Bionatura
Latin American Journal of Biotechnology and Life Sciences

Bionatura Issue 3 Vol 8 No 1 2023

Article

Effect of oily extracts on chemical parameters of frozen-stored beef Berker

Rana Qassim Mahood Issa[1] and Batoul A.A. Abdulrahem[2]*
[1] Department of Food Sciences, College of Agricultural Engineering-University of Baghdad/Baghdad/Iraq.
[2] Department of Food Sciences, College of Agricultural Engineering-University of Baghdad/Baghdad/Iraq.
*Correspondence: batool.a@ coagri.uobaghdad.edu.iq
Available from: http://dx.doi.org/10.21931/RB/CSS/2023.08.03.32

Abstract
In this study, the oil extracts of Swiss chard and watercress were prepared, and the active substances were detected by qualitative and quantitative detection using the chromatography-mass spectrometry-GC\MS technique, calculating the percentage of its yield, then introducing the oil extracts into the preparation of bovine birch, and studying the effect of these extracts on chemical indicators such as the number of peroxide PV. And thiobarbituric acid (TBA), total volatile nitrogen (TVN) and free fatty acids (FFA) during the storage period (0,15,30). It was noted that the oily extract of chard and watercress contained tannins, carbohydrates, phenols, resins, flavonoids, saponins, and alkaloids but did not contain glycosides between compounds, coumarins and extracts such as 18. With several active compounds in it, it was noted that the chemical indicators recorded PV (2.26,1.96) % mEq/kg fat and TBA (0.43, 0.38) % mg Malone Aldehyde/kg meat TVN (2.46,2.38) % mg N/100 gm meat and FFA (0.18, 0.17) % in beef burger to which the oil extract was added, which increased slightly and not significantly with growing storage period and up to 30 days, which led to change the chemical properties compared to the control sample.

Keywords: oil extracts, bovine birch, beef burger.

Introduction

Medicinal plants and herbs are the standard means of treating many diseases and pathogens humans suffer from, so the World Health Organization (WHO) has taken care of herbal medicine and plants, developed legislation and established a global drug policy. Medicinal plants occupy, at present, a great place in agricultural and industrial production and are the primary source of plant drugs or a source of materials and active compounds that enter into medicine in the form of extracts or raw materials for the production of some chemical compounds. Moreover, the importance of oils extracted from medicinal plants, their uses in many fields and the food industry, and their possession of phenolic compounds with antioxidant properties through their high effectiveness and low toxicity, compared to those manufactured antioxidant phenols [7] and natural plants and herbs. It contains antioxidants, as both chard and watercress are widely used as food additives because they have protective effects on the body, and this antioxidant activity comes from the fact that it contains a large amount of phenolic compounds, flavonoids, and organic acids. Using watercress as an oil extract im-

proves the qualitative, chemical, and sensory evaluation characteristics of Berker's tablets treated with aqueous watercress extract stored by refrigeration and freezing [6]. The addition of plant extracts is vital in developing, improving, and preserving food products and their use as functional food components, antioxidants, and antimicrobial growth through their ability to process meat to enhance oxidative stability and maintain food quality for a more extended period [20].

The research aims to prepare oily extracts of chard and watercress plants and to diagnose their active compounds using GC-MS technology, then introduce the extracts into Berker mixtures and study their effect on chemical indicators throughout the preservation period up to 30 days.

Materials and Methods

Two models of plants were selected, which are chard and watercress. They were washed well and dried. The leaves were used only for the chard. As for the watercress, the whole plant was used. The vegetable leaves were ground and sifted using an electric grinder. Fat-free beef was used from the thigh area, as the meat was cut into cubes. Small to facilitate the mincing process and minced by using a meat disc twice to homogenize the meat and use the fat deposited around the bones of the pelvis and kidney, as it was obtained from the same carcass, then cut the fat into small cubes and mince in a meat mincer machine. He used garlic powder, black pepper powder, table salt, and basmati as a filler.

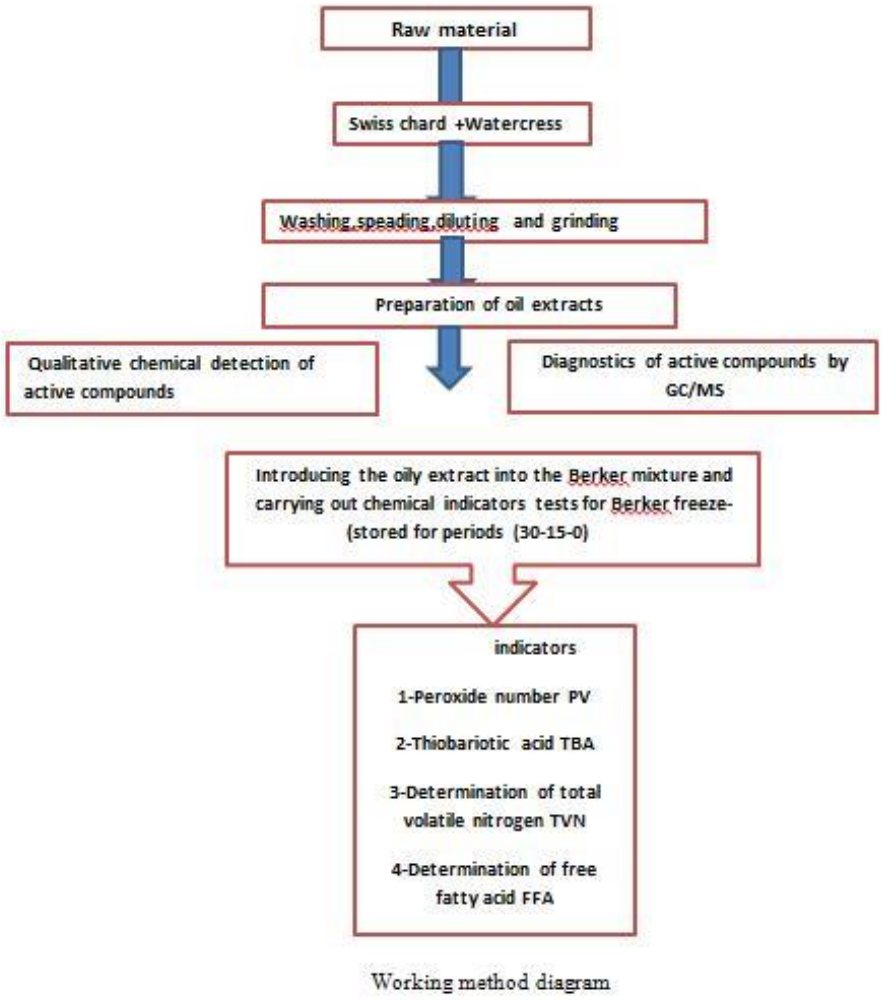

Figure 1: Working method diagram.

Prohibition of oily extracts of chard and watercress:
The extraction was done by the volatile organic solvent extraction method described in [10] using the volatile aromatic solvent petroleum ether by taking 60 g of dry, crushed plant sample and sifting in a sieve with a diameter of 0.5 mm for each sample to facilitate the penetration process The solvent and its spread over the largest area of the surfaces of the plant parts to extract the most significant amount of oil [11,12]. Plus, 100 ml of the organic solvent was added to it and placed in a thimble in a Soxhlet device connected to a circular flask of 500 ml and extracted at a temperature ranging from (30- 35) m for a period ranging from (4-5) hours. This method is called hot extraction, and the process is repeated twice to obtain the most significant amount of oil, then separate the oil with the (Rotary evaporator). Keep the oil in an opaque, tightly closed, and store at a temperature of 4 m until used.

Identification of the active compounds in the oil extract of chard and watercress using GC/MS technology and chemical and qualitative detection of these compounds.
The active compounds of each of (chard - watercress) were diagnosed separately, and this was done using a gas chromatograph connected to a mass spectrometer type Gc-msQP2010ultra Shlmlozu After obtaining the mass spectrum of each compound, the results were processed with the Gc-ms solutions program, and the effective Peaks curves were defined based on the Nstao8 machine database. Then, the active compounds were detected in the oil extract of each of the chard and watercress samples under study in the laboratories of the Ministry of Science and Technology / Center Ibn Al-Bitar's research and the [23] and [25] detectors and Marx's 1984), (Harbon's detector) were used to detect alkaloids. The method described in (Harbone, 1984) was used to detect phenols and the method described in [27] for the detection of flavonoids, the method described in (Shitata, 1951) for the detection of resins and the method described in (gawad, 1997) for the detection of tannins and the method described in [27] for the detection of glycosides and the method described in (Haddad, 1965) for the detection of saponins. Besides, the method described in (Shriner, 1980) was used to detect aldehydes and ketones, and the method described in (Harborne, 1984) for detecting triterpenoids, triterpenes, and sterols.

Preparing the birker mixture
Al-Berker tablets were manufactured and prepared according to what was mentioned [1] using 80% pure beef meat, 10% abdominal fat, 5% filler, 1% table salt, 0.7% black pepper, and garlic powder by 0.7%. 0.8% and 1% oil extract was added to it.

Chemical Indicators Tests for Bovine Berkers Freeze-Store (30-15-0)
Peroxidation value (PV) Peroxidation
Method [18] was used to estimate the PV value in frozen-stored beef Berker samples.

Determination of thiobarbituric acid (TBA)
Fat oxidation was measured in bovine burker samples by determination of thiobarbituric acid according to the method[13]

Estimation of TVN Total Volatile Nitrogen (TVN)
Estimating Total Volatile Nitrogen (TVN) in beef Berker samples according to method [13].

Estimation of Free Fatty Acids (FFA)
The percentage of free fatty acids was calculated using method [13].

Result

Percentage yield of vegetable oil extracts of chard and watercress
Table 1 shows the percentage of oily plant extracts extracted using the solvent petroleum ether. It is noted from the Table that the highest extraction rate was for the oily chard two oilseeds, which amounted to (3.34)%, which does not differ significantly from its percentage in the watercress oil extract, which amounted to (3.01)%.

Extracts	Yield
Oily chard	3.34 d
Oily watercress	3.01 d

Table 1: Percentage yield of vegetable oil extracts of chard and watercress.

Diagnosing the active compounds in the Swiss chard and watercress oil extract using the GC/MS technique.
Active compounds in the oil extract of Swiss chard. It is noted from Table 2 that 18 peaks appeared with their names and percentages of each compound, as the highest peak was No. 15, represented by the compounds Octadecane, 1-(eth-enyloxy)-acetic acid, chloro-hexadecylester, dichloroacetic, 4-pentadecylester, and the most important of these compounds is octadine, one of the hydrocarbon alkanes in the form of white crystals or odorless powder. Oleic acid is a lion, and it is one of the omega-9 acids that are important for maintaining the health of the body. It is essential in forming the cell membrane and developing the brain.

N P	DT	Active compounds	%
1-	4.477	Cyclotrisiloxane, hexamethyl1,2Bis(trimethylsilyl)benzene	0.93
2-	5.215	5-(3-Methylbutyl)-2-pyridinecarboxylic acidBenzaldehyde, 4-methoxy-ethylphenoxymethyl)-Phthalic acid, 2,7-dimethyloctn-5-yn-4-yl hexyl ester	2.96
3-	6.170	4-Chloro-6-methoxy-3-quinoline-meth anolN,N-Dimethylbis(trifluoromethyl)a cetamideBenzene, 1,1'-(2,2-dichloroethylid ene)bis[4-ethyl	1.00
4-	20.166	Oxazole, 4,5-diphenylCarbonic acid, monoamide, Nylphenyl)-, 2-methylpropyl ester-Amino-2Phenylindenone	2.29
5-	21.063	Diethyl Phthalate	15.23
6-	21.566	Diethyl Phthalate	0.92
7-	23.742	Isophytol, acetate13-Oxabicyclo[10.1.0]tridecane 2-Methyl-Z,Z-3,13-octadecadienol	3.41
8-	24.079	2-Pentadecanone, 6,10,14-trimethyl7-Oxabicyclo[4.1.0]heptane, 1,5-di me-thyl-3-Ethenylheptan-2,6-dione	4.76
9-	24.352	Cyclododecanol, 1-ethenyl-2(3H)-Benzofuranone, hexahy-dro7a-trimethyl-Oleic Acid	3.29
10-	25.020	3-Methyl-2-(3,7,11-trimethyldodecyl) furan Bicyclo[2.2.1]heptane, 2,2,3-trimethyl- 4-Methylimidazole-5-butyric acid,	3.05

11-	25.237	10-Undecynoic acid, methyl ester2-Hexadecenoic acid, methyl ester,(E)-Nonanoic acid, 9-oxo-, methyl este	5.19
12-	26.076	E-11-Hexadecenoic acid, ethyl esteOleic Acid6-Octadecenoic acid	1.07
13-	26.127	Acetic acid, 4-(7-methylydenebicyclo[3.3.1]non-2-en-3-yloxy)butyl esterE-11-Hexadecenoic acid, ethyl este 1-Bromo-3-(2-bromoethyl)-	1.72
14-	27.667	9,12,15-Octadecatrienoic acid, 2,3-dihydroxypropyl ester, (Z,Z,Z)-	19.40
15-	27.832	Octadecane, 1-(ethenyloxy)-Acetic acid, chloro-hexadecyl eter Dichloroacetic acid, 4-pentadecy	22.44
16-	28.449	9,12,15-Octadecatrienoic acid, eth	9.52
17-	28.558	12-Methyl-E,E-2,13-octadecadien-1-ol1,5,9,13-Tetradecatetraene 7,10,13-Hexadecatrienoic acid, methyl ester	1.27
18-	32.979	9-Octadecenoic acid (Z)-, 2,3-dihydroxypropyl ester 1-Bromo-3-(2-bromoethyl)-nonane2-Methyl-Z,Z-3,13-	1.55

Table 2: Active compounds in the oil extract of Swiss chard.

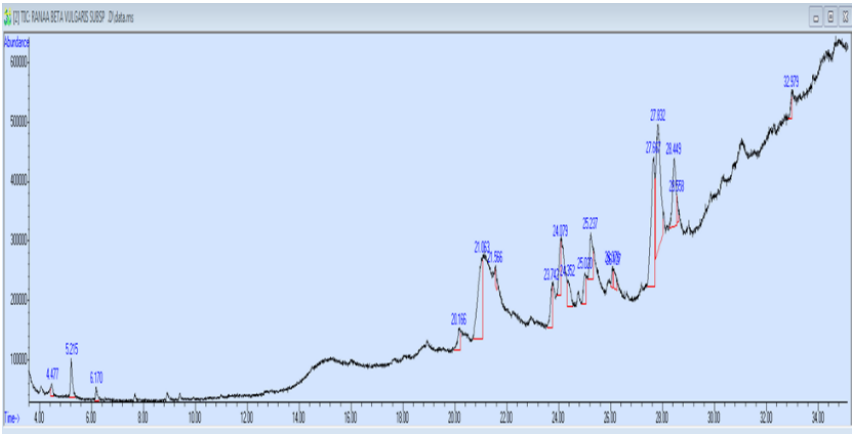

Figure 2: Active compounds in the oil extract of Swiss chard.

The active compounds in the oily extract of watercress,

As noted in Table 3 (20), peaks appeared with their name and percentages for each compound, as the highest peak was No. 10) represented by several compounds, the most important of which is 9-12-15-Octadecatrienoic acid, which is a natural product Known as valinolenic acid, it is an unsaturated fatty acid. It is one of the omega-3 acids. Its regular name is 9-12-15-Octadecatrienoic acid. It has a liquid appearance and a density of 0.92/g/cm3. It is crucial in the formation of several essential oils. In addition, the oil extract of arugula contains A large proportion of vatocopherol, one of the flavonoid compounds, which is a natural antioxidant.

NP	DT	Active compounds	%
1-	5.184	4-Ethoxy-2-(methylamino)troponeBenzeneacetic acid, .alpha.-[(trimethylsilyl)oxy]-, trimethylsilyl ester 1-Methyl-1-hydroxymethyladamantane	1.88
2-	21.038	Diethyl Phthalate	4.48
3-	21.540	Diethyl Phthalate	1.67
4-	24.104	2-Pentadecanone, 6,10,14-trimethyl7-Oxabicyclo[4.1.0]heptane, 1,5-dimethyl	3.01
5-	24.130	2-Pentadecanone, 6,10,14-trimethylCyclodecanol, acetate	2.37
6-	25.262	12-Tridecynoic acid, methyl esterNonanoic acid, 9-oxo-, methyl esteCyclopentanetridecanoic acid, methyl ester	3.45

7-	25.326	Hexadecanoic acid, methyl ester	2.18
8-	27.686	i-Propyl 9,12,15-octadecatrienoate9,12,15Octadecatrienoic acid, eth	15.19
9-	27.756	Ethyl 9,12,15-octadecatrienoate methyl ester, (Z,Z,Z)-	2.24
10-	27.839	1,2-Epoxy-5,9-cyclododecadiene9,12,15-Octadecatrienoic acid, methyl ester, (Z,Z,Z)-Bicyclo[10.1.0]tridec-1-ene	21.16
11-	28.475	9,12,15-Octadecatrienoic acid, 2,3dihydroxypropyl ester, (Z,Z,Z)-	2.45
12-	33.844	alpha.-Tocopheryl acetate	10.90
13-	33.889	Vitamin E.alpha.-Tocopherol-.beta.-D-mannosidedl-.alpha.-Tocopherol	4.11
14-	33.927	(.+/-.)-.alpha.-Tocopherol acetate.alpha.-Tocopheryl acetateVitamin E	3.12
15-	33.965	(.+/-.)-.alpha.-Tocopherol acetate.alpha.-Tocopheryl acetat-edl-.alpha.-Tocopherol	3.63
16-	34.022	.alpha.-Tocopheryl acetate	5.58
17-	34.073	alpha.-Tocopheryl acetate	3.11
18-	34.105	.alpha.-Tocopheryl acetate	2.75
19-	34.169	dl-.alpha.-TocopherolVitamin E(+)-.gamma.-Tocopherol, O-methyl-	3.58
20-	34.220	dl-.alpha.-TocopherolVitamin E(+)-.gamma.-Tocopherol, O-methyl-	3.17

Table 3: The active compounds in the oily extract of watercress.

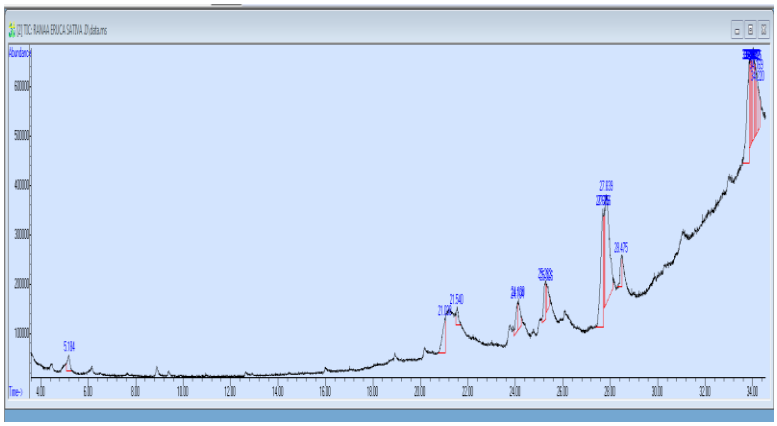

Figure 3: Active compounds in the oily extract of watercress.

Chemical and qualitative detection of the active compounds in the three extracts of each of the plants under study

It is noted from the Table that the chard oil extract contains tannins, carbohydrates, phenols, resins, flavonoids, saponins, alkaloids, and coumarins and that it does not contain glycosides, terpenes, and steroids. The watercress oil extract appeared to have tannins, carbohydrates, phenotypes, resins, flavonoids, saponins, and alkaloids, and not glycosides, coumarins, terpenes, and terpenes.

Extracts	Tannins	carbohydrate	Glycosides	Phenols	Resins	Flavonoids	Saponins	Alkaloids	Coumarins	Turbines	steroids
Oily chard	+	+	-	+	+	+	+	+	+	-	-
Oily water-cress	+	+	-	+	+	+	+	+	-	-	-

Table 4: Chemical and qualitative detection of the active compounds.

Chemical indicators of beef burgers to which the oil extracts of Swiss chard and watercress have been added, frozen for periods (30-15-0)

Peroxide number PV.

It is noted from Table 5 that the highest percentage of peroxide values was for the tablets treated with the oily extract of chard, as the values of the peroxide recorded a significant decrease, amounting to (2.26%) mEq/kg fat, which does not differ significantly from the value of the peroxide for the tablets treated with the oily extract watercress (1.96) % mEq/kg fat. This is what was recorded by the results of the period 0 days. As for the results of the period (15), the values of peroxide pv for the tablets treated with the chard oil extract recorded a slight, insignificant increase, reaching (2.31) % mEq/kg of fat, which does not differ significantly. The pv value of the tablets treated with watercress oil extract amounted to (2.11) % mEq/kg fat. As for the results of the period (30), the PV values recorded a slight, non-significant increase, reaching in chard oily extract (2.38) % mEq/kg fat, which does not differ significantly from The PV value of Berker's tablets treated with watercress oil extract was (2.30%) mEq/kg fat compared to the control sample.

3.5.2 Thiobariothioric acid (TBA) mg Malone aldehyde/kg meat

Is also noted in Table 5 the effect of oil extracts on the values of thiobariothioric acid, as it was pointed out that there were significant differences depending on the type of extract, as the value of TBA in the Berger tablets treated with the chard oily extract reached (0.43) % mg Malone Aldehyde/kg meat, which does not differ significantly from its value in Tablets treated with watercress oily extract, amounted to (0.34) % mg Malone Aldehyde/kg meat. These were the results of the period of 0 days. As for the product of the period of 15 days, the value of TBA increased slightly and continued to rise during the subsequent period of 30 days; no significant differences were recorded, as the value of The TBA of the beer kernel tablets treated with the oily extract of chard during the 15th period was (0.45%) mg Malone Aldehyde/kg meat, and the TBA value of the tablets treated with the oily extract of watercress was recorded, which amounted to (0.39) % mg Malone Aldehyde/kg meat. As for the results of the 30 days, tablets were recorded. The Berger was treated with chard oil extract (0.46) % mg Malone aldehyde/kg meat. As for the tablets treated with the oily watercress extract, the value of TBA was (0.41) % mg Malone aldehyde/kg meat compared to the control sample.

Total Volatile Nitrogen TVN mg N/100/gm Meat

The results in Table 5 show the effect of vegetable oil extracts on the value of TVN in frozen beef tablets. It is noted from the Table that there is a decrease in the value of TVN, so significant differences were recorded, as the value of TVN was recorded for Berker-treated tablets. With the oily extract orchard, it amounted to (2.85) % mg N/100gm of meat, while the value of TBA decreased insignificantly for the biker tablets treated with the oily extract of watercress, which amounted to (2.38) % mg N/100gm of meat. The value of TVN for nettles treated with oily chard extract recorded a slight increase from the previous period, which amounted to (2.46%) mg N/100/gm of meat. In contrast, the value of TVN for tablets treated with oily extract of watercress was recorded as (2.40)% mg N/100/ As for the results of the 30 days, the value of TVN for the tablets treated with the oily extract of chard was recorded, which amounted to (2.98)% mg N/100/g of meat, which does not differ in significant differences from the value of TVN for the tablets treated with the oily extract ofwatercress, which amounted to (2.46) mg N/ 100/gm meat compared to the control sample.

Free fatty acids FFA

The effect of the oil extracts of Swiss chard and watercress on the percentage of free fatty acids FFA in frozen-stored Berker tablets, as it is noted from Table (7) that the percentage of free fatty acids in the tablets treated with chard oil extracts was (0.18) % Which does not differ with significant differences from its percentage in the watercress oil extract, which amounted to (0.17)%. This was the result of the period of 0 days. As for the results of the period of 15 days, the FFA recorded a slight insignificant increase, as the percentage of FFA for the tablets treated with thechard oily extract reached (0.20)%, which does not differ significantly from its value in the tablets treated with the oily extract of watercress, which amounted to (0.19)%, while the FFA increased in the storage period of 30 days, recording significant differences, as the percentage of FFA of the tablets treated with the chard oily extract reached (0.22)%, which differs with insignificant differences from Its value in the Berger tablets treated with watercress oil extract was (0.23)% compared to the control sample.

Chemical indicators	Extracts	Storage period		
		0	15	30
PV	Standard	2.54 a	2.70 a	2.72 a
	Oily chard	2.26 ab	2.31 ab	2.38 ab
	Oily watercress	1.96 b	2.11 b	2.30 b
TBA	Standard	0.16 b	0.63	0.64
	Oily chard	0.43 ab	0.45	0.46
	Oily watercress	0.38 ab	0.39	0.41
TVN	Standard	6.10 a	6.21 a	6.25 a
	Oily chard	2.85 b	2.96 b	2.98 b
	Oily watercress	2.38 b	2.40 b	2.46 b
FFA	Standard	0.31 a	0.35 a	0.42 a
	Oily chard	0.18 ab	0.20	0.22
	Oily watercress	0.17 ab	0.19	0.23

Table 5: Chemical indicators of beef burgers.

Discussion

The percentage of oily plant extracts agreed with (Al-Hakim and Hassan, 1985) when they extracted natural oils from plant sources.

The chemical and qualitative detection of the active compounds in the three extracts of each plant under study results led to the conclusion that steroids were used. (Van poppel et al., 1999) And (Lynn et al., 2006).

The decrease in peroxide values by adding oil extracts is due to the effect of these oil extracts in curbing fat oxidation and attacking free radicals, which leads to a

decrease in peroxide values. These results agree with [15] and [17]. As for the effect of the storage period, the PV values increased slightly and insignificantly during the storage periods (30-15-0), and for all oil extracts, the peroxide values were at the lowest level in the period. Then, it began to rise during the storage period. The reason is that during freezing, oxidation of fats occurs, and thus, peroxides are formed, which increases during storage. As for the Berker tablets treated with extracts, their peroxide formation decreases due to the presence of the extracts and the fact that these extracts contain effective compounds that reduce the formation of peroxides during the storage periods. These results are with [3].

We conclude from this that the value of TBA decreased by the difference in the type of extracts added due to the different content of these extracts from the flavonoid compounds that contribute to the protection of fats from oxidation and reduce rancidity or delay the occurrence of rancidity [19]. TBA slightly increased and continued to rise throughout the storage period and for all extracts, as it reached its highest value during the last storage period. The increase in the value of TBA during the continuous storage period is due to the oxidation that occurs to fats during the period of freezing storage and the formation of peroxides, aldehydes and ketones. These results agreed with [3.]

The decrease in the value of TVN for the extract-treated tablets Oily extracts of vegetable oils is that these extracts contain effective compounds that have a natural antioxidant effect in meat stored in cold and freezing. The total volatile content in prepared meat tablets increased slightly with increasing storage periods for tablets treated with oily chard extracts and watercress. TV N continued to rise to reach the highest level in 30 days. These results with [22]

This is due to the different contents of the extracts from flavonoids, vitamin E and tocophenols and their effect as inhibitors of the action of lipolytic bacteria [28]. Its level was at 0 days and then began to rise continuously during the storage period of 30 days. The presence of lipolytic enzymes is what works to release the FFA continuously during the storage period [29,30].

Conclusions

It was noted that the oily extract of chard and watercress contained tannins, carbohydrates, phenols, resins, flavonoids, saponins, and alkaloids but did not contain glycosides between compounds, coumarins and extracts such as 18. With several active compounds in it, it was noted that the chemical indicators recorded PV (2.26,1.96) % mEq/kg fat and TBA (0.43, 0.38) % mg Malone Aldehyde/kg meat TVN (2.46,2.38) % mg N/100 gm meat and FFA (0.18, 0.17) % in the beef burger to which the oil extract was added, which increased slightly and not significantly with growing storage period and up to 30 days, which led to change the chemical properties compared to the control sample.

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Received: May 15, 2023/ Accepted: June 10, 2023 / Published: June 15, 2023
Citation: Issa, R. Q.; Abdulrahem, B.A. Effect of oily extracts on chemical parameters of frozen-stored beef Berker. Revis Bionatura 2023;8 (3) 32. http://dx.doi.org/10.21931/RB/CSS/2023.08.03.32