sluiceway for these parasites and contamination water is substantial exporter of human infection may by direct consumption or the contaminate water [16].

This study conducted in six stations of euphrates river flowed in Al-Najaf governorate were include:

- 1-Al-Manadira river station. (ST.1)
- 2-Al-Heera river station. (ST.2)
- 3-Bahr Al-Najaf. (ST.3)
- 4-Al-Kufa river station. (ST.4)
- 5-Al-Qadisiah river station. (ST.5)
- 6-Al-Abbassai river station. (ST.6)

2.2. Sample collection

The collected of samples from this station through during from January 2019 to September 2020. Water samples were collected for parasitic and environmental tests in clean 500 ml glass bottles with a sterilizable stopper, then the bottles were sealed and encased in the middle from the outside with aluminum foil and then sterilized with an autoclave at 121°C was temperature and 15 lb/inch² for 15 min was pressure, after collecting the samples, they were transferred to the laboratory within 2–3 h for the neces-

sary tests. The bottom sediment samples were also collected using grab sample vanvee from the middle of the river and kept in marked nylon bags in a sterile box [17].

2.3. Parasitic assay

Water samples were placed in test tubes and centrifuged several times with the physiological solution in the centrifuge device and then a drop was taken from sediment and examined by a microscope during observations, living and parasite eggs identified.

Each sample of sediment samples was placed in marked tubes with the name of the station from which the sediment was taken and dissolved with a quantity of distilled water, then filter from a gauze pad to expel large particles and debris, filtrate was taken and parasites were isolated from it using the sedimentation concentration technique [18].

2.4. Environmental assay

2.4.1. Physical and chemical measurements

were determined immediately according to [19]

1 Temperature: The air temperature was measured by mercuric thermometer which was divided (0–100) °C. The water temperatures were measure directly in the area by digimeter [51–53].

2 Hydrogen Ion Concentration (PH): measured with a pH meter (digital pH 21) and conductivity measured with Portable Conductivity Meter Bischofi 17 unity by (μS/cm) after standardizing with KCL and NaCl solutions.

3 Electrical Conductivity and Salinity: measured by E.C-meter Making a company HANA, the salinity value was measured depending on the following equation: % Salinity = E.C * 640 * 10⁻⁶

4 Dissolved Oxygen: measured depending on azide modification of Winkler method, total hardness by EDTA titration used erichrome black (T) indicator.

2.5. Preparing activated carbon from *Phoenix dactylifera* (Date seeds)

Dates seeds were used in this study as they are adsorbent and were placed in the microwave to reduce the processing time to reach an active adsorbent:

- 1-Samples were washed to get rid of the dirt and dust that may be stuck in the seeds and heated to a temperature of 70°C
- 2-Heated samples are sieved with a metering sieve 1–2 mm.
- 3-Samples are burned at a temperature of 700°C with pure nitrogen gas in a tube,
- 4-Saturate the samples with KOH at a ratio 1:1,75
- 5- The samples saturated with KOH fillers were placed in a tube and placed in the microwave 600w for 8 min
- 6- Then the sample is washed with deionized water and hydrochloric acid to become PH from 6 to 7.

An electron microscope scan of the structural structure of the studied sample was performed before and after activation, The samples were tested to adsorb methylene blue [53–56], where its adsorption efficiency was reached 316.11 mg/g and it reached the surface area 856.23 m²/g while the porosity were 0.4680 cm³/g [20].

7-The carbonization and activation of sieving Date seed will be executed at the same time. Activation will pick through activated agent H3PO4. 30 g of shrieved Date Seed will mix with H3PO4 60% at an inoculation proportion the 100% H3PO4 gram of arid precursor [21].

2.6. Used activated carbon resulting from date seeds (GAD) in water treatment

The GAD filter contained from pieces of glass wool crowded with 200gm of the granular activated carbon. Filtrate have slot from the top where checking valve is integrated also open from the lower mesh screen about 1.5 cm/diameter let to water for passed through it while retain the GAD. Lengths filter 21 cm and 4.8 cm/diameter.

Bituminous carbon amount 14/50 is coal based and carbon bead size used in the filter between 0.6 and 2 mm and densities between 0.48 and 0.52 g/mL depending on manufacturer, placed carbon grains in oven at heated in the obscurity of air when of 1000°C temperature. Oxidizing gases is push through the heated carbon created small splits inward carbon grain. Known this process as activation and increase the surface area for the carbon which used in the water filter to 1000 m²/g. The causing behind activating carbon to effective surface area is increase molecules on adsorption, where results in greater filtration takeout the parasite. As in Fig. 5

The profit these extra areas, molecules to become small sufficient to get of the pore space; to pore radius of the activated carbon were 2.5–5.0×10⁻⁹ m. This length tally was 3 instruction of size smaller than the parasite 5×10⁻⁶ m. Physically prevent the pores enter of the cysts. As in Fig. 6

2.7. Statistical analysis

T-test (t) and analysis of variance (ANOVA) used to determine statistically significant difference between evaluated filter media configurations [22].

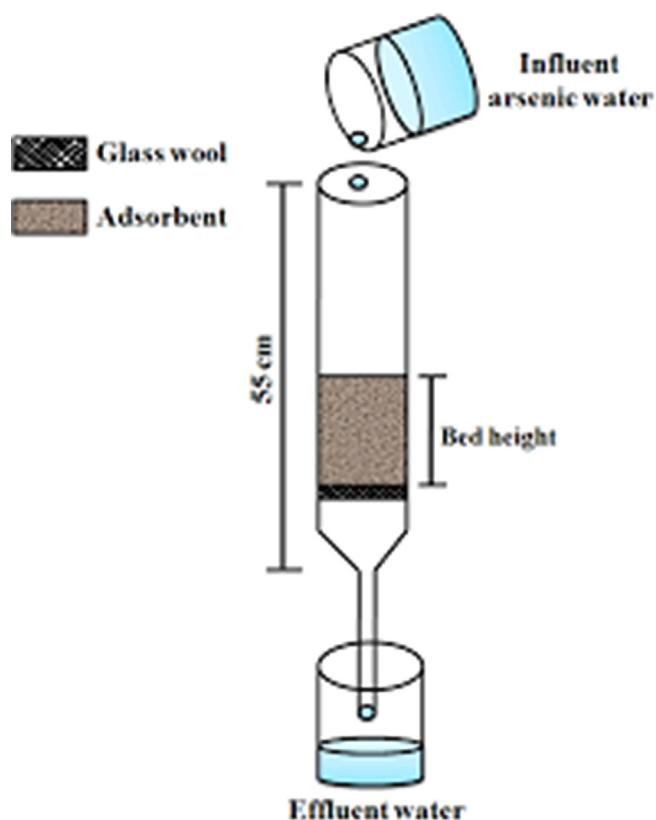


Fig.5. GAD technique for water treatment.

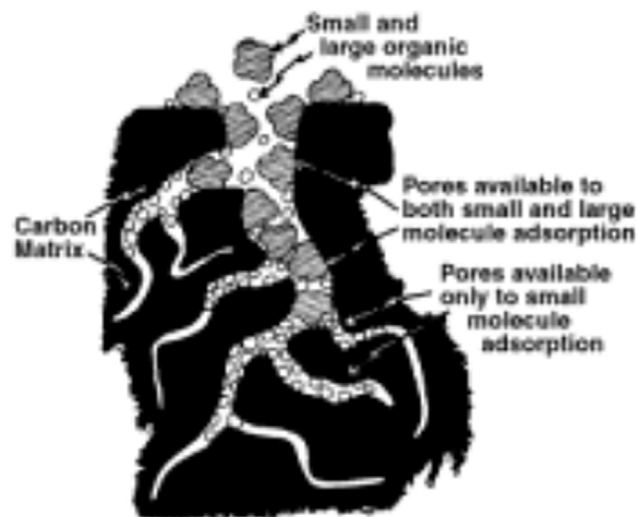


Fig 6. Diagram of Activated Carbon Pore Space.

3. Results

The current study shown that the water of the first station was polluted 25.8% , water of the second station was 12.8%, Water of the third station was 4.2%, Fourth station water was 22.8%, Water of the fifth station was 12.0% and Water of the sixth station was 12.9% also ten parasite species have been isolated occupied in it *Giardia lamblia* rate 25.4% followed by a parasite *Cryptosporidium* spp. then followed *Enterobius vermicularis* 9.0%, *Balantidium coli* 7.8%, *Trichomonas hominis* 7.2% *Entamoeba histolytica* 6.8%, *Echinococcus granulosus* 6.4%, *Taenia* spp. 5.8% and *Trichuris trichiura* was 5.7%, This study showed a significant difference all the six stations when ($P < 0.05$). As in Table1 and Fig. 7.

The sediment of the first station was contaminated with parasites 13.7%, sediment of the second station 20.2%, Third station sediment 18.2%, Fourth station sediment 18%, Fifth station deposits sediment 5.4% and Sixth station sediment was 1.7%. Seven species of parasites were isolated *Trichomonas hominis* rate 18.4% followed by a parasite *Cryptosporidium* spp. 15%, *Trichuris trichiura* 12.6%, *Giardia lamblia* 8.8%, *Enterobius vermicularis* 8.2%, *Echinococcus granulosus* 7.3% and *Taenia* spp. was 6.9%. This study showed a significant difference all the six stations when ($P < 0.05$). As in Table2 and Fig. 8.

Some environmental characteristics were measured, such as the temperature of water and air, where the average air temperature was lowest 15.2°C in winter in the first station and the highest rate 40.10°C in the summer in the sixth station while the lowest average water temperature 9.4°C In the winter in the third station and the highest rate 26.3°C in the summer in the fifth station, record the lowest rate to PH

7.5 in the summer in the sixth station and the highest rate 9.89 In the winter in the sixth station, as the current study also showed the lowest rate of electrical conductivity 2515 $\mu\text{s}/\text{cm}$ in the summer in the sixth station and the highest rate 5745 $\mu\text{s}/\text{cm}$ in the winter in the second station while the lowest average of Salinity was 1.56 g/cm in the summer in the fourth station and the highest rate 4.80 g/cm in the winter in the third station, the lowest rate of dissolved oxygen 6.2 mg/L in the summer in the fifth station and the highest rate 12.9 mg/L in the spring in the first station.

The results of the statistical analysis shows there significant differences in the values of air temperature between all seasons, The statistical analysis of the water temperature showed significant differences in all seasons except for summer compared with spring and autumn seasons, No significant pH differences were recorded

Table 1
Distribution of parasite prevalence rates in the water of the six stations.

Parasite	ST.1	ST.2	ST.3	ST.4	ST.5	ST.6	The total percentage of each parasite
<i>Giardia lamblia</i>	3 (60%)	1 (18.4%)	1 (15.3%)	2 (25.8%)	1 (17.4%)	1 (15.5%)	9 (25.4%)
<i>Entamoeba histolytica</i>	0 (0.0%)	1 (15.4%)	0 (0.0%)	1 (13.3%)	0 (0.0%)	1 (12.5%)	3 (6.8%)
<i>Balantidium coli</i>	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (13.3%)	1 (18.5%)	1 (15.3%)	3 (7.8%)
<i>Trichomonas hominis</i>	1 (15.3%)	0 (0.0%)	0 (0.0%)	1 (15.8%)	0 (0.0%)	1 (12.2%)	3 (7.2%)
<i>Entamoeba coli</i>	0 (0.0%)	1 (15.3%)	1 (10.2%)	1 (12.5%)	0 (0.0%)	0 (0.0%)	3 (6.3%)
<i>Taenia spp.</i>	1 (20%)	0 (0.0%)	0 (0.0%)	1 (15.3%)	0 (0.0%)	0 (0.0%)	2 (5.8%)
<i>Cryptosporidium spp.</i>	2 (40%)	0 (0.0%)	0 (0.0%)	1 (20.3%)	1 (15.4%)	1 (10.5%)	5 (14.3%)
<i>Echinococcus granulosus</i>	0 (0.0%)	1 (15.4%)	0 (0.0%)	1 (12.5%)	0 (0.0%)	1 (10.5%)	3 (6.4%)
<i>Enterobius vermicularis</i>	1 (20%)	0 (0.0%)	0 (0.0%)	1 (12.5%)	1 (10.5%)	1 (11.4%)	4 (9.0%)
<i>Trichuris trichiura</i>	0 (0.0%)	1 (12.5%)	0 (0.0%)	1 (11.4%)	1 (10.5%)	0 (0.0%)	3 (5.7%)
Total	8 (25.8%)	5 (12.8%)	2 (4.2%)	11 (22.8%)	5 (12.0%)	7 (12.9%)	38

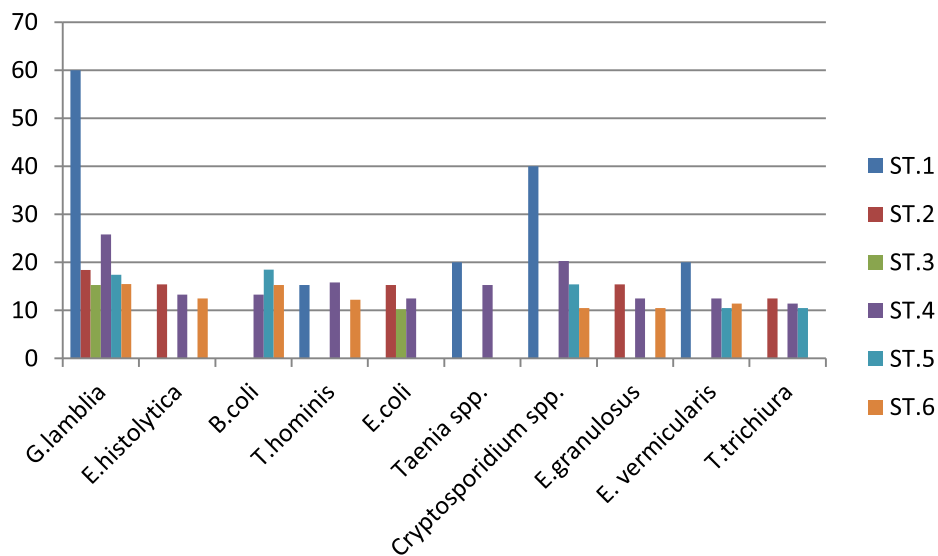


Fig.7. Scheme shows the percentage of water contamination with parasites.

Table 2.
Distribution of parasite prevalence rates in the sediments of the six stations.

Parasite	ST.1	ST.2	ST.3	ST.4	ST.5	ST.6	The total percentage of each parasite
<i>Giardia lamblia</i>	1 (30%)	0 (0.0%)	0 (0.0%)	1 (12.5%)	1 (10.5%)	0 (0.0%)	3 (8.8%)
<i>Trichomonas hominis</i>	0 (0.0%)	0 (0.0%)	1 (99%)	1 (11.4%)	0 (0.0%)	0 (0.0%)	2 (18.4%)
<i>Taenia spp.</i>	1 (20%)	0 (0.0%)	0 (0.0%)	1 (11.4%)	0 (0.0%)	1 (10.5%)	3 (6.9%)
<i>Echinococcus granulosus</i>	0 (0.0%)	1 (20%)	0 (0.0%)	1 (12.5%)	1 (11.4%)	0 (0.0%)	3 (7.3%)
<i>Enterobius vermicularis</i>	1 (12.5%)	1 (11.4%)	1 (10.5%)	1 (15.3%)	0 (0.0%)	0 (0.0%)	4 (8.2%)
<i>Trichuris trichiura</i>	0 (0.0%)	1 (50%)	0 (0.0%)	1 (15.4%)	1 (10.5%)	0 (0.0%)	3 (12.6%)
<i>Cryptosporidium spp.</i>	1 (20%)	2 (40%)	0 (0.0%)	1 (30%)	0 (0.0%)	0 (0.0%)	4 (15%)
Total	4 (13.7%)	5 (20.2%)	2 (18.2%)	7 (18%)	3 (5.4%)	1 (1.7%)	22

in all seasons except for summer compared with winter and autumn, Significant differences in electrical conductivity were not recorded in all seasons except for winter compared to summer, No significant differences were recorded for salinity in all seasons except for summer compared to winter, The statistical analysis recorded significant differences of dissolved oxygen in all seasons except for spring compared with autumn, as well as significant differences for dissolved oxygen between all study stations at ($P < 0.05$).As in Table3.

The current study showed that carbon resulting from the granular activation of date seeds (GAD) filter in water treatment of parasite were more effective for outflowing samples to cysts, egg and oocysts, pre-treatment of *Entamoeba histolytica* (Cyst) was 14.65% while post-treatment 1.04%, *Enterobius vermicularis* (Egg) was 12.34 %while post-treatment 0.70%, *Giardia lamblia* (Cyst) was 50.81% while post-treatment 0.36%, *Entamoeba coli* (Cyst) was 71.6%while post-treatment 3.1%, *Cryptosporidium spp* (oocyst)

pre-treatment was 59.9 6% while post-treatment 1.0%, *Ascaris lumbricoides* (Egg) was 20.4% while post-treatment 0.3%, *Trichuris trichiura* (Egg) was 65.2% while post-treatment 1.1%, *Balantidium coli* (Cyst) was 25.5% while post-treatment 0.03%, *Taenia spp* (Egg) pre-treatment was 13.6% while post-treatment 0.2%, *Ancylostoma duodenale* (Egg) was 76.0% while post-treatment 0.1% and *Fasciola hepatica* (Egg) was 22.7% while post-treatment by (GAD) filter become 1.02%, in this study showed presence significant differences and low levels of cyst, egg and oocyst in treated water. As in Table 4 and Fig. 9

4. Discussion

In the current study, many species of parasites were isolated in the water and sediments of the six stations, which corresponds to [23] where there was found a relationship between of the spread to

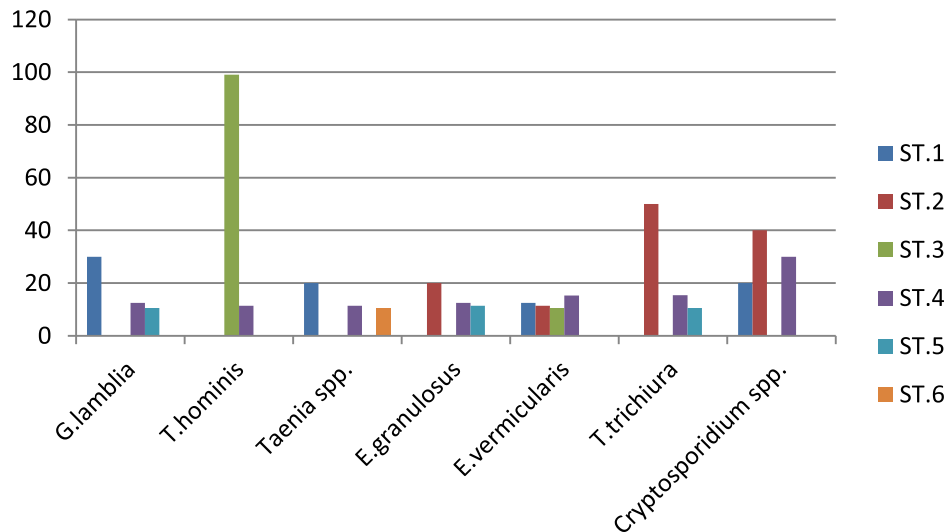


Fig 8. Scheme shows the percentage of sediments contamination with parasites.

Table 3
Seasonal averages of some physical and chemical properties of the study stations.

Do(mg/L)	Sal (g/cm)	Ec(μ s/cm)	PH	W.t($^{\circ}$ C)	A.t($^{\circ}$ C)	Stations (ST)	Season
10.7	3.12	5475	8.54	9.8	15.2	ST.1	Winter
9.5	4.22	5745	8.30	9.9	15.4	ST.2	
11.2	4.80	5830	8.44	9.4	15.8	ST.3	
11.6	4.50	5653	9.51	10.3	16.1	ST.4	
11.9	3.74	5430	9.76	11.1	16.3	ST.5	
12.2	3.60	5100	9.89	11.6	16.7	ST.6	
12.9	2.82	3612	8.60	12.2	20.2	ST.1	Spring
11.8	2.23	3623	9.1	13.5	20.86	ST.2	
11.2	1.89	4511	8.70	14.5	20.98	ST.3	
10.9	1.75	5230	8.66	16.4	21.54	ST.4	
9.5	1.65	5423	8.44	17.6	32.40	ST.5	
9.8	2.88	5855	7.54	18.8	35.30	ST.6	
8.7	2.45	4634	7.50	20.5	35.45	ST.1	Summer
8.1	2.12	4212	7.44	23.6	36.30	ST.2	
7.8	1.99	3500	7.23	24.3	38.15	ST.3	
6.6	1.56	3267	7.12	25.5	38.40	ST.4	
6.2	1.70	2543	7.9	26.3	39.14	ST.5	
7.3	1.85	2515	7.5	22.8	40.10	ST.6	
9.6	1.95	3054	8.67	20.2	28.12	ST.1	Autumn
8.7	2.34	3120	8.54	19.3	27.32	ST.2	
7.5	2.56	3245	8.50	19	26.13	ST.3	
6.8	2.78	3540	8.41	18.6	25.11	ST.4	
6.5	3.11	3624	8.22	18.3	24.14	ST.5	
7.3	3.24	4534	8.20	18	24	ST.6	

Table 4
Relationship between treatment by Activated carbon resulting from (GAD) filter and detection of parasite species of the study stations during 24 h.

Post-treatment%	Pre-treatment%	Stage	Parasite species
1.04	14.65	Cyst	<i>Entamoeba histolytica</i>
0.70	12.34	Egg	<i>Enterobius vermicularis</i>
0.36	50.81	Cyst	<i>Giardia lamblia</i>
3.1	71.6	Cyst	<i>Entamoeba coli</i>
1.0	59.9	Oocyst	<i>Cryptosporidium spp</i>
0.3	20.4	Egg	<i>Ascaris lumbricoides</i>
1.1	65.2	Egg	<i>Trichuris trichiura</i>
0.03	25.5	Cyst	<i>Balantidium coli</i>
0.2	13.6	Egg	<i>Taenia spp</i>
0.1	76.0	Egg	<i>Ancylostoma duodenale</i>
1.02	22.7	Egg	<i>Fasiola hepatica</i>

some parasitic diseases and water contaminated with parasites in kufa river water Al-najaf province, the presence of these species in water and sediments is evidence of the accumulation of waste, dead animals, and sewage water without treatment. It was noted in this study that *Giardia lamblia* have significant increased from the rest of the parasites [24] in colombia, giardiasis was the highest prevalence among people dependent on drinking water from deep wells. This is since the chlorine is irregular and the lack of filtration increases the resistance of the cysts of that parasite [25]. *Cryptosporidium spp* appeared in the sediments at a rate of 15%, and these agree with [26] attributed to the fact that the oocyst of this parasite possesses high resistance to environmental changes [27]. The presence of significant differences between the sediments of the stations is since the sediment water is heavier and the transporter is slower than the water such as in al-najaf about 45% of the citizens of the kufa city were connected to connection send they waste for plant treatment while <2% of the people utmost of al-najaf governorate have waste processing [28].

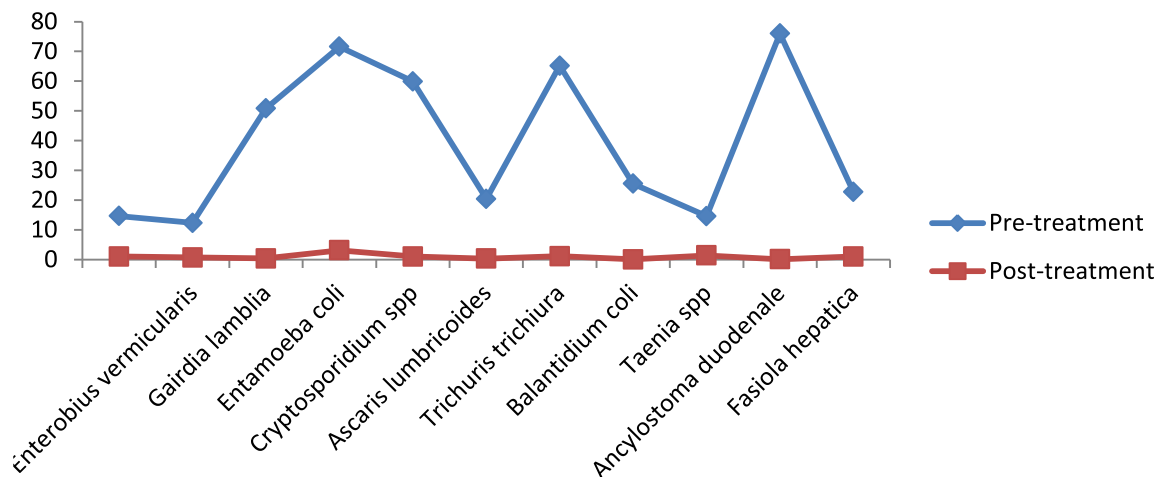


Fig 9. Treatment of water by Activated carbon of Date seeds (GAD) filter.

It has also been noted of this result of the present study that there are seasonal changes in the rates of air and water temperatures. The main reason for this may be the difference in the intensity of the sun's brightness and the length of the daily shining period, Where the highest rates of temperature is recorded in the summer and lower in the winter (40.10–15.2°C) as for the water temperature between (26.3–9.4°C) As the surface water temperature tends to follow changes in air temperature more often and it may be attributed to shallower water and an increase in the water surface area compared to the volume [39]. Slight local changes in the temperature of air and water were recorded between the stations and the reason may be due to the variation in the time of collection of samples because the temperature is affected by the velocity of the flow that works on the good mixing of water and thus homogeneity of the temperature from the bottom to the surface and this corresponds to [30].

As for the pH, its value is the result of many chemical and biological reactions that take place in the water, and it is one of the factors affecting the presence of the parasite in the water [31].

The pH value depends on the activity of micro-organisms and algae, as the algae consume carbon dioxide for the purpose of photosynthesis, so the pH value increases in the day, and the microorganisms analyzed and the rest of the organisms consume oxygen and release carbon dioxide in the process of respiration, the pH value decreases [32]. The pH value in the current study ranged between (9.89–7.5), it was showed through the results of this study Table 3 that all the studied water samples were of a basic nature, which is a general characteristic of water in Iraq [33].

The oxygen content of natural water is an important factor in the distribution and growth of parasites, as the dissolved oxygen values are affected by several factors, including temperature, abundance of aquatic plants, wind speed, and the amount of organic matter, Also results of this current study shown an increase in values of the dissolved oxygen during the spring, and this is due to the lower temperatures that are backward proportional to the dissolution of gases in the water, as well as the lack of decomposition of organic matter [34]. As for the decrease in dissolved oxygen values during the summer, it may be due to the increase in temperature, which increases the level of decomposition of organic matter due to the increase in parasite activity and thus the consumption of dissolved oxygen [35]. Salinity is one of the important environmental factors that determine the presence and distribution of parasites, and that the increase and decrease in salinity affects physiological actions, regardless of the extent of their pollutant effect [36]. It was noted in the current study that the high salinity

during the winter, as the amount of salts and substances dissolved in the water increased, which may be due to the washing of saline soil that occurs in the winter, or it may be due to the decrease in the water level due to the lack of rain and the lack of drainage rates, and this is consistent with what was reached [37]. It was noticed that the decrease in salinity during the summer of the study stations may be due to the high water grade and increase in their discharge rates due to the increase in water releases during this season after the levels were low and the rates of discharge were low in the fall and winter this study agrees with [38].

Activated carbon is one of the most important industrial carbonates and has been known for thousands of years to purify water used for medicinal purposes, The porous carbon consists of hexagonal rings of carbon that are irregular and inconsistent, especially at the edges, and this composition adds some quality of the activated carbon, including of the distribution the activated carbon rings leading to the presence of holes and gaps of a variety of size that help to adsorb the pollutants [39]. However, the cost of activated carbon and its loss during the regeneration process began to search for less expensive local alternatives, as the use of agricultural waste was distinguished for adsorption of parasites and other microorganisms [40]. These study research of the ability of the GAD water purification in removed parasite species where this method has proven its ability to filter eggs, cyst and oocyst post-treatment through pore size of the filter, *Ancylostoma duodenale* eggs found the highest rate pre-treatment was 76.0 level decreases to 0.1 this study agrees with [41] *Giardia* and *Cryptosporidium spp* treatment analysis of order exist that granular activated carbon (GAC) and fast sand filter extra effective to outflowing samples for cysts and oocysts. As their worms were common parasites transfer by the water to humans for example *Trichuris trichiura*, *Fasciola spp*, *Ascaris lumbricoides* and *Tenia spp* these parasite helps on environment contamination that untreated with antiparasitic drugs [42]. Also, other study by [43] GAC act to sediments filter with smaller pore interval to enclose protozoa cysts and oocyst may remove.

5. Conclusion

In current study showed efficiency of sterilization in eliminating parasites and its suitability on environmental measurements, water and sediment samples were gather from six stations, ten species of parasites isolated from the water of the six stations while seven species were found in the sediments of those stations,

in environmental study been through it physical and chemical measurements find that there are seasonal changes in the rates of air and water temperatures. As found that pH values tend to basal it is the reason that leads to the spread of parasites and multiplication and causing contamination. As showed that river's water was of low salinity in six stations and these results of the current study find an increase in the values of dissolved oxygen during the spring, and this is due to the lower temperatures that are inversely proportional to the dissolution of gases in the water.

This study showed that the utilization of Date seed for removed parasite from water active and common way of wastewater treatment as showed that carbon resulting from the granular activation of date seeds (GAD) filter in water treatment of parasite were more effective to effluent samples for cysts, egg and oocysts, Also studies would be proceed to mend of the adsorption potential of the Date seed used easy and cost-effective techniques of during dehydrate carbon or in the shape of medium filter. Prepared plain through used Date seed treatment with hydrochloric acid at 70°C to treated waste water and get rid of parasite.

GAD filter has manufacture hopeful results compared with sand bottom filters and may be identify paid to its fading density article, filtration rate high, filtration time long, less backflow water used and other contamination from wastewater.

According to the results obtained from this study, it is suggested that date seed must be used in treatment of the contamination of the water and the disinfection effect on parasite attached to carbon fines was better and faster than that with only chlorine. The activated carbon application realms are limited due to high cost. In these study prepare from locally obtainable date seeds by use for the elimination of methylene blue from water, to find alternative to trade activated carbon, Physical characteristics of activated carbon date seeds used get rid of parasite in this study eleven species of parasites were isolated as find a significant difference pre-treatment with activated carbon technology than post-treatment the highest rate of *Ancylostoma duodenale* (Egg) was 76.0% while post-treatment become 0.1% followed *Entamoeba coli* (Cyst) was 71.6% while post-treatment 3.1%, *Trichuris trichiura* (Egg) was 65.2% while post-treatment 1.1%, *Cryptosporidium spp* (oocyst) pre-treatment was 59.9% while post-treatment 1.0%, *Giardia lamblia* (Cyst) was 50.81% while post-treatment 0.36%, *Balantidium coli* (Cyst) was 25.5% while post-treatment 0.03%, *Fasciola hepatica* (Egg) was 22.7% while post-treatment 1.02%, *Ascaris lumbricoides* (Egg) was 20.4% while post-treatment 0.3%, *Entamoeba histolytica* (Cyst) was 14.65% while post-treatment 1.04%, *Taenia spp* (Egg) pre-treatment was 13.6% while post-treatment 0.2% and *Enterobius vermicularis* (Egg) was 12.34% while post-treatment 0.70%.

The study consequences found that GAD gets high percentage and good prospect for economic abstraction of parasites and in a sophisticated.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Further reading

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