IJST

INTERNATIONAL

Journal for Sciences and Technology

VOL. (15), NO. (4) DECEMBER 2020 ISSN:2305-9346

www.ijst-jo.com

International Journal for Sciences and Technology

المجلة الدولية للعلوم والتكنولوجيا

Volume 15, No. 4/ December 2020 / ISSN: 2305-9346

A Refereed Scientific Journal with specialties of Biological, Medical & Health Sciences

مجلة علمية محكمة متخصصة في العلوم البيولوجية والطبية والصحة

Issued By:

The International Centre for Advancement of Sciences and Technology

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EDITORIAL BOARD - 2020

FORWARD

Dear Colleagues,

IJST was a fruitful effort issued by the International Centre for Advancement of Sciences and Technology – ICAST, which tries to take part in both globalization and revolution in information and communication technologies, because S&T development becoming not only the key elements of economic growth and industrial competitiveness, but also essential for improving the social development, the quality of life and global environment. ICAST took then a decision to establish a scientific alliance with TSTC (Tharwa for scientific Training & Consultations) and this alliance comes to support the efforts towards publishing IJST.

Today, we announce a new issue of our journal, that is the fourth issue from the fifteen volume of IJST, December, 2020.

Finally, I hope that all significant figures of sciences whom joined the editorial board, the researchers, and the readers of our journal will keep IJST between their eyes and contribute in continuing its journey, with their remarks, valuable recommendations and their researching outcomes.

Thanks a lot for all who support IJST.

Editor-in-Chief

IJST

Abdul Jabbar Al- Shammari

The Referees for this Issue

** The referees and advisory group below are listed according to alphabetical order, with deep appreciation for all.*

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Balancing of chemical questions by the atom mass number of atoms

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Republic of Iraq

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ABSTRACT

In this study, a new approach was proposed for balancing chemical equations depend upon the mass number of atoms, whereby the rates that need coefficients (large numbers) can be measured for resistance, i.e., the equations that are unable to balance using common traditional methods. In this study, the researcher attempted to balance chemical equations by calculation of mass number of atoms in the reactants and products, which she believed isn't previously explored.

Keywords: chemical reaction, mass number of atoms, balancing chemical equations.

INTRODUCTION

The chemical equation is a symbolic representation of a chemical reaction in which the reactants and products are denoted by their respective chemical formulae. These equations consist of substances that found at beginning of the reaction (Reactants) and the substances formed during reaction (products). The balance of chemical reactions is an important topic as it is a fundamental issue in chemical reactions, where chemical equations play a major role in theoretical and industrial chemistry (1-3).
The chemical equations are weighed so that the number of atoms involved in the reaction is the same as that resulting from the reaction, in order to obey the law of conservation of the mass, which states that during a chemical change that substance is neither destroy nor created atoms. The chemical equations are balanced by coefficients added at beginning of the symbols for reactants and products. The traditional method used in balancing chemical equation was the stoichiometric (4,5) in addition to Algebraic balancing method (1,3,4).
From a scientific point of view, a chemical reaction can only be balanced if it generates a null space. The studied chemical reactions belong to the category of chemical reaction with unique parameters. These reactions are usually computer-balanced if they contain atoms with correct oxidation numbers. The traditional method was used to achieve balance through the use of mathematical methods (5).
Thorne was proposed a new method to balancing chemical equations depend upon scientific calculators and basic computer spreadsheets that have matrix inversion applications. The method utilizes the familiar matrix-inversion operation in an unfamiliar and innovative way (7). Hamid proposed the Gauss elimination method to solve the mathematical problem with this method. It was possible to handle any chemical reaction with given reactants and products by a system of linear equations (8).
The chemical equation to be balanced, it must fulfill certain two conditions: Article preservation law and the law of conservation of electric charge. There are many ways to balance chemical reactions, but all of them have a limited use, because they depend upon trial-and-error method that become very difficult to conclude and can only be used for simple chemical reactions (5,9). But this method is not suitable for more complex reactions, so the half reaction is used ion electron that makes the equation difficult to balance.
The researcher tried to search for method that would help in balancing chemical rate, especially equations that require large coefficients to balance them. Here this study is presenting the balancing of chemical equations by using the mass number of atoms method, whereby we can balance the rates that need coefficients (large numbers) for the purpose of resistance, i.e., the equations that are unable to balance using common traditional methods. In this study, the researcher tried to balance chemical equations by this method, which she believed it's not previously applied.

HYPOTHESIS

The law of conservation of mass states that no atoms are lost or made during a chemical reaction, so the total mass of the products is equal to the total mass of the reactants. That is, when any chemical reaction occurs, the masses of the reactants are equal to the masses of the substances resulting from the reaction. It is also mentioned that any mass in a closed system will remain constant no matter what happens within the system.

Mass number: The mass number of atom is the number of protons and neutrons in the nucleus.
That is,

The number of protons + the number of neutrons = the mass number of an atom.

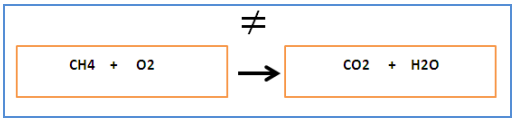
METHODOLOGY

The steps used in balancing chemical equation by proposed a new method depends on mass number of atoms. It was noticed that the number of atoms on each side is not the same, (i.e., the number of atoms is not equal on both sides of chemical equation), and the mass number is not equal, as well as the charges are not equal. Among the conditions of a balanced chemical equation, two basic conditions must be met: the law of mass conservation and the law of charges conservatives. So, the equation needs to add coefficients (numbers) in front of the chemical formulas to adjust the number of atoms, so that they are the same on both sides. We have come to this method: balancing the equation by means of the mass number of atoms. The same steps can be applied to balance any chemical equation.
The steps are described as follows:
1. Write the unbalanced chemical equations.
2. Write the mass number of atoms.
3. Listing the mass number of the atoms involved in the reaction, as in equation (1) below.

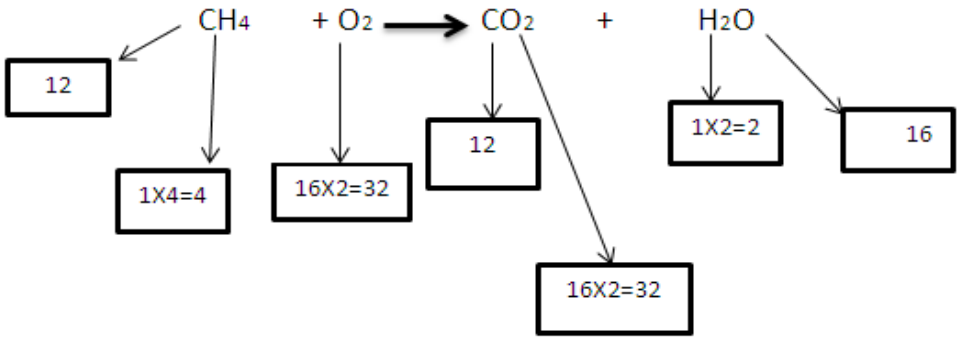
Example 1:
A simple equation: The reaction of methane with oxygen gas.

Part one: Law of mass conservation

Equation (1):



Atom	Mass number of atom
C	12
O	16
H	1



1. Count the mass number of atoms for the reactants as well as for materials resulting from the reaction as follows:

The side of reactants:

(CH_4) [C=12 H=1x 4= 4] + [O_2= 16 x2=32]

The side of products:

(CO_2) [C=12 O=16 x 2=32] + H_2O [H=1 x2=2 O=16]

Note: The mass number of hydrogens at the end of the reactants= 4. We divided the mass number of hydrogens in the products by 2. The result will be 2. Consider the water molecule with (2): $2H_2O$. The number of oxygen atoms will be (2) and the result will be the mass number of oxygen (16 x 2= 32). The equation becomes:

$$CH_4 + O_2 \rightarrow CO_2 + 2\ H_2O$$

The total oxygen mass in the products = 64.
The mass of oxygen at the side of reactants = 32, divide 64 by 32, so the results will be 2. Try the oxygen molecule with 2 ($2O_2$) on side of reactants.
The final equation becomes (Table 1):
Total mass of oxygen in the products = 64.

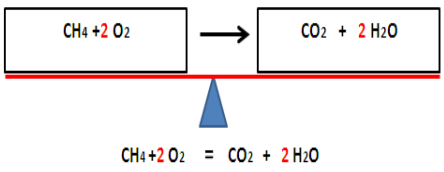


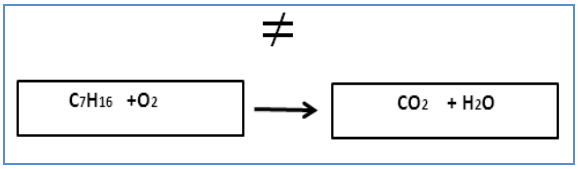
Table (1): The conservative law applies in the equation

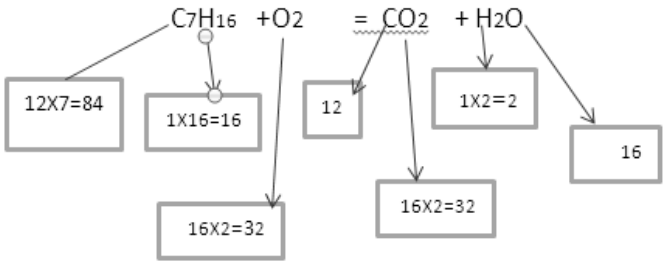
Atoms	Mass number of reactants	Mass number of products
C	12	
H	4	
O	32 x2 =64	32+ (16x2)=64

Example 2:

$$C_7H_{16} + O_2 \rightarrow CO_2 + H_2O$$

C =12 , H=1, O=16





Mass number for atoms:

Reactants materials:

C =84, H=16, (C_7H_{16}) + (O_2) O =32

Products:

C= 12, O= 32 (CO_2) + (H_2O) H=2, O= 16

In the tip of reactants, the mass number for carbon =12x7= 84 and in the tip of product's the mass number of carbone atom = 12. Divide 84/12 = 7 Results multiplied 7 (CO_2) with (7 CO_2) the equation becomes as follows (Table 2):

$$C_7H_{16} + O_2 \rightarrow 7\ CO_2 + H_2O$$

Here's firstly the carbon atoms become balanced, take H in the side of reactants (16x1) and in the other side (1x2= 2), divides 16/2=8 multiply (H_2) by 8 and the equation becomes:

$$C_7H_{16} + O_2 \rightarrow 7\ CO_2 + 8\ H_2O$$

The oxygen atoms on the reactants' side equal 16x 8+ 128 (in water molecules) + 32x7=224 (in carbon dioxide molecules), the total is 128+224= 352, divided the number by 32= 11 and the equation becomes as follows:

$$C_7H_{16} + 11O_2 \rightarrow 7\ CO_2 + 8\ H_2O$$

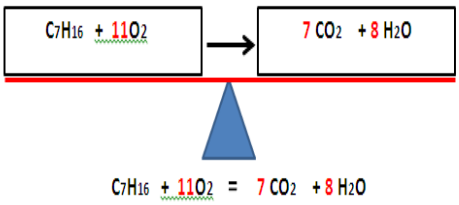


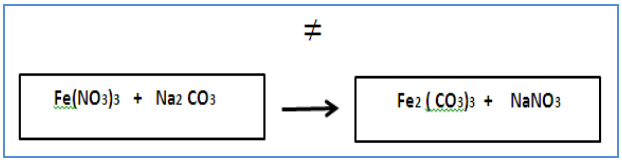
Table (2): The conservative law applied in the equation

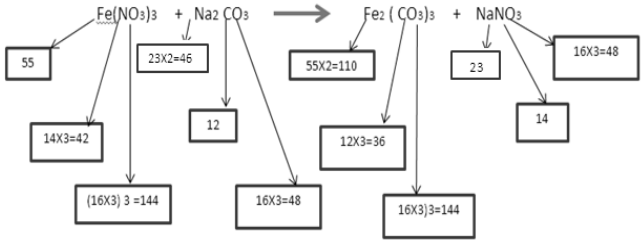
Atoms	Mass number of reactants	Mass number of products
C	12x7=84	12x7= 84
H	1x16=16	2x8=16
O	32x11= 352	16x8+32x7=352

Example 3: An unbalanced equation

$$Fe(NO_3)_3 + Na_2CO_3 \rightarrow Fe_2(CO_3)_3 + NaNO_3$$

Fe= 55, N= 14 , O=16 ,Na =23 ,C=12





Balancing steps:
Mass number of atoms: Reactants (R) and products (P)
Na=46,C=12, O=48 ،$Fe(NO_3)_3$ + (Na_2CO_3) (Fe=55, N =42 ,O=144),Na=23 ,N=14 ,O =48 Fe=110 , C=36 ,O=144 , [$Fe_2(CO_3)_3$] + ($NaNO_3$).
In the products tip, since Fe= 55x2=110 dividing 110/55=2, So multiple by 2= [$2Fe(NO_3)_3$] for reactants.

$$2\ Fe(NO_3)_3 + Na_2CO_3 \rightarrow Fe_2(CO_3)_3 + NaNO_3$$

The number of mass number for Nitrogen in the reactants= 42x2=84, dividing by number of nitrogen mass number (14) = 84/14=6, the multiples by 6=6($NaNO_3$) and final the equation becomes as follows (Table 3):

$$2\ Fe(NO_3)_3 + Na_2CO_3 \rightarrow Fe_2(CO_3)_3 + 6\ NaNO_3$$

The number of Sodium molecules in the product = 23x6= 138, divided by 46 (mass amount of sodium in the Na_2CO_3 for reactants= 138/46=3

$$2\ Fe(NO_3)_3 + 3\ Na_2CO_3 \rightarrow Fe_2(CO_3)_3 + 6\ NaNO_3$$

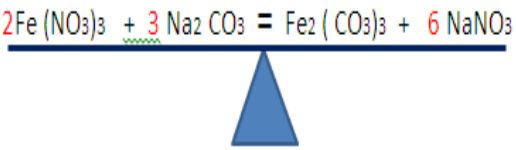


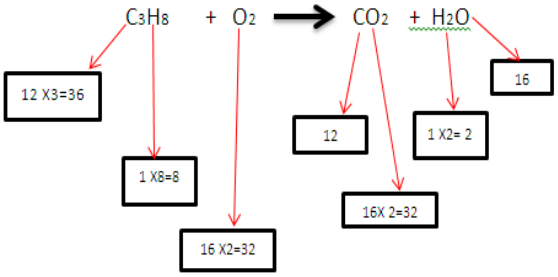
Table (3): The conservative law applied in the equation

Atoms	Mass number of reactants	Mass number of products
Fe	110	110
N	84	84
O	288=144=432	144+288=432
Na	138	138
C	36	36

Example 4: An unbalanced equation

$$C_3H_8 + O_2 \neq CO_2 + H_2O$$

Mass number of atoms: C=12, H=1, and O=16. Follow up the same steps previously mentioned



C=12x3=36 , H =1x8=8 + O_2 = 16x2=32 , (C_3H_8)
32 + (H_2O), H=1x2=2 ,O=1x16=16 = C=12x1=12 , O=16x2 ,(CO_2)

$$C3H8 + O2 \rightarrow 3\ CO2 + H2O$$

Mass number of (C) of reactants (12x3= 36) equal to mass number of (C) in product, and the equal number of atoms in both sides of equation. On other hand the (H) in (C_3H_8) =8 and mass number of (H) in H_2O=2. Divide mass number of (H) in (C_3H_8)/ mass number of (H) which equals 2 in (H_2O): 8/2=4.

Multiplying (H_2O) by factor (4) and the equation becomes:

$$C3H8 + O2 \rightarrow 3\ CO2 + 4\ H2O$$

The mass number of oxygens in ($3CO_2$) = 16x2x3= 96, adding the mass number of (O) in ($4H_2O$), which equal to 16_X4=64 and the total 96+64= 160. Dividing by total mass number of oxygens in the products (160/32) = 5 and the multiple the oxygen molecule by 5 and the equation become balanced (Table 4):

$$C_3H_8 + 5O_2 \rightarrow 3\ CO_2 + 4\ H_2O$$

Table (4):The conservative law applied in the equation

Atoms	Mass number of reactants	Mass number of products
C	3x12= 36	3x12= 36
H	4(1x2) 8	8x1=8
O	3(16x2) + 4(16x1) =160	5(16x2) = 160

Part two: Law of charges conservation:

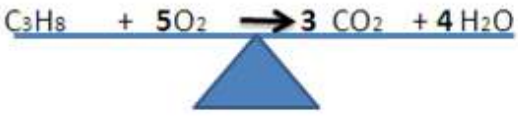
Conservation law for charges in equations: verifications of charges balancing.

$$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$$

$$(3\ X\ 4+) + (1+X\ 8) + 5(2\ X\ 2-) \rightarrow (3\ X\ 4+) + 3(2\ X\ 2-) + 4\ (1+X\ 2) + (4\ X\ 2-)$$

$$(20+) + (20-) \qquad (12+) + (12-) + (8+8-)$$

Number of charges of the atoms involved in the reaction on both sides of equation:
C charge = +12 reactants material equal to the C charges (+12) in the products materials.
H charge = +8 (in the reactants) = + 8 (in the product's),
O charges = -20 (in the reactants) = -8 + (-12) =-20.



Example 5:

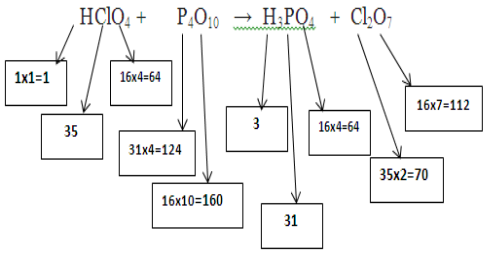
$$HClO_4 + P_4O_{10} \rightarrow H_3PO_4 + Cl_2O_7$$

The equation is unbalanced; the left side is not equal the right side.

≠

$$HClO_4 + P_4O_{10} \rightarrow H_3PO_4 + Cl_2O_7$$

The mass number of atoms: Cl = 35, O = 16, P = 31



Balancing steps:

The mass number of atoms for reactants and product's
H=1,Cl =35, O= 64,($HClO_4$) + (P_4O_{10}), P=124, O=160
Cl =70 , O= 112 ,H=3 ,P=31 ,O=64,(H_3PO_4) + (Cl_2O_7).
The mass number of P= 124 in the reactants (P_4O_{10}) and the mass number in the products (H_3PO_4) is 31. Dividing 124/31=4, so the others side of equation must multiply by 4.

$$HClO_4 + P_4O_{10} \rightarrow 4\ H_3PO_4 + Cl_2O_7$$

In ($4H_3PO_4$), the number of H atoms equal to 3x4=12 divided by mass number of H (12), then the mass number of H in the reactants' side= 1. For balancing 12/1=12 as follows:

$$12\ HClO_4 + P_4O_{10} \rightarrow 4\ H_3PO_4 + Cl_2O_7$$

Mass number for Cl in the reactants' ($12HClO_4$) and becomes equal to 12x35=420. Divided the mass number for Cl in the ($12HClO_4$) by mass number for Cl in the Cl_2O_7= 70; 420/70= 6 and the equation becomes (Table 5):

$$12\ HClO_4 + P_4O_{10} \rightarrow 4\ H_3PO_4 + 6\ Cl_2O_7$$

Table (5): mass numbers on both sides of the equation

Atoms	Mass number of reactants	Mass number of products
H	1x12= 12	(1x3)x4= 12
Cl	35 x12= 420	(35x2) x6 = 420
O	(16 x4) x12 =768 16 x10=160 Total: 928	(16x7) x6 =672 (16x4) x4=256 Total: 928
P	31x4 = 124	31x4 = 124

Conservation law for charges in equations: verifications of charges balancing:

$$12\ HClO_4 + P_4O_{10} \rightarrow 4\ H_3PO_4 + 6\ Cl_2O_7$$

$$(zero)\ 12 + (zero)1 \longrightarrow (zero)4 + (zero)6$$

zero zero

RESULTS AND DISCUSSION

All chemical calculations are not correct unless the chemical equation is balanced, and when chemical reactions contain atoms that need high numbers to balance the equation (1-6). Such a case, when the equilibrium is very difficult and we cannot balance the chemical equation by conventional methods, as the method of counting atoms on both sides of chemical equation (trial and error method), these methods is suitable for simple equations and requires efforts and time. Accordingly, the author decided to search for a method that would help the students and researchers in balancing chemical equations that cannot balance in traditional methods. By used research and experimentation, we reached a new method for chemical equations balancing depend upon the mass number of atoms for reactants and products. The method seems at first glance lengthy, but with applying the procedure steps we mentioned in methodologies, the students can balance the equation by 2 or 3 steps after calculation the mass number of atoms for each side of the chemical equation. As these steps were tried on a set of equations that need to be balanced for large numbers (Coefficients), and the result were fair (6-9). The two-condition required to be met in weighted chemical equation have been fulfilled, namely: the law of preservation of matter and the law of preservation of electric charges, also the coefficients appearing in weighted equation give us the ratio in the number of the moles between the reactants and the resulting materials, and accordingly that information can be converted into masses and weights of the materials involved in the reaction and we came to the balanced equation, which is a chemical reaction is described, where the number of atoms for each of the reacting elements, and the total charge are equal in both the reactants and the materials resulting from the reaction, in other words the mass of the elements and their charges on both sides of the equation are equal. This effort is a modest addition to the field of balancing chemical equations.

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Letter to Editor…

Governmental management of Covid -19 pandemic in Jordan

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ABSTRACT

Tracing Covid-19 pandemic from the start around the world in general and in Jordan in particular, revealed that Jordan government managed the pandemic in a proper way to get the least effects on its people managing that medically, administratively, and economically to be the least affected between neighboring wealthier countries and some other countries around the world.

From the early days of the pandemic that hits the world and retarded its economy and lifestyle, the Jordanian government took strict actions with the help and the commitment of Jordanian people and the residents to pass the crisis and that was very clear.

The government established a Crisis Committee in January 24th , 2020 and started giving its orders to face the crisis since then, right after China declared the spread of the disease. These rules started by bringing Jordanian students in China back home including other residents in the country from other nationalities living in Jordan applying quarantine for 14 days in hotels followed by additional 14 days of home quarantine. The costs of the hotels were covered by the government and through donations from some hotels, with other procedures trying not to get the virus in.

The Defense (Emergency) Act enforced in 19 March 2020 and still current in the country, about 130 orders given since the establishment of the Crisis Committee until the enforcement of the Defense Act.

The first case of Covid-19 in Jordan was recorded in March 02, 2020. Belonging to a Jordanian citizen who was coming from Italy, which lead to the application of the defense act, through which many public health procedures were taken on top of economic orders regarding living of the people in the country, the relation between the laborers and their employers establishing supporting fund boxes to support the daily laborers and the social welfare beneficiaries. Punishments applied strictly on those who do not comply with the orders given through the defense act.

Briefly, the Defense Act Orders contained:

1. Applying curfew that started comprehensive except for permit holders like the security forces, and the medical personnel. Those who were not sticking to the orders punished according to the laws, and they were minimal. Except for the weekends, the curfew reduced gradually, limiting the movement of cars, and letting pedestrian move in certain hours of the day. Later on, cars allowed in a system relating to the license plate number, in which going out depended on whether the license plate ended with an odd or even number, and the next day would be the opposite. Moreover restricting the number of occupants in the car down to two persons. Adding a curtain separating the driver compartment from the backseat compartment in all taxis/Ubers/etc. The curfew is still applied but limited from midnight till' 8 AM the next morning.

The comprehensive curfew applied during the weekends helped the medical teams to do the sporadic Covid-19 testing all over the country to detect new cases.

2. Orders regulating the relation between the laborers and the employers and the time of curfew. (Regarding their salaries and benefits to protect their rights).
3. Stressing on applying the means of personal protection by using hand washing, masks, gloves, and social distancing in public areas.
4. Banning all types of gatherings at first, whether social or religious, then starting to relieve them, while taking all the personal protection measures in religious gatherings, but still banning all other social ones.
5. Establishing the "Mettle of the Homeland" "Himmat Watan" fundraising box to support the social welfare beneficiaries, the ministry of health, and the daily paid laborers.
6. Closing down governmental (and other) establishments, while extending the appointment dates given earlier to the people of the country to a later on dates.
7. Ordering to start online teaching in all schools and universities.
8. Warning and punishing all of those who spread fear and panic between the people or publishing any personal information regarding Covid-19 patients on social media appliances or other forms of publication.

9. Applying special programs to support the social beneficiaries in April and May.
10. Extending tax day declarations.
11. Applying an electronic application (AMAN) on the mobiles that shows if the holder was in contact with infected people during the last fourteen days and what his/her status is now.
12. Flights from and to Jordan were also stopped.

Early in May, restrictions were gradually lifted, and since then, all the restrictions were lifted, except for the personal protection procedures, continuing on fourteen days in hotel quarantine for the citizens who were trapped abroad and are coming home followed by 14 days in house quarantine, where they are tracked with electronic bracelets.
After that, the inland number of cases dropped dramatically, to one or two, or no cases at all for the last few weeks, but the personal protection procedure, social distancing, and occupant restriction in taxis and such are still applied.
Jordan passed the crisis with minimum loss compared to other regional and global countries. Table (1) shows that:
1. Jordan is in the 89th rank globally as far as the GDP is concerned, which reflects the economic ability of the country having the least GDP between the regional countries.
However, the crisis committee and the government properly maneuvered its resources to stand solidly in the face of the pandemic, balancing between the economical, medical, and population needs from all aspects, in spite of that low GDP.
2. The total number of cases did not exceed 1218 cases, the number of cases per million of population did not exceed 119 until July 20, 2020, which is the least number compared to other regional countries and Sweden, which took the line of herd immunity in dealing with the pandemic, which had the highest number of cases per million population.
3. The incidents of death per million populations are 1%, which is also the least between the regional countries. While we see the incidents is the highest in Sweden. For the numbers of tests per million populations has also surpassed that in other regional countries which are better economically.

From all of the above, and the evaluation of the six months that passed, one can conclude that the actions taken by the Jordanian government Crisis Committee were sound protective, therapeutic, economical, and administrative procedures. Adding to that, the commitment of the Jordanian people and residents to apply the procedures and the proper implication of these orders by the armed and security forces resulted in the dramatic best response in facing the pandemic. Other countries can take the Jordanian measures and apply them, not only for Covid-19 response but also for other similar pandemics.

Table (1): List of countries by GDP ranking up to July 2020

Country	Rank GDP	Total cases	Total deaths	Total recovered	Active cases	Serious critical	Total cases/ IM pop.	Deaths/ IM pop.	Total tests	Tests / IM pop.	GDP (US$ Million)
Jordan	89	1,218	11	1,024	183	3	119	1	513,932	50,345	44,172
Saudi Arabia	18	250,920	2,486	197,735	50,699	2,180	7,202	71	2,670,926	76,664	779,289
UAE	30	56,922	339	49,269	7,314	1	5,752	34	4,508,205	455,549	405,771
Qatar	52	106,648	157	103,377	3,114	128	37,983	56	441,700	157,311	191,849
Iraq	49	92,530	3,781	60,528	28,221	397	2,298	94	793,024	19,697	224,462
Kuwait	57	59,204	408	49,687	9,109	132	13,854	95	459,349	107,486	137,591
Iran	25	273,788	14,188	237,788	21,812	3,556	3,258	169	2,148,999	25,570	458,500
Turkey	19	219,641	5,491	202,010	12,140	1,246	2,603	65	4,273,377	50,642	743,708
Sweden	23	77,281	5,619	N/A	N/A	56	7,650	556	681,820	67,490	528,929

Source: https://www.worldometers.info/coronavirus/ July 20, 2020

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Amman July 20, 2020

Molecular and Serological Detection of *Toxoplasma gondii* from Random Blood Samples Donors at Central Blood Bank of Nineveh City in Iraq

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ABSTRACT

The current study was designed to investigate the percentage rate of toxoplasmosis among male selected randomly from blood donors attended the Blood Bank at Nineveh city (North of Iraq) during March to May 2020. Blood samples were collected from 115 male aseptically and divided into two parts; part A was placed in a container containing EDTA for PCR detection, while part B placed in test tubes without EDTA for serological detections. DNA was extracted from whole blood using QIA commercial kit and was assayed by PCR. Two serological methods were used to detecting the IgM and IgG against *Toxoplasma gondii*; Combo IgG and IgM rapid cassette and Latex agglutination test. Demographic questionnaire was used to all induvial in this study. The results reveal high percentage of toxoplasmosis positive men by latex agglutination test (61.73%), compared with 15.65% and 10.43 % by Combo test against IgG and IgM respectively. The results for serological tests were confirmed by PCR analysis and shows only 14 men were positive out of 115 men (12.17%). The study concluded that the men infected by toxoplasmosis, as well as female and the disease is endemic in the city.

Keywords: Molecular detection, *Toxoplasma gondii*, blood bank donor, serological tests, latex test.

INTRODUCTION

Toxoplasma gondii (T.gondii) is a pathogen that causes disease nearly all warm-blooded mammalian includes humans (1). Cats are the main source of infection to human hosts; the litter box of cat should be cleaned daily. Vegetables should be splashed before eating because they may have been contaminated with feces of cat (2) also consume under cooked meat particularly lamb is a more important source of human infections in some countries (3). Fecal contamination of hands is a significant risk factor and (4). *T. gondii* organisms in meat may be destroyed by exposure to extreme heat or cold, but Tissue cysts in meat are destroyed by heating the meat throughout to 67 ℃ (5) or by cooling to −13 ℃ (6). Toxoplasma cysts in tissue are as well destroyed by use gamma irradiation (7).
Clinical signs of *Toxoplasma gondii* infection are nonspecific and unreliable for diagnosis (8). *Toxoplasma gondii* levels high on the list of diseases which lead to death in patients with acquired immunodeficiency syndrome (AIDS); approximately 10% of AIDS patients in the USA and up to 30% in Europe are estimated to die from toxoplasmosis (9). Recent studies have shown that monoplex and multiplex PCR can be useful for specifically identifying *T. gondii* (using the B1 gene as the target sequence) from tissue biopsies, cerebrospinal fluid or vitreous body from patients with undiagnosed uveitis, fetal blood and amniotic fluid (10,11,12). The goal of this study was to study the prevalence of Toxoplasmosis in blood collected from donor at blood-Bank laboratory in Nineveh City north of Iraq.

MATERIALS AND METHODS

Samples collection:
A total of 115 men selected randomly from blood donor from central blood bank of Nineveh city from (March-May) 2020. A questionnaire form was filled by each male which include: age, address, blood group, Rh and carrier. Blood samples were collected and serum was separated for the estimation of antibodies against *T. gondii* infection. Venous blood (10 ml) was drawn carefully and divided into two parts; part A was transferred into EDTA tube for PCR analysis, and part B blood tube was left for 15-30 min. then centrifuged at 300 rpm for 5 min. to separate clear serum, the sera were tested for the estimation of antibodies against *T. gondii* infection.

Serological tests:
Latex agglutination test: Serum samples purified from whole blood donors were tested by latex agglutination test and Combo rapid test. Latex agglutination test was performed according to manufacture instructions (Plasmatic company, UK). One- step rapid slide latex particle agglutination test was used for qualitative and quantitative determinations for *T. gondii* antibodies. Positive result indicated by formation of agglutinin drops on slide.
Toxo IgG\IgM combo rapid test: A rapid one step test for the simultaneous detection and differentiation of IgG and IgM anti-*Toxoplasma gondii* in human serum, plasma or whole blood.

PCR technique:
Extraction of DNA form blood samples: Total DNA was extracted from whole blood according to manufacturer instruction's (QIAgen commercial mini kit). The extracted DNA from 115 men samples was running on 1% agarose gel for 15 min at 100 v and stained with ethidium bromide (11).

Detection methods:
Polymerase chain reaction (PCR):
Samples with positive results by immunodiagnostic techniques were confirmed by PCR technique. The technique used to rapidly increase the number of copies of specific region of DNA. Adjust the concentration of DNA in all this study samples by dilution with TE buffer solution to make PCR reaction and it is (50) Nano g/µL.
For each sample, prepare the Master reaction mixture for every PCR reaction that for DNA sample with the specific gene primer with master-mix in side Eppendorf 0.2 ml (Biolaps Co.) (12,13). Mix the mixture in microfuge for (3-5) second and enter the reaction tubes to thermocycler to make the polymerase reaction by use the specific program for each reaction.
Carried sample in Agarose gel wells that prepare previously with concentration 1%, and add the ladder DNA in one well.

Detection of *Toxoplasma gondii* B1gene in sample of blood of pregnant and aborted woman amplification was performed using two primers with the following sequences:

Forward	TTTTGACTCGGGCCCAGC
Revers	GTCCAAGCCTCCGACTCT

The steps of thermal cycles were as followings:

No.	Stage	Temperature	Time	Cycle number
1.	Initial denaturation	95	6 min.	1
2.	denaturation	95	45 sec.	35
3.	Annealing	58	1 min.	
4.	Extension	72	1 min.	
5.	Final extension	72	5 min.	1
6.	Initial denaturation	95	6 min.	1

Gel electrophoresis was carried out with 1X Tris-borate EDTA running buffer on a 1% agarose gel. Bands were visualized by UV light and photographed.

Statistical analysis: The statistical method used was T-test to calculate the frequency and percentage.

RESULTS AND DISCUSSION

Table (1) reveals the general characteristic of total 115 blood samples donors. Samples distributed according to age, the major group representative were military individual and representative 45% from total samples. Group O blood was the major group and AB group was the latest group.

Table (1): The general characteristics of the total blood donor men samples

Characters	Age	20-30	31-40	41-50	51-60
Samples numbers	N=115	18	32	10	11
percentage		25.35%	45.07/%	14.08%	15.49%
characters	Carrier	employee	Military	unskilled	
Samples numbers	N=115	7	16	48	
percentage		9.85%	22.53%	67.60%	
characters	Blood group	Group A	Group B	Group AB	Group O
Samples numbers	N=115	17	1 5	4	35
percentage		23.94%	21.12%	5.61%	49.29%

Table (2) shows the results of two serological methods used in this study to determine the titer of antibodies against *T.gondii*. Latex agglutination test gave high proportion of positive, since this technique used for screening individuals infected with toxoplasmosis, on other hand the infection seems chronic since mostly the carry IgG antibodies, while only 10% of samples were positive to IgM and may representative acute infection (Table 2). Figure (1) shows the comparison between the three techniques used in this study. If we start with the PCR assay, the test used to confirm the serological test, even though only 14 samples out of 101 samples that gave positive results for serological tests. The accuracy of PCR was more sensitive and specific and indicated that the serological test may gave positive because the patient may be exposed to *T.gondii* some time ago and not necessarily during the time of study (Figure 1).

Table (2) The rates of gondii antibodies, %, due to toxoplasmosis in relation to different laboratory techniques. From blood bank

Lab. Tech.	No.+	%+
Latex	71	61.73 a
IgG	18	15.93
IgM	12	10.43
PCR	14	12.17
Total	115	

a-b, proportions within column with different lettered superscripts are significantly different (p<.o5)

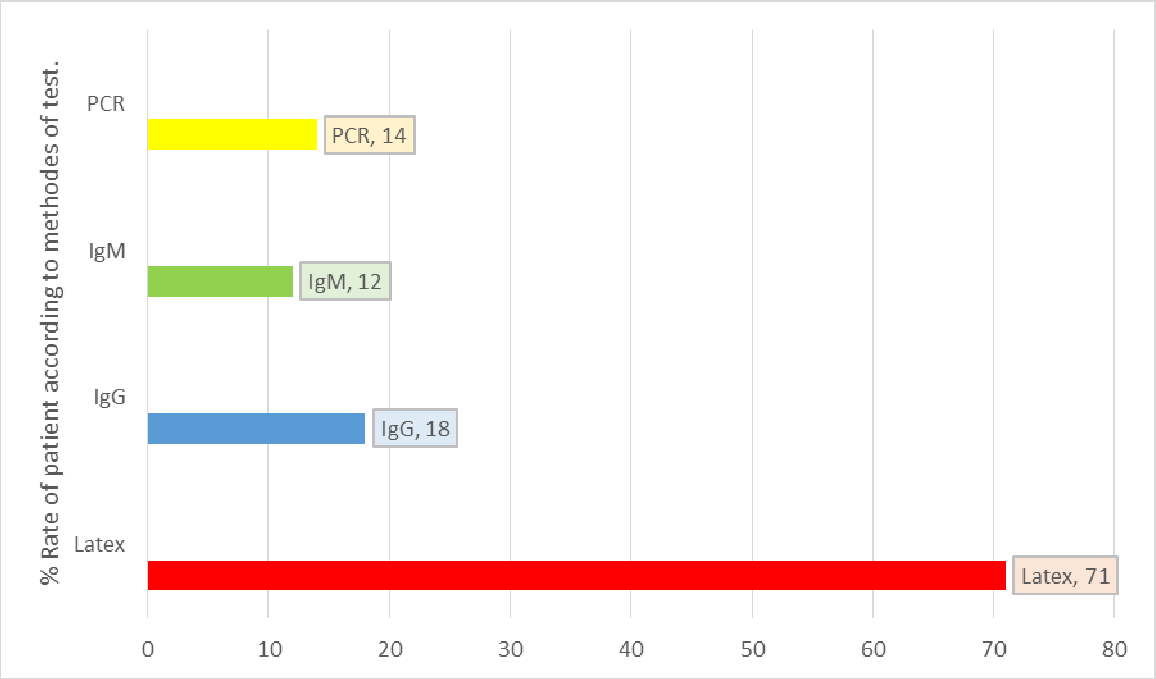

Figure (1): Analysis distributed according to different laboratory techniques in blood donor

Latex
IgG
PCR
IgM

The PCR assay using primer specific B1 gene amplification reaction was carried out using extracted DNA from blood samples donors. Positive samples gave bands with molecular weight size 100 bp as compared with the standards DNA, the techniques also indicated the uniform bands in all examined samples (Figure 2).

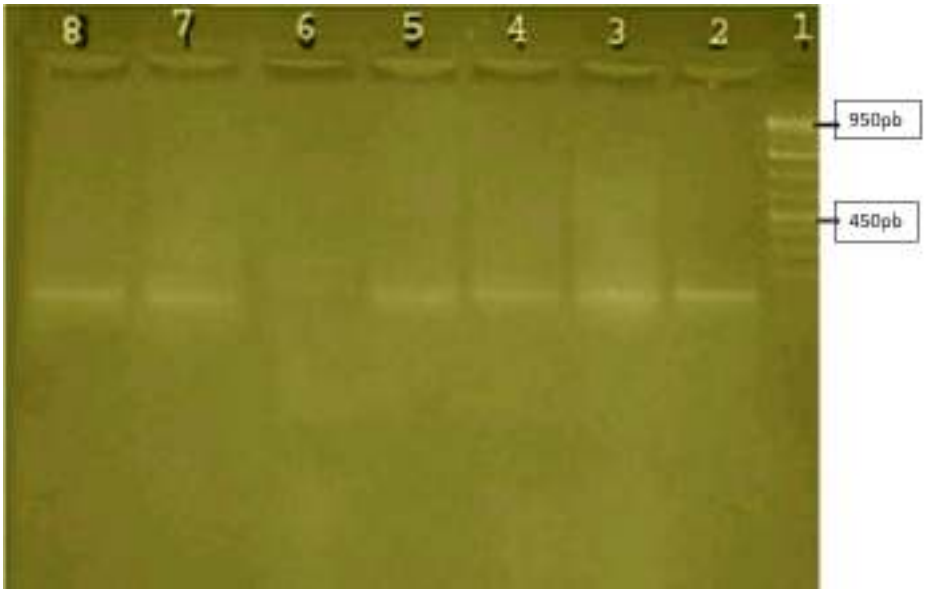

Figure (2): Agarose gel (1%) electrophoresis analysis of PCR amplification of DNA samples with specific primers for *T. gondii*

A similar study conducted in Central Blood Bank in Baghdad city, Zahair *et al.,* (14) was found that the prevalence of *T.gondii* among donors was 34% by latex agglutination test, the later author used large sample population. The reason may be because the number of samples that (400 sample) was used, or may be due to specificity of test as shown in this study when compared with more sensitive and accurate PCR technique. In Libya, Gashoust *et al.* was found 38% of women suffering from spontaneous abortions were positive for anti-toxoplasma IgG and IgM. Bin Dajem and Almushait (2012) found that the prevalence of *T.gondii* in pregnant women's at Asser region in KSA was 38.6% as detecting by IgG testing.

Since there are a differences in detecting the antibodies by serological test, It is become a obliquity to use more accurate test for detecting the presence of T.gondii antigens in blood samples as the current study and other studies (10,11,12.13) performed the confirmation by using PCR.

The highest rate was among (31-40) years old in this study and agree with Saleh in Diyalaa city east of Iraq, that he found the highest rate of infection of toxoplasma was with age group (30-40) years (Figure 3).

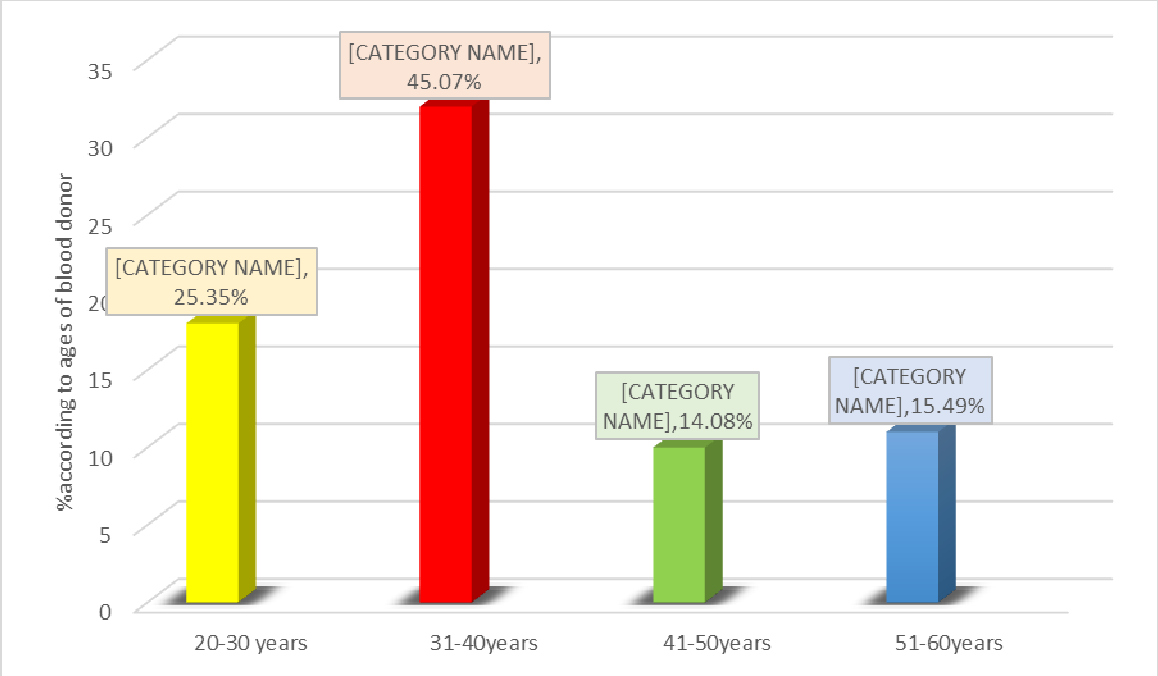

Figure (3): Analysis distributed according to different ages gropes of blood donor

20-30
31-40
41-50
51-60

Regarding careers the highest positivity rate is 67.60% for unskilled that may be because Eating outside the home at restaurants and little cleaned condition because long time of the work, 22.53% to Militant because contamination there food with oocyst and found of cats in training zone and 9.85% for employee (Table 3).

Table (3) the rates of gondii antibodies, due to toxoplasmosis, in relation to different career respondents from a random sample of a group of individuals

Career	No. positive	%,positive
Unskilled	48	67.60a
Militant	16	22.53b
Employee	7	9.85%
Total positive	71	

a-b, proportions within column with different lettered superscripts are significantly different (p<.o5).

To double the assurance about the effects of the blood groups, proportions comparisons had adopted. Results indicated that no differences in gondii infection according to different and RH of blood groups (table 4).

Table (4): The rates of gondii antibodies,%, due to toxoplasmosis, in relation +RH or –RH of blood group

Group	Positive response	%,+
A+	17	23.94%%
A-	0	0%
B+	15	21.12%
B-	0	0%
AB	2	2.81%
AB-	2	2.81%
O+	29	40.84%
O-	6	8.45%
Total positive	71	

To test if there is an association between the different blood groups and the positive or negative occurrence of antibodies against the *toxo. gondii ch.* sq. test was used.

Results revealed that is a-c proportions within column with different lettered superscripts are significantly different (p<.o5).

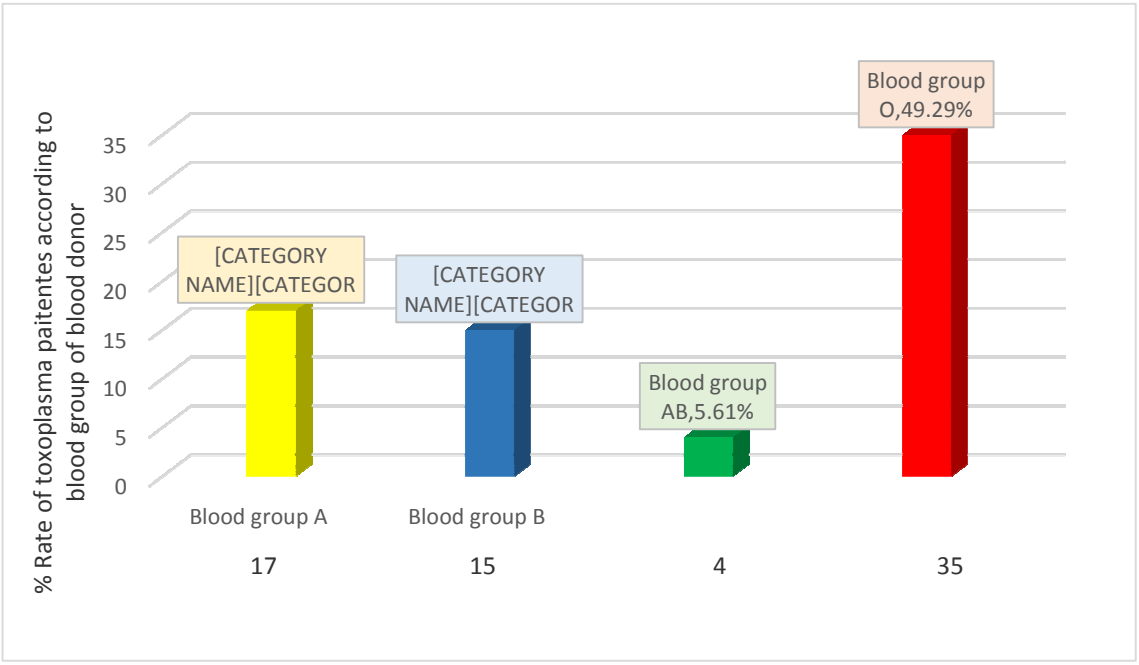

Figure (4): Analysis distributed according to different blood group of blood donor

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Study of component of follicular fluid, Serum hormones and Minerals in she-camel in south of Iraq

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ABSTRACT

In she-camels with small and large Graafian follicles, serum and follicular fluid levels of some hormones were analyzed during the breeding season and non-breeding seasons. Genitalia was collected from 50 mature she-camel of different ages at the Al Basrah abattoir in the south of Iraq during September 2019 to March 2020. Follicular fluid Isolate from follicles using a sterilized 22 g needle syringe. The fluid was centrifuged at 3000 rpm for 15 minutes to take off cellular debris. The Blood samples were collected immediately after slaughtering. Hormonal and minerals analysis for progesterone, estradiol, calcium, and phosphorus level were investigates. Results shows that the level of serums progesterone were significantly higher ($P<0.05$) during the non-breeding season than the breeding season. However, the reverse was true for the serum estradiol levels. Animals with small follicles had higher ($P<0.05$) serum progesterone and level than those with large follicles, Follicular size had a non-significant effect on serum estradiol levels. In the follicular fluid, the estradiol level was higher ($P<0.05$) during the non-breeding season. Only the progesterone level in the follicular fluid was affected by follicle size, which was higher ($P<0.05$) in large follicles. The current study concluded that the estradiol levels in the serum were higher during the breeding season than the non-breeding season; while the reverse was true for serum progesterone level estradiol levels in the follicle fluid were higher during the non-breeding season than the breeding season. Influenced the progesterone level by Follicle size only, which were higher in large than in small follicles.

Keywords: Estradiol, Progesterone, Follicular fluid, Blood, She camel

INTRODUCTION

The camel word comes from the Greek word 'kremal'. Camel is a significant component of the deserts, and is known as the "Ship of the desert". People do not depend on this animal for meat, milk, and hide only, however also one of the desert most significant modes of transport in the desert. Camelids are characterized by the chromosomes in the cell with a diploid number of 2n = 74 and almost similar chromosomes, with only a little difference in the amount and distribution patterns of heterochromatin (1). The breeding season begins in autumn and rises significantly in the winter then it decreases in spring and summer (2). The ovary of the camel-like a pea or a nut. The length of the Graafian follicle of the camel about 1-1.5<Cm. and when completely mature measured about 2.5-3 cm. The forming of follicular fluid is beginning inside the ovary follicle earlier through its development (3). The cells of the ovary produce soluble substance like growth factors, steroids hormone growth factor, steroid hormones, inhibition factors, fat substance and ionic (4-6), as well as some salts and minerals (7). All these materials have an important function in the metabolic activity of the ovary cells. The follicular fluid has the capacity, to keep the Meiosis of the egg in quiet stage and save it from lysis after the released during fertilization (8), and increase attractiveness movement, and hat reaction of the sperm (9). Hassan et al., study the effects of follicular size during breading seasons and concluded that there is a significant increase in the glucose and cholesterol concentration, while there was significant decrease in the total protein in large size follicles. Also, they reported that a significant increase was seen in the concentration of Na+ and Ca+2 in relation to the size of the follicles, while the concentrations of K ions decreased with increasing in follicular size (10).

The current study was designed to measure the level of steroid hormone, estradiol, progesterone, and some minerals, calcium, phosphorous in follicular fluid and blood serum during the season and out season.

MATERIALS AND METHODS

Experimental Samples:

Samples collection: Genitalia was collected in 30 minutes after slaughtering from 50 mature she-camel of different ages in Basrah abattoir in the south of Iraq (from September 2019 to March 2020). The genitalia were transported to the laboratory in the cool box (4-8 C), ovaries were isolated from connected tissue washed with 70% ethanol to inhibit the microbial contamination, and then washes with normal saline two times. The diameters of the follicles measured using calipers (Vernier calipers (Nichi-Japan). The follicles were divided into three groups according to their diameter. Follicular fluid isolated from follicles using a sterilized 22 g needle syringe. The fluid was centrifuged at (3000 rpm) for 15 minutes to take off cellular debris. Samples were kept at (-4 °C) for further investigations (2, 3, 10).

Blood samples:

The blood samples were collected immediately from slaughtered She-Camel in a test tube with gel. The blood was centrifuged at (3000 rpm) for 10 minutes, and serum was collected in clean sterile tubes and, kept until use.

Collections of ovaries:

The Ovaries were collected from 50 mature She-camel slaughtered at Basrah abattoirs during and outbreeding season. The reproductive organ was transported within 1-2 hours to isolate the ovaries from the genitalia and removed the other attached tissue, the diameters of follicles form each ovary was measured using calipers. Follicles were grouped into three groups according to the ovary's diameter: small (3–5 mm), medium (6–9 mm), and large (10-20 mm) (10).

Hormones and minerals analysis:

The samples of the follicular fluid and serum were analyzed to measure the concentration of the progesterone estradiol by EIA technique using Cobas e 411 analyzers (Germany), progesterone was determined by using kits from PROG III Elecsys from Cobas (Germany). Estradiol was determined by using kits from E2 Elecsys from Cobas (Germany). Calcium and phosphorus concentrations were determined by using kits from Cobas Integra / Cobas c systems through the EIA technique using Cobas Integra 400 plus analyzer (Germany) (6,10).

Statistical analysis:

Statistical analysis was performed using the Statistical Package of Social Since (SPSS) version 25 (Inc., Chicago, IL, USA) computer software. Data were expressed as mean ± SEM. Statistical tests T-test, the personal correlation coefficient was applied whenever found suitable and necessary. A P-value less than 0.05 was considered significant (11).

RESULTS AND DISCUSSION

The present study shows a significant increase at ($P<0.001$) level in follicular size during and outbreeding seasons. The ovary's size variation may be due to the accumulation of granulose cells in Graafian follicles in the breeding season than in out of season, the high temperature (heat stress), decrease the degree of control of dominant follicle leading to the survival of the medium size lower follicles (Table 1). The Serum progesterone concentration was significantly higher ($P<0.05$) in

the non-breeding season (0.59±0.14) compared with the breeding season (0.27±0.02) (Table 2). The ovaries in camel are continuous ovulatory stimulation and the follicles continue to develop then regress in the absence of mating. In cattle and mare has been reported the follicle luteinization in the absence of ovulation (12).

Table (1): The variation in follicular size and follicular fluid contents in camel between breeding season and out of season

Parameters	Season	Out of Season
Follicle size	11.40 ±1.07	5.07 ±0.63***
Estrogen	14.72 ±1.29	20.94±2.15 (NS)
Progesterone	0.96 ±0.10	0.53 ±0.08*
Calcium	9.44±0.15	9.55 ±0.19(NS)
Phosphorus	6.07±0.23	6.35 ±0.32(NS)

Table (2): The variation in follicular size and serum contents in camel between breeding season and out of season

Parameters	Season	Out of Season
Estrogen	21.07±1.91	8.39±0.55***
Progesterone	0.27±0.02	0.59±0.14*
Calcium	9.25±0.26	9.31±0.16(NS)
Phosphorus	6.03±0.27	6.11±0.45(NS)

Such phenomena can also happen in camels, and their occurrence may have been higher in the non-breeding season than the breeding season, leading to higher levels of progesterone in the non-breeding season. Besides, animals with small ovarian follicles were shown to be higher ($P<0.05$) serum progesterone concentration Compared with large ovarian follicles. Similar findings were reported by other's (13-15).

The follicular fluid progesterone level was lesser than the value of Cattle, Mares, and buffalo that have been reported by others (12,16,17). This finding indicates that there is a difference in hormone value between species and may be a major factor responsible for variations. Indeed, the Camel reproductive physiology varies from other species in that the camel is stimulated ovulatory while other species have spontaneous ovulatory.

The follicular fluid progesterone level was higher ($P<0.05$) in large follicles than in small ones. These results approve some previous findings in camels (18) and gilts (19). Hasan et al., explain the follicular size increase due to the increase in the level of cholesterol because the follicular cholesterol is considered as a precursor for lipid hormones (6,10). A higher level of progesterone in large follicles Observed in the present study suggest that luteinization of granulose cells happens in camels, as has been present in mares and cattle (12).

The presences of estradiol in the follicle fluid were significantly higher ($P<0.05$) in the non-breeding season (20.94±2.15) than the breeding season (14.72 ±1.29), (Table 1) this is expected results as the ovarian activity was found to be greater during the breeding season. The follicular size was shown to affect its estrogen production in bovine, when the size of the follicle increased, follicular fluid estrogen content increased (16). In mares, late dominant of estradiol-17β concentrations were significantly higher than in earlier follicles and decreased between later dominant and healthy pre-ovulatory follicles (20).

The serum estradiol concentration was slightly higher in the breeding season (21.07±1.91) than the follicular fluid (14.72±1.92) while in the non-breeding season the mean estradiol concentration in the follicular fluid higher (20.94±2.15) than the serum (8.39 ±0.55) Since Graafian follicles are the main source of serum estrogen its concentration should have been higher in the follicular fluid than in serum. These findings were disagreed with group of researchers dealing with this issue. (18,21-23).

This study examined the Values of Calcium and Phosphorous in serum and follicular fluid during and outbreeding season. There is no significant variation in the calcium level of blood serum and follicular fluid during and out the breeding season (9.25±0.26 and 9.31±0.16), (9.44±0.15 and 9.55±0.19) (Tables 1 and 2) respectively as a record during this study and this agree with (24). Reported that there is no significant difference that calcium concentration differs between the small and large follicles in camel and disagree with Amer *et al.,* (25) and Meurer *et al.* (19) reported the level of (Ca) in camels has been to increase in significant variation in medium follicles. Phosphorus is known to be a necessary part of cAMP, as the second messenger in the physiological activity of steroid hormones (14). There is no significant variation in phosphorus concentration of follicular fluid and serum in season and out the season (6.07 ± 0.23 and 6.35 ± 0.32), (6.03±0.27 and 6.11±0.45) (Tables 1 and 2) respectively as recorded during present study this agree with (25,26) that report in camel the concentration of phosphorus it is not affected by different follicular size.

CONCLUSION

The current study concluded that the serum estrogen was higher during the breading than outbreeding seasons, while the progesterone was higher at out of breeding seasons. There was a positive significant ($P<0.001$) correlation between follicular size and concentration of estrogen and progesterone in follicular fluid during and out of the breeding season. The follicular size effects on the progesterone level were higher in large than in the small follicular. There was a negative significant ($P>0.05$) correlation between follicular size and concentration of calcium and phosphorus in follicular fluid during breading and out of the seasons.

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