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Effect of Well Water on the Chemical Composition of Sheep Meat

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Abstract

This study was conducted in the College of Agriculture/Tikrit University/Postgraduate Laboratories and the Laboratory of Soil and Water Department, as it aimed to identify the salinity of well water used for irrigation and livestock grazing purposes in the Al-Alam district and its impact on the chemical composition and physical and chemical properties of sheep meat. The water of five types of sheep was studied. Wells on which flocks of sheep are raised, and which use well water for irrigation,The results of the study showed that the physical and chemical indicators of the studied well water exceeded the internationally permissible limits. The results recorded a high total hardness and ranged between (1650-1452) mg / liter, and the salinity of the water reached a value between (2.88-3.46) mg / liter, as well as The high sulfate concentrations reached a maximum value of (3402) mg/L, and the electrical conductivity reached (5525) microspheres/cm. The results of the study also showed that there were no significant differences in the level of moisture, as the highest level of moisture was recorded at (75.35)% in the kidney tissue in the area of the third well, while the lowest level of moisture was recorded at (70.10)% in the muscle tissue of the back meat in the area of the well the first.The results of the study also recorded that the protein did not record significant differences, as it reached the highest level of protein (20.30)% in the liver tissue in the area of the third well, while the lowest level of protein was (17.10)% in the back meat, while the fat recorded the highest value of fat in The muscle tissue of the thigh meat was (6.25)% and the lowest level of fat was (3.30)% in the back meat at the area of the first well, the ash did not record significant differences in all the studied samples.

Introduction

Water is one of the important natural resources that every living organism needs and all developed and undeveloped biological communities need. Although fresh water is one of the most important forms of water, its percentage on the surface of the earth is low compared to other forms of water,Dobson and Frid(2004).

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Human activities such as land use change, extensive withdrawals and wastewater discharge to groundwater have a strong impact on the hydrological composition, and sometimes this change is stronger than the climatic changes, Abd al-Ridha (1996). Water is one of the basic elements that support all forms of life and is obtained from two sources: surface water, such as freshwater lakes, rivers, and streams, and groundwater such as well water. Water has unique chemical properties due to its polarity and hydrogen bonds, which made it able to dissolve and absorb many different compounds and thus In the nature of water, it is not pure because of its high ability to acquire pollutants from its surroundings (Momodu, 2010).

Research methods and materials

Moisture estimation

Estimated according to the method described in A.O.A.C. (2008) using clean dried eyelids, and weighed while empty after drying and cooling, then put 3 g of the sample in it and put it in the oven at a temperature of 100 ºC for 3 hours and weigh after cooling until the weight is fixed and the percentage of moisture is estimated according to the following equation.

Ash estimate

It was estimated according to the method described in A.O.A.C (2008) as the percentage of ash content was estimated by taking a weight of 2 g of the sample and it was placed in a pre-dried ceramic jar and its weight was fixed, then dried using an electric oven at a temperature of 100 ° C to get rid of moisture, then transferred the eyelid To the incineration furnace at a temperature of 600 ° C, until a white or gray powder is obtained, and the percentage of ash was calculated

Protein Estimation

Protein was estimated according to the method described in A.O.A.C. (2008) which is Kjeldahl's method for determining the percentage of nitrogen in wet oxidation of food, by taking 2 g of the sample and digesting it using concentrated sulfuric acid H2SO4.

Fat estimation

It was estimated according to the method described in (A.O.A.C., 2008), as the fat was extracted by continuous extraction to estimate the crude fat in the Extraction Unit E-812 Soxhlet, using petroleum ether at a boiling point of 40-60 °C as an extraction solvent, by taking 3 Smear the pancake sample on a filter paper and place it in the extraction flask, and the extraction process continued for 6 hours until it was confirmed that the fat was

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completely extracted from the sample, after which the solvent was evaporated until the weight was fixed. The amount of fat was estimated based on the difference in the weight of the sample before and after extraction, then the fat was calculated as g/100g dry weight.

Results and discussion

moisture

The results of Table (1) recorded the effect of well water salinity on the level of moisture in thigh meat, back meat, liver meat and kidneys in five different wells from the flag area. In the thigh meat at the first well (p1), while the lowest level of moisture was recorded in the femoral muscle (71.12)% in the third well (p3), and this may be attributed to the nature of the water used for the Rio and its high salinity. It is noted from Table (4) the effect of water salinity on the moisture content in the dorsal muscle, as it reached the highest level of humidity (71.10)% at the second well (p2), while the area of the first well (p1) and the fifth well (p5) recorded the lowest level of humidity reached (70.10,70.10%)%, respectively.The results of the study recorded that the level of moisture reached the highest level in the liver at the well (p4), reaching (75.42)%, while the lowest level of moisture was recorded, which reached (73.91)% in the area of the third well, while the kidney meat recorded similar and high levels in the level of moisture It reached (73.50, 74.32, 75.35, 74.70, 74.48)% in all the studied samples, respectively.

chemical composition(%)						
protein	The sample	P1	P2	P3	P4	P5
	thigh meat(A)	72.25	71.40	71.12	71.55	71.95
	Back meat(B)	70.10	71.70	70.80	71.15	71.10
	Liver meat(C)	74.80	73.91	74.50	75.42	74.40
	Kidneymeat(D)	74.48	74.70	75.35	74.32	73.50
	Arithmetic mean	72.908 a	72.928 a	72.943 a	73.11 a	72.738 a

Table No. (1) Moisture level in meat samples

Protein

The results of Table (2) showed the effect of local interference and water pollution on the protein percentage of the studied meat samples, as the results of Table (4) recorded the

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absence of significant differences in the protein ratios for the average of the studied samples. The protein percentage in the meat of the thigh muscle of the fourth well (p4) reached the highest level of protein It reached (19-10)%, while the results recorded that the protein levels in each of the sample (p3,p1) recorded similar levels amounting to (19.05, 19.00)%, respectively, while the moisture percentage reached its lowest level (18.90,18.80)%. In the quadriceps muscle of the samples (p5,p2).The results of the study in Table (4) showed that the protein level in the dorsal muscle was all the same recorded protein values, reaching (17.50, 17.33, 17.26, 17.60, 17.10)%, respectively. It is noted from Table (4) that the protein in liver meat recorded high levels. The highest level in the treatment (p5, p3) was the third well and the fifth well, where the same result reached (20.30)% for them.The results of the study recorded that the percentage of protein showed high results in the kidneys, reaching its highest level (18.75%) in treatment (p5), while the lowest level of protein reached (18.15%) in treatment (p1) at the first well area>

chemical composition(%)						
protein	The sample	P1	P2	P3	P4	P5
	thigh meat(A)	19.00	18.80	19.05	19.10	18.90
	Back meat(B)	17.10	17.60	17.25	17.33	17.50
	Liver meat(C)	20.00	19.25	20.30	19.20	20.30
	Kidneymeat(D)	18.15	18.30	18.50	18.25	18.75
	Arithmetic mean	18.563 a	18.488 a	18.775 a	18.47 a	18.863 a

Table No. (2) The level of protein in meat samples

fat

The results of Table (3) showed the effect of water salinity on the percentage of fat in the quadriceps muscle, dorsal muscle, liver and kidneys of the studied sheep.The results showed that there were no significant differences in the level of fat in the average wells, as the highest level of fat was recorded in the thigh muscle (6.50)% in the second treatment (p2) in the area of the second well, while the lowest level of fat was recorded at (5.99, 5.85)% in each of the Transaction (p4 and p3) respectively.The results of the study showed that the lowest level of fat reached (3.30)% in the treatment (p1) in the dorsal muscle, while the results of the study recorded similar levels in the level of fat amounted to (4.00, 4.10, 4.33, 4.45)% in the

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treatment (p5, p4, p3, p2,p1) respectively.The results of the study recorded that the level of fat in liver meat was (4.34, 4.31, 4.28, 4.64, 4.10)% in all studied samples, respectively.The results of the study showed that the level of fat in liver meat recorded similar levels if it reached its highest level (3.95%) at the treatment (p2) in the second well area.

chemical composition(%)						
Fat	The sample	P1	P2	P3	P4	P5
	thigh meat(A)	6.25	6.50	5.85	5.99	6.41
	Back meat(B)	3.30	4.45	4.33	4.10	4.00
	Liver meat(C)	4.10	3.64	4.28	4.31	4.34
	Kidneymeat(D)	3.65	3.87	3.95	3.72	3.30
	Arithmetic mean	4.325 a	4.615 a	4.603 a	4.530 a	4.513 a

Table No. (3) The level of fat in meat samples

Ash

It is clear from Table (4) the effect of the salinity of the water wells used for watering livestock on the percentage of ash in the samples of the thigh muscle and the dorsal muscle of liver and kidney meat. The average wells recorded no significant differences in the level of ash for all studied samples.The results of the study showed a high level of ash in all study parameters of the femoral muscle, as it reached (2.94, 3.00, 3.06, 2.65, 7.93) %, respectively.The dorsal muscle showed that the highest level of ash reached (1.93)% when treating (p1) the first well, and both kidney meat and liver meat recorded similar levels of ash, as the percentage of ash reached (1.55, 1.40, 1.10, 1.00, 1.05)% in all studied samples of liver meat sample. While kidney meat recorded the highest level of ash (1.45, 1.45)% in treatment p5 and p4, respectively, while the lowest level of ash was (1.20)% in treatment p2.

chemical composition(%)						
Ash	The sample	P1	P2	P3	P4	P5
	thigh meat(A)	2.93	2.65	3.06	3.00	2.94
	Back meat(B)	1.93	1.58	1.55	1.70	1.61
	Liver meat(C)	1.05	1.00	1.10	1.40	1.55
	Kidneymeat(D)	1.35	1.20	1.30	1.45	1.45

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	Arithmetic mean	1.815 a	1.607 a	1.753 a	1.888 a	1.888 a

Table(4) Ash level in meat samples

The results of the study showed that there are noticeable differences between the samples taken from the four parts of the sheep with respect to their content of moisture, protein, fat and ash, as the moisture percentage increased in the fourth treatment for all samples studied compared to other treatments, as the average factor was (73.11)% in the meat of the sheep that were grazing At the fourth well area compared to other sites.As for the effect of water salinity and the location of the well from which the studied samples were taken with respect to protein, the fifth treatment p5 outperformed at the fifth well area, as it recorded the highest average protein amount of (18.863)% compared to the studied samples taken from other well sites.Concerning the fat concentration, it is noticed that there are no significant effects of the location and salinity of the water on the average fat concentration in all the studied samples.The results of the study also recorded the effect of the well location and water salinity on the ash concentration, as the treatment p5, p4 recorded the highest average ash concentration of (1.888, 1.888)% in the area of the fourth well and the fifth well.The discrepancy in the values of meat components between the different studied samples, which are the dorsal muscle, the thigh muscle, the liver and the kidneys, may be attributed to the influence of many factors, including water salinity, the nature of nutrition, as well as the anatomical location of the muscle as in the different parts studied from the carcasses. These results agree with the findings of Pereira and vicenie (2013), which attributed the reason for the difference in the values of chemical composition to the nature of nutrition and the quality of the feed provided, as well as the type of meat piece, which adds a big difference to the chemical and sensory properties. The chemical of sheep meat, as the results of the study recorded a significant effect of the muscle location on the chemical composition, while the sex of the animal did not record clear effects

Conclusions

1- The results of the study recorded that all the water from the wells studied were of high salinity and higher than the permissible limits and that they are suitable for drinking livestock and agriculture.

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2- The water salinity and the location of the wells did not have a significant effect, p≤0.05, on the chemical composition and physical and chemical indicators of the sheep meat studied.

3- The type of muscle tissue recorded the presence of mathematical differences in the chemical composition (moisture, protein, ash, fat).

4- The results of the study recorded significant differences (p≤0.05) on the sensory characteristics of the studied sheep meat.

5- The results of the study recorded that the level of heavy metals was higher than the internationally permissible limits.

The References

1. **Al-Jubouri, Muhammad Attia Saleh (2013).** Assessment of groundwater efficiency in the Al-Alam area, Master's thesis, Tikrit University, College of Education, Department of Geography.
2. **Al-Tarshan, ZiyadKhalafJassem Al-Tarshan (2017).** Study of the physical and chemical properties of the water of a number of wells in Salah al-Din Governorate, Tikrit Journal of Pure Sciences.
3. **Arwana, Abdulaziz (2012)** Meat Health and its Technologies, Theoretical and Practical Parts, Research University, College of Veterinary Medicine, 515 pages.
4. **Abd al-Ridha, Abd al-RidhaKazem (1996).** Bacteriological studies on the water of some wells used as a source of drinking water. Master Thesis . College of Science, University of Baghdad.
5. **Dobson, M. and Frid, C. (2004).** Ecology of aquatic systems, Longman. Fifth edition . Pearson Prentice Hall. United state of America.
6. **AOAC .2008.**Official Methods of Analysis, 20thed.Association of Official Analytical Chemists, Washington.
7. **Momodu, M.A and Anyakora, C.A (2010)** Heavy Metal Contamination of Ground Water: The Surulere Case Study. Research Journal Environmental and Earth Sciences 2(1): 39-43, 2010.
8. **Sawyer , C. N. and P. L. McCarty .(1978) .**Chemistry for environmental engineering .3rdedn. McGraw-Hill book CO. New York p.351-377.
9. **Siddiqui, M. K. J.; Jyoti, S.; Singh, P. K.; Mehrotra, K.; Sing and Sarangi, R. (2006).** Comparison of some trace elements concentration in blood, tumor free breast and

Annals of R.S.C.B., ISSN:1583-6258, Vol. 26, Issue 1, 2022, Pages. 2983 - 2990
Received 08 November 2021; Accepted 15 December 2021.

tumor tissues of women with benign and malignant breast lesions: An Indian study. Environ. Int., 32: 630-637.

10. **Suttle N. F. (2010)** Mineral Nutrition of Livestock. MPG, 4th Ed, UK, 579.
11. **SUTTLE N. F.(2010)** Mineral Nutrition of Livestock. MPG, 4th Ed, UK, 579.
12. **Swarup, D.; Patra, R. C.; Naresh, R.; Kumar, P.; Shekhar, P. and Baragangatharathilagar, M. (2006).**Lowered blood copper and cobalt contents in goats reared around lead-zinc smelter. Small Ruminant Res., 63: 309-313.