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RESEARCH PAPER

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Changes in the Biochemical and Fatty Acids Composition of Different Body Parts of Warty Crab (*Eriphia Verrucosa,* Forsskål, 1775) Caught from the Southeastern Black Sea and Their Relationship to Seasons and Sex

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Abstract

The study was carried out by taking samples from 10 different stations between the Giresun and Hopa coasts of the Southeastern Black Sea. In this study, the nutritional value of various edible body parts (carapace, right and left claw, and legs) of the warty crab (*Eriphia verrucosa*, Forsskål, 1775) was evaluated, sex seasonal proximal biochemical and fatty acid composition were compared. The highest content of protein (20.85%) was found in females (left claw) in winter and the highest content of fat (1.11%) in males (legs) in winter. Furthermore, the most dominant fatty acids in the fatty acid composition were Palmitic acid (11.2-13.9%) in SFA, Oleic acid (10.09-15.7%) in MUFA, and docosahexaenoic acid (DHA, 17.5-21.9%) in PUFA. There were no significant differences in SFA and MUFA contents in the fatty acid composition of female and male crab flesh meat samples except for the spring and summer seasons. However, Differences were obtained between the sexes in the n-3 and EPA+DHA fatty acid values in the spring season ($p<0.05$). In addition, the amount of EPA+DHA in 100g of edible crab meat was varied in 137.7-219.3 mg.

Introduction

Seafood contains sufficient and balanced protein, fat, and minerals suitable for human consumption. Therefore, it is thought to be a good food source for a healthy diet. Crabs are commonly used and marketed in the world for human consumption. *Eriphia verrucosa* (Forskål, 1775) is an intertidal crab from the North-Eastern Atlantic, found along coasts from Brittany to Mauritania and in the Azores, and along Mediterranean coasts (Pérez-Miguel et al., 2017). It is currently reported to be distributed in the Aegean and Black Sea (Erkan et al., 2008; Ulas and Aydın, 2011). This species is a typically crepuscular-nocturnal crustacean that leaves its shelter shortly before sunset in search of food and preferentially eats in the vicinity of its shelter (Pérez-Miguel et al., 2017). *E. verrucosa* spread throughout the Black Sea. It is distributed in shallow water along the rocky coast, between rocks and algae to a depth of 15 meters. Its carapace is thick and smooth, and the claws are strong and often uneven. Males are larger than females. The average carapace length was found as 5 cm, and the average weight was 102.6 g (Aydın et al., 2013). This species has a potentially high commercial value in Mediterranean countries, and to date, it is episodically found in local fish markets (Kaya et al., 2009; Zotti et al., 2016). There are five different crab species with economic value in Turkey. Among those, *E. verrucosa* and *Callinectes sapidus* species stand out as consumer preferences and are widely consumed in the Aegean and Mediterranean coastal regions (Çağlak and Karslı, 2017; Ozekinci and Acarlı, 2018). Bio-ecological

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studies have been carried out on warty crab (*E. verrucosa*) in the Black Sea region. The studies covered its distribution, population status, determination of spawning period, and food preference (Selimoğlu, 1997; Bilgin and Çelik, 2004; Erkan et al., 2008; Karadurmuş and Aydın, 2016). Few studies also occur on the proximate composition and fatty acid profile of this species caught from the West and Middle parts of the Black Sea (Gökoğlu and Yerlikaya; 2003; Çelik et al., 2004; Küçükgülmez et al., 2006; Altinelataman and Dinçer, 2007; Kuley et al., 2007; Küçükgülmez and Çelik, 2008; Turan et al., 2009; Kaya et al., 2009; Özoğul et al., 2013; Demirbaş et al., 2013; Erdem et al., 2015; Bayraklı, 2021). However, no study exists on the seasonal variation in the proximate composition and fatty acid contents of *E. verrucosa* caught from the Southeastern Black Sea. Therefore, this study aimed to investigate the changes in chemical composition and fatty acid values of warty crab in the Southeastern Black Sea region. Dernekbaşı et al. (2021) reported that gender differences could significantly affect the proximate composition of this species caught from the Middle part of the Black Sea. In addition, past studies demonstrated changes in nutritional values in different body parts of crabs and other seafood such as fish (Tufan et al., 2013). Moreover, none of the previous studies estimated the sexual differences in the nutritional composition of this species. Furthermore, no study exists on sexual differences and the variations in the nutritional value of this species caught from the Northeast Black Sea. For this reason, the effect of differences in gender and body parts on both chemical composition and fatty acid values of warty crabs have also been included in this research.

Materials and Methods

Sampling

The crabs used in the study were collected seasonally from Giresun, Trabzon, Rize, and Artvin/Hopa coastlines, which are situated in the Southeastern Black Sea Region. The samples were caught seasonally in the selected areas (10 stations) (Figure 1) by gillnets and free diving methods. Approximately 15-26 crabs were taken from each station. The samples were brought to the Faculty of Marine Sciences Laboratory in styrofoam boxes in chilled condition. Firstly, gender discrimination was made according to Selimoğlu (1997), then measurements such as carapace height and body weight were carried out. According to the measurement results, the carapace length and width of the crabs were found as 55.23-59.45 and 72.35-75.63 mm, respectively. Total body weight was determined as 25.21-36.64 g. Then, flesh meat from different body parts (carapace, right claw, left claw, and legs) were separated (Figure 2). Finally, all the edible flesh of the experimental body parts was removed and prepared for analysis. The collected crabs were separated by considering their sex and body parts. The meats obtained from the same sex and the same body part representing the same season were combined by mixing with a homogenizer (Arçelik; K-1631 P Valso Plus, 2.2 L capacity, Türkiye).

Analysis of Proximate Composition

Moisture content was determined by the oven drying method of AOAC (1995). Five grams of crab meat were dried at 105°C until a constant weight was

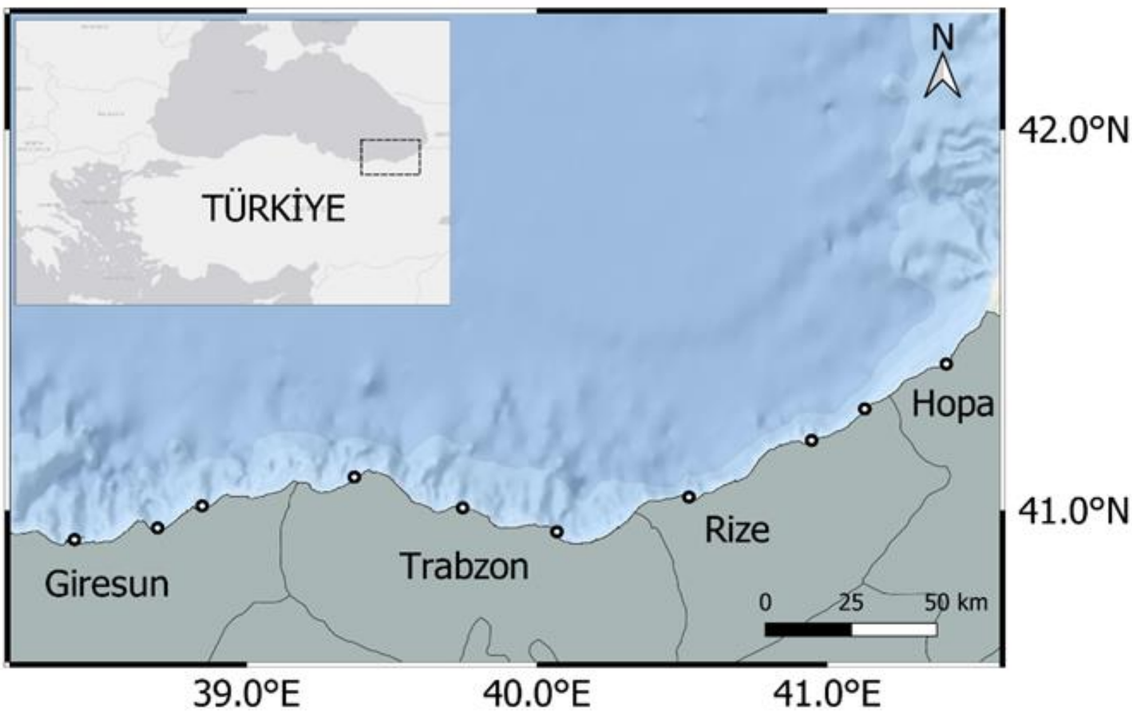

Figure 1. Sampling area of Warty Crab

obtained (AOAC, 1995, Method 985.14). Results were expressed as g water/100g muscle. Ash was determined by the AOAC (2005a) Method 7.009. Crude fat content was determined using a solvent extractor Velp SER 148/6 (Velp Scientifica, Milano, Italy) with petroleum ether (130°C). Protein content was determined by AOAC Method 2.507 (AOAC, 2005b).

Analysis of Fatty Acids

Fatty acid analysis of edible crab meat samples was carried out according to the method described by Tufan et al. (2016). Methyl esters were prepared using a transesterification method with 2 M potassium hydroxide (KOH) in methanol and n-hexane according to the method of Ichihara et al. (1996) with few modifications. First, the extracted oil was dissolved in 2 mL n-hexane in a tube. Then, 4 mL of 2 M methanolic KOH were added. The tube was vortexed for 2 mins at room temperature. Next, it was centrifuged for 10 mins at 4,000 rpm. Then, the hexane layer was used for gas chromatography (GC).

Gas Chromatography Conditions

Fatty acids were determined using a Shimadzu 2010 GC equipped with an autosampler (Shimadzu, JAPAN), a split injector (ratio 1:20), and a flame ionization detector (FID). The column was a 100m SUPELCO (SP™-2380, USA) fused silica capillary column (film 0.20 µm, diameter 0.25 mm). The temperatures of the detector and the injector port were held at 260ºC. The injected volume was 1 µL. The column temperature was held at 140ºC for 5 mins, raised to 240ºC at 5ºC/min, and kept at 240ºC for 30 mins. The identification of fatty acids was carried out by comparing the retention times of FAME with Supelco™ 37 component FAME mixture (Cat. No. 47885-U). FAME was quantified by using the area normalization method. The area composition of each compound was detected, and the results were expressed as FAME%. Three replicated GC analyses were performed for each sample extract, and the results were expressed in GC area % as the mean value standard deviation (SD). The amount of g fatty acid in edible crab meat portion was calculated by the method explained in Greenfield and Southgate (2003) and Exler et al. (1975) using the formulae given below;

Fatty acid (FA) content (g FA per 100g edible portion) = FAME % x FACF x lipid content % (g lipid/100g food) /100 (Eq. 1)

Where FAME is fatty acid methyl esters, FACF: the lipid conversion factor (fatty acid conversion factor, g FA/g lipid) that is reported as 0.90 for crab meat which contains fat above 5%, if the fat contents are below 5%, the FACF is calculated from the equation for crustaceans: 0.956 - (0.273/TL) for crab muscle, where TL means total lipid content (Weihrauch et al., 1977).

Statistical Analysis

The data obtained were analysed by analysis of variance (One-Way ANOVA) and when significant differences were found, comparisons among means were carried out by using a TUKEY and Mann Whitney U test (data not provided in the normality of assumptions) under the program called JMP 5.0.1 (SAS Institute. Inc. USA) and SPSS (SPSS Inc., Chicago, IL) (Sokal and Rohlf, 1987). A significance level of 95% ($p<0.05$) was used throughout the analysis.

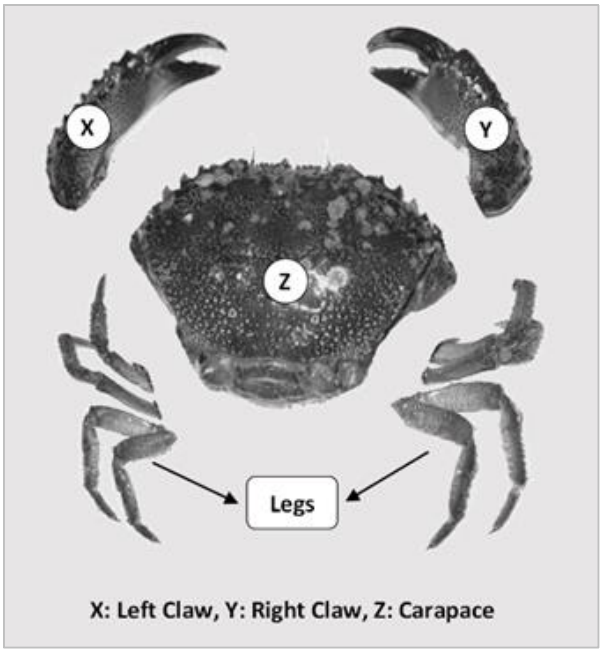

Figure 2. Body parts of Warty Crab (Karadurmus, 2013)

Results

Proximal Composition Results

The nutrient composition results of male and female crab samples caught in different seasons of the year were given in Table 1. According to these results, the protein values were found to be the lowest in summer and the highest in winter at 16.49±0.43 and 19.70±0.90% on average, respectively. The opposite situation occurred for the moisture contents, and overall the highest and lowest values were 76.92 and 79.68%, respectively. In the same respect, the lowest fat content corresponded to Autumn, while the highest fat values were found for spring at 0.76 and 0.95%. The ash values were determined between 1.76 and 2.25%, with the lowest and highest values corresponding to spring and summer, respectively. When the contents of protein values in the body parts of warty crabs were examined, the highest protein (20.85%) was found in the left claw of female crabs in winter and the lowest protein (13.24%) in the legs of male crabs in summer. While the fat values were highest (1.11%) in the legs of male crabs in winter, the lowest fat (0.66%) was determined in the right claw of female crabs in the same season.

Fatty Acid Composition Results

Variations in the fatty acid profile amongst different body parts of warty crabs within the same sex and same season have been shown in Table 2, 3and 4 relating to four different seasons. The highest fatty acid

Table 1. Seasonal variation of proximate composition in body parts of male and female crabs (g/100g edible meat)

Seasons	Gender	Body Parts	Protein	Fat	Moisture	Ash
WINTER	♂	*Carapace*	20.59±0.08$^{a}_{A}$	1.10±0.04$^{a}_{A}$	77.78±0.10$^{a}_{A}$	2.23±0.10$^{a}_{A}$
		Left Claw	19.35±0.17$^{a}_{A}$	0.85±0.01$^{b}_{A}$	76.72±0.02$^{a}_{A}$	2.07±0.02$^{a}_{A}$
		Right Claw	18.24±0.14$^{a}_{A}$	0.82±0.01$^{b}_{A}$	77.61±0.05$^{a}_{A}$	1.88±0.05$^{ab}_{A}$
		Legs	19.68±0.14$^{a}_{A}$	1.11±0.02$^{a}_{A}$	76.70±0.21$^{a}_{A}$	2.49±0.21$^{c}_{A}$
		Mean	19.46±0.97$_{A}$	0.97±0.05$_{A}$	77.20±0.57$_{A}$	2.17±0.26$_{A}$
	♀	*Carapace*	19.80±0.15$^{a}_{A}$	0.81±0.09$^{a}_{B}$	76.45±0.06$^{a}_{A}$	2.26±0.06$^{a}_{A}$
		Left Claw	20.85±0.06$^{a}_{A}$	0.73±0.07$^{a}_{A}$	75.98±0.14$^{a}_{A}$	2.29±0.14$^{a}_{A}$
		Right Claw	20.22±0.12$^{a}_{A}$	0.66±0.03$^{b}_{B}$	76.66±0.20$^{a}_{A}$	2.09±0.20$^{a}_{A}$
		Legs	18.87±0.11$^{b}_{A}$	0.84±0.03$^{a}_{B}$	77.49±0.04$^{a}_{A}$	2.20±0.04$^{a}_{A}$
		Mean	19.93±0.83$_{A}$	0.76±0.08$_{B}$	76.64±0.63$_{A}$	2.21±0.90$_{A}$
		Overall Means	19.70±0.90	0.87±0.07	76.92±0.60	2.19±0.59
SPRING	♂	*Carapace*	16.25±0.60$^{a}_{A}$	1.05±0.10$^{a}_{A}$	80.02±0.40$^{b}_{A}$	1.55±0.16$^{a}_{A}$
		Left Claw	17.14±0.11$^{ab}_{A}$	0.92±0.12$^{a}_{A}$	78.75±0.12$^{a}_{A}$	1.66±0.17$^{a}_{A}$
		Right Claw	17.57±0.06$^{ab}_{A}$	0.90±0.08$^{a}_{A}$	79.64±0.01$^{a}_{A}$	1.17±0.11$^{b}_{A}$
		Legs	16.38±0.02$^{a}_{A}$	1.06±0.07$^{a}_{A}$	79.43±0.77$^{a}_{A}$	1.92±0.11$^{c}_{A}$
		Mean	16.83±0.62$_{A}$	0.97±0.06$_{A}$	79.48±0.55$_{A}$	1.75±0.31$_{A}$
	♀	*Carapace*	19.85±0.12$^{a}_{B}$	0.98±0.06$^{a}_{A}$	77.63±0.19$^{a}_{B}$	1.65±0.19$^{a}_{A}$
		Left Claw	17.70±0.11$^{ab}_{A}$	0.88±0.08$^{ab}_{A}$	77.97±0.43$^{a}_{A}$	1.62±0.05$^{a}_{A}$
		Right Claw	18.72±0.20$^{a}_{A}$	0.86±0.03$^{ab}_{A}$	77.49±0.32$^{a}_{A}$	1.93±0.10$^{b}_{B}$
		Legs	18.82±0.43$^{a}_{B}$	0.98±0.04$^{a}_{A}$	78.23±0.14$^{ab}_{A}$	1.89±0.51$^{b}_{A}$
		Mean	18.77±0.88$_{B}$	0.93±0.08$_{A}$	77.83±0.33$_{A}$	1.77±0.16$_{A}$
		Overall Means	17.80±0.75	0.95±0.07*	78.66±0.44	1.76±0.24*
SUMMER	♂	*Carapace*	14.26±0.09$^{a}_{A}$	0.85±0.10$^{a}_{A}$	81.43±0.79$^{a}_{A}$	2.33±0.02$^{a}_{A}$
		Left Claw	13.72±0.08$^{ab}_{A}$	0.80±0.04$^{a}_{A}$	83.67±0.29$^{ab}_{A}$	2.17±0.02$^{a}_{A}$
		Right Claw	15.98±0.09$^{ac}_{A}$	0.72±0.03$^{ab}_{A}$	81.44±0.37$^{a}_{A}$	2.01±0.03$^{ab}_{A}$
		Legs	13.24±0.06$^{ab}_{A}$	0.81±0.01$^{a}_{A}$	82.79±0.16$^{a}_{A}$	2.41±0.16$^{a}_{A}$
		Mean	14.30±0.19$_{A}$	0.81±0.06$_{A}$	82.33±1.10$_{A}$	2.23±0.18$_{A}$
	♀	*Carapace*	18.49±0.07$^{a}_{B}$	0.89±0.03$^{a}_{A}$	77.04±0.66$^{a}_{B}$	2.04±0.02$^{a}_{A}$
		Left Claw	18.90±0.09$^{a}_{B}$	0.71±0.03$^{b}_{A}$	76.75±0.51$^{a}_{B}$	2.43±0.03$^{bc}_{A}$
		Right Claw	17.88±0.11$^{ab}_{B}$	0.73±0.02$^{b}_{A}$	78.26±0.27$^{ab}_{B}$	2.21±0.07$^{ab}_{A}$
		Legs	19.49±0.18$^{a}_{B}$	0.85±0.02$^{a}_{A}$	76.05±0.19$^{a}_{B}$	2.37±0.04$^{bc}_{A}$
		Mean	18.69±0.68$_{B}$	0.79±0.08$_{A}$	77.02±0.92$_{B}$	2.26±0.17$_{A}$
		Overall Means	16.49±0.43*	0.80±0.07	79.68±1.01*	2.25±0.18
AUTUMN	♂	*Carapace*	18.89±0.06^{aA}	0.86±0.10$^{a}_{A}$	77.69±0.42$^{a}_{A}$	1.86±0.01$^{a}_{A}$
		Left Claw	19.27±0.12$^{ab}_{A}$	0.78±0.07$^{a}_{A}$	76.01±0.96$^{a}_{A}$	1.66±0.13$^{a}_{A}$
		Right Claw	17.68±0.17$^{c}_{A}$	0.76±0.05$^{a}_{A}$	77.69±0.42$^{a}_{A}$	1.77±0.16$^{a}_{A}$
		Legs	17.84±0.03$^{c}_{A}$	0.80±0.03$^{a}_{A}$	77.37±0.43$^{a}_{A}$	2.48±0.26$^{b}_{A}$
		Mean	18.42±0.78$_{A}$	0.80±0.04$_{A}$	76.78±0.87$_{A}$	1.94±0.36$_{A}$
	♀	*Carapace*	17.45±0.04$^{a}_{A}$	0.80±0.02$^{a}_{A}$	77.28±0.42$^{a}_{A}$	2.38±0.05$^{a}_{B}$
		Left Claw	14.43±0.06$^{b}_{B}$	0.72±0.05$^{a}_{A}$	81.17±0.71$^{b}_{B}$	2.30±0.02$^{a}_{B}$
		Right Claw	17.32±0.03$^{a}_{A}$	0.70±0.06$^{a}_{A}$	77.98±0.46$^{a}_{A}$	2.14±0.06$^{a}_{B}$
		Legs	16.47±0.03$^{a}_{A}$	0.79±0.04$^{a}_{A}$	78.54±0.56$^{a}_{A}$	2.77±0.09$^{a}_{A}$
		Mean	16.41±0.39$_{B}$	0.75±0.06$_{A}$	78.75±0.69$_{A}$	2.39±0.26$_{B}$
		Overall Means	17.42±0.58*	0.76±0.05	77.77±0.78	2.12±0.31

n=3, ±: standard deviation.

Different superscript letters in the same column (a, b, c and d) indicate significant differences amongst different body parts of the same sex within the same season ($p<0.05$; One-Way ANOVA).

Different subscript letters (A and B) in the same column indicate significant differences between the same body parts of different sexes (male and female) within the same season ($p<0.05$; TUKEY and Mann Whitney U test).

Superscript '*****' indicates that the mean nutrient composition of males and females differences between seasons ($p<0.05$; One-Way ANOVA)

Table 2. Seasonal variations of the main fatty acids groups amongst the same body parts within the same sex (g/100g)

		Male						Female					
	Body Parts	∑SFA	∑MUFA	∑PUFA	EPA+DHA	∑n3	∑n6	∑SFA	∑MUFA	∑PUFA	EPA+DHA	∑n3	∑n6
WINTER	*Carapace*	$19.2\pm0.2_A^a$	$16.3\pm0.2_A^a$	$44.8\pm0.9_A^b$	$33.4\pm0.4_A^b$	$34.2\pm0.4_A^b$	$9.8\pm0.5_A^a$	$19.5\pm0.8_A^{ab}$	$15.1\pm0.2_B^b$	$39.8\pm1.3_B^{ab}$	$29.4\pm1.9_B^b$	$30.6\pm1.8_B^a$	$8.1\pm0.5_B^a$
	Right Claw	$18.5\pm0.1_A^a$	$17.5\pm0.5_A^a$	$44.5\pm0.7_A^b$	$32.9\pm1.2_A^b$	$33.5\pm1.2_A^b$	$10.3\pm0.5_A^a$	$17.2\pm0.1_B^b$	$12.5\pm0.2_B^b$	$40.4\pm0.5_B^a$	$29.8\pm0.4_B^a$	$30.7\pm0.4_B^a$	$8.7\pm0.0_B^b$
	Left Claw	$16.6\pm0.7_A^a$	$14.8\pm1.2_A^b$	$38.7\pm1.1_A^b$	$28.7\pm1.6_A^{ab}$	$29.5\pm1.6_A^a$	$8.7\pm0.4_A^b$	$18.3\pm0.2_B^a$	$14.0\pm0.0_A^a$	$40.7\pm2.0_A^{ab}$	$29.4\pm0.1_A^a$	$30.5\pm1.0_A^a$	$9.3\pm0.8_A^{ab}$
	Legs	$17.0\pm0.7_A^a$	$12.8\pm0.3_A^b$	$42.1\pm0.2_A^a$	$31.8\pm0.3_A^a$	$32.5\pm0.3_A^a$	$8.8\pm0.1_A^{ab}$	$20.4\pm0.7_B^a$	$12.5\pm0.4_A^b$	$46.1\pm1.9_B^b$	$35.3\pm1.5_B^b$	$35.8\pm1.5_B^a$	$9.0\pm0.4_A^a$
SPRING	*Carapace*	$21.6\pm0.8_A^b$	$16.5\pm0.5_A^a$	$41.5\pm0.7_A^{ac}$	$32.3\pm0.2_A^c$	$32.7\pm0.2_A^c$	$8.5\pm0.5_A^{ab}$	$20.6\pm0.1_B^{ab}$	$14.6\pm0.6_B^{ab}$	$40.8\pm0.1_A^b$	$31.7\pm0.2_B^a$	$32.5\pm0.2_A^a$	$7.4\pm0.1_B^b$
	Right Claw	$19.6\pm0.1_A^b$	$16.9\pm0.5_A^{ab}$	$45.5\pm1.0_A^b$	$32.0\pm0.5_A^b$	$32.4\pm0.5_A^b$	$11.9\pm0.3_A^b$	$19.8\pm0.1_A^a$	$13.7\pm0.1_B^c$	$46.6\pm0.9_A^b$	$35.3\pm0.9_B^b$	$36.3\pm0.9_B^{ab}$	$9.4\pm0.1_B^c$
	Left Claw	$21.0\pm0.0_A^b$	$18.1\pm0.1_A^a$	$43.6\pm0.7_A^a$	$29.8\pm0.6_A^{ab}$	$30.3\pm0.6_A^a$	$12.2\pm0.0_A^c$	$19.2\pm0.2_B^a$	$13.0\pm0.1_B^b$	$45.6\pm0.6_B^c$	$35.0\pm0.5_B^b$	$36.1\pm0.5_B^b$	$8.7\pm0.1_B^b$
	Legs	$24.1\pm1.2_A^b$	$14.7\pm0.1_A^c$	$47.0\pm0.2_A^b$	$35.5\pm0.1_A^b$	$36.0\pm0.1_A^b$	$9.6\pm0.2_A^a$	$19.9\pm0.2_B^a$	$11.8\pm0.1_B^c$	$46.1\pm0.2_B^b$	$36.6\pm0.4_B^b$	$37.6\pm0.4_B^b$	$7.6\pm0.2_B^b$
SUMMER	*Carapace*	$25.0\pm0.0_A^c$	$17.5\pm0.8_A^b$	$42.8\pm1.4_A^{abc}$	$31.1\pm0.8_A^{ac}$	$32.0\pm0.8_A^c$	$9.6\pm0.6_A^{ab}$	$23.1\pm1.0_B^c$	$14.0\pm0.7_B^a$	$37.4\pm0.8_B^c$	$27.9\pm0.8_B^b$	$28.6\pm0.9_B^b$	$8.0\pm0.0_B^a$
	Right Claw	$21.0\pm0.0_A^c$	$17.8\pm0.6_A^a$	$38.2\pm0.7_A^a$	$26.9\pm0.2_A^a$	$27.5\pm0.2_A^a$	$10.4\pm0.5_A^a$	$19.5\pm0.0_B^a$	$14.8\pm0.2_B^a$	$41.0\pm0.3_B^a$	$29.0\pm0.7_B^a$	$29.7\pm0.6_B^a$	$10.4\pm0.3_A^a$
	Left Claw	$23.0\pm0.5_A^c$	$18.4\pm0.1_A^a$	$38.8\pm0.5_A^b$	$26.6\pm0.0_A^c$	$27.8\pm0.0_A^{ab}$	$9.7\pm0.4_A^{bd}$	$17.6\pm0.2_B^b$	$13.1\pm0.1_B^b$	$42.4\pm1.0_B^{ab}$	$32.0\pm1.0_B^c$	$32.7\pm0.1_B^c$	$8.7\pm0.0_B^b$
	Legs	$21.0\pm0.7_A^c$	$21.0\pm0.0_A^d$	$40.7\pm1.1_A^a$	$30.6\pm1.9_A^a$	$31.3\pm3.9_A^{ab}$	$9.2\pm0.2_A^a$	$20.5\pm1.2_A^{ab}$	$14.1\pm0.6_B^a$	$42.7\pm2.0_A^a$	$31.6\pm2.6_A^{bc}$	$32.3\pm2.28_A^a$	$9.4\pm0.6_A^a$
AUTUMN	*Carapace*	$19.4\pm1.3_A^a$	$15.7\pm0.8_A^a$	$40.9\pm1.8_A^a$	$29.5\pm1.3_A^a$	$30.3\pm1.1_A^a$	$9.7\pm0.7_A^a$	$21.5\pm0.2_B^a$	$14.0\pm0.4_B^a$	$42.5\pm1.0_A^a$	$32.3\pm0.6_B^a$	$33.4\pm1.6_B^a$	$8.2\pm0.6_B^a$
	Right Claw	$21.0\pm0.0_A^c$	$17.8\pm0.6_A^a$	$38.2\pm0.7_A^a$	$26.9\pm0.2_A^a$	$27.5\pm0.2_A^a$	$10.4\pm0.4_A^a$	$19.5\pm0.0_B^a$	$14.8\pm0.2_B^a$	$41.0\pm0.3_B^a$	$29.0\pm0.7_B^a$	$29.7\pm0.6_B^a$	$10.4\pm0.7_A^a$
	Left Claw	$20.3\pm0.1_A^b$	$18.1\pm0.3_A^a$	$42.8\pm0.1_A^a$	$30.2\pm0.1_A^a$	$31.1\pm0.1_A^a$	$11.0\pm0.1_A^a$	$19.1\pm0.8_B^a$	$14.0\pm0.3_B^a$	$40.9\pm0.6_B^a$	$29.0\pm0.2_B^a$	$29.7\pm0.2_B^a$	$10.4\pm0.7_A^a$
	Legs	$21.0\pm0.7_A^c$	$16.5\pm0.1_A^a$	$40.7\pm1.1_A^a$	$30.6\pm0.9_A^a$	$31.3\pm0.9_A^a$	$9.2\pm0.2_A^a$	$20.5\pm1.2_A^{ab}$	$14.1\pm0.6_B^a$	$42.7\pm2.0_A^a$	$31.6\pm0.9_A^a$	$32.3\pm2.5_A^a$	$9.4\pm0.6_A^a$

n=3, ±: standard deviation.

Superscript lowercase letters (a, b, c and d) in different lines indicate seasonal differences in similar fatty acid values of the same sex in similar body organs ($p<0.05$; One-Way ANOVA).

Subscript capital letters (A and B) in different columns indicate differences in similar fatty acid values for different sexes ($p<0.05$; TUKEY and Mann Whitney U test).

Table 3. Seasonal variation and sexual differences in the overall mean of fatty acid values (including all body parts) for the male and female crabs

	WINTER			SPRING			SUMMER			AUTUMN		
Fatty acid (%)	♂	♀	Mean	♂	♀	Mean	♂	♀	Mean	♂	♀	Mean
C14:0	$0.1\pm0.0^{a}_{A}$	$1.0\pm0.1^{b}_{B}$	0.5±0.1	$0.4\pm0.1^{b}_{A}$	$1.0\pm0.2^{bc}_{B}$	0.7±0.2	$0.3\pm0.0^{bc}_{A}$	$0.9\pm0.1^{bc}_{B}$	0.6±0.0	$0.1\pm0.0^{a}_{A}$	$0.7\pm0.1^{a}_{A}$	0.4±0.0
C16:0	$11.5\pm0.8^{bc}_{A}$	$11.2\pm1.1^{a}_{A}$	11.4±0.9	$12.9\pm0.7^{ab}_{A}$	$12.0\pm0.5^{a}_{A}$	12.4±0.6	$13.9\pm0.9^{a}_{A}$	$11.6\pm2.1^{a}_{A}$	12.7±1.5	$13.3\pm0.5^{a}_{A}$	$12.5\pm0.8^{a}_{A}$	12.9±0.6
C18:0	$5.7\pm0.5^{ab}_{A}$	$6.1\pm0.8^{a}_{A}$	5.9±0.6	$7.1\pm0.8^{c}_{A}$	$6.4\pm0.4^{a}_{A}$	6.7±0.6	$9.1\pm1.0^{d}_{A}$	$6.0\pm0.7^{ab}_{B}$	7.5±0.9	$6.7\pm0.5^{a}_{A}$	$6.3\pm0.6^{a}_{A}$	6.5±0.5
C20:0	$0.1\pm0.1^{a}_{A}$	$0.1\pm0.1^{a}_{A}$	0.1±0.1	$0.1\pm0.0^{a}_{A}$	$0.1\pm0.1^{ab}_{A}$	0.1±0.0	$0.1\pm0.0^{a}_{A}$	$0.0\pm0.0^{a}_{A}$	0.0±0.0	$0.1\pm0.0^{a}_{A}$	$0.0\pm0.0^{a}_{A}$	0.1±0.0
C22:0	$0.3\pm0.9^{ab}_{A}$	$0.4\pm0.1^{b}_{A}$	0.3±0.1	$0.2\pm0.1^{ab}_{A}$	$0.2\pm0.1^{ab}_{A}$	0.2±0.1	$0.3\pm0.1^{ab}_{A}$	$0.2\pm0.0^{ac}_{A}$	0.2±0.1	$0.1\pm0.0^{a}_{A}$	$0.2\pm0.0^{a}_{A}$	0.2±0.0
C24:0	$0.2\pm0.1^{a}_{A}$	$0.3\pm0.1^{a}_{A}$	0.2±0.1	$0.1\pm0.1^{ab}_{A}$	$0.2\pm0.1^{a}_{A}$	0.2±0.1	$0.2\pm0.1^{a}_{A}$	$0.1\pm0.1^{ab}_{A}$	0.1±0.0	$0.4\pm0.0^{a}_{A}$	$0.3\pm0.1^{a}_{B}$	0.3±0.1
∑SFA	$17.8\pm1.1^{b}_{A}$	$19.0\pm1.6^{a}_{A}$	18.4±1.4	$21.2\pm2.1^{a}_{A}$	$19.8\pm0.4^{a}_{A}$	20.5±1.3	$23.8\pm1.1^{ac}_{A}$	$18.7\pm0.8^{ab}_{B}$	21.2±1.9	$20.7\pm0.5^{a}_{A}$	$20.0\pm1.1^{a}_{A}$	20.4±0.8
C14:1	$0.7\pm0.2^{a}_{A}$	$0.5\pm0.1^{ab}_{A}$	0.6±0.2	$0.6\pm0.1^{a}_{A}$	$0.2\pm0.0^{c}_{B}$	0.4±0.0	$0.7\pm0.1^{a}_{A}$	$0.5\pm0.1^{ab}_{A}$	0.6±0.1	$0.6\pm0.1^{a}_{A}$	$0.9\pm0.1^{a}_{A}$	0.8±0.1
C16:1	$0.1\pm0.0^{a}_{A}$	$0.6\pm0.3^{ab}_{B}$	0.3±0.1	$0.1\pm0.0^{a}_{A}$	$1.1\pm0.1^{c}_{A}$	0.6±0.1	$0.1\pm0.0^{a}_{A}$	$0.8\pm0.0^{b}_{B}$	0.5±0.1	$0.0\pm0.0^{a}_{A}$	$0.3\pm0.1^{a}_{A}$	0.2±0.0
C18:1n9	$13.2\pm0.8^{ab}_{A}$	$11.1\pm0.7^{ab}_{B}$	12.1±1.3	$15.0\pm1.3^{a}_{A}$	$11.0\pm0.8^{ab}_{B}$	13.0±1.1	$15.6\pm0.9^{a}_{A}$	$10.9\pm0.7^{ab}_{B}$	13.3±0.8	$15.7\pm1.0^{a}_{A}$	$12.0\pm0.5^{a}_{B}$	13.9±0.8
C20:1	$0.8\pm0.1^{a}_{A}$	$0.8\pm0.2^{a}_{A}$	0.8±0.1	$0.7\pm0.1^{a}_{A}$	$0.7\pm0.1^{a}_{A}$	0.7±0.1	$0.8\pm0.1^{a}_{A}$	$0.9\pm0.1^{ab}_{A}$	0.8±0.1	$0.7\pm0.1^{a}_{A}$	$0.7\pm0.3^{a}_{A}$	0.7±0.2
C24:1	$0.5\pm0.1^{ab}_{A}$	$0.5\pm0.0^{c}_{A}$	0.5±0.0	$0.3\pm0.0^{c}_{A}$	$0.3\pm0.1^{ab}_{A}$	0.3±0.09	$0.4\pm0.1^{abc}_{A}$	$0.4\pm0.0^{ab}_{A}$	0.4±0.0	$0.3\pm0.1^{ac}_{A}$	$0.3\pm0.1^{ab}_{A}$	0.3±0.1
∑MUFA	$15.2\pm0.9^{b}_{A}$	$13.4\pm1.0^{ab}_{B}$	14.3±1.4	$16.6\pm0.3^{ac}_{A}$	$13.3\pm0.2^{ab}_{B}$	14.9±1.2	$17.6\pm0.9^{c}_{A}$	$13.5\pm0.8^{ab}_{B}$	15.6±0.9	$17.4\pm0.8^{a}_{A}$	$14.2\pm0.6^{a}_{B}$	15.8±0.1
C18:2n6	$2.3\pm0.3^{a}_{A}$	$2.2\pm0.3^{ab}_{A}$	2.2±0.3	$3.1\pm0.4^{b}_{A}$	$2.1\pm0.2^{ab}_{B}$	2.6±0.3	$2.3\pm0.3^{a}_{A}$	$2.2\pm0.2^{ab}_{A}$	2.3±0.3	$2.3\pm0.3^{a}_{A}$	$1.9\pm0.1^{a}_{A}$	2.1±0.2
C18:3n3	$0.5\pm0.1^{a}_{A}$	$0.7\pm0.1^{ab}_{B}$	0.6±0.1	$0.2\pm0.1^{ab}_{A}$	$0.8\pm0.1^{b}_{B}$	0.5±0.14	$0.4\pm0.1^{a}_{A}$	$0.6\pm0.0^{a}_{A}$	0.5±0.1	$0.5\pm0.1^{a}_{A}$	$0.5\pm0.1^{a}_{A}$	0.5±0.1
C18:3n6	$0.2\pm0.1^{ab}_{A}$	$0.4\pm0.1^{b}_{B}$	0.3±0.1	$0.1\pm0.0^{a}_{A}$	$0.3\pm0.1^{bc}_{A}$	0.2±0.0	$0.1\pm0.0^{ac}_{A}$	$0.2\pm0.0^{cd}_{A}$	0.2±0.0	$0.1\pm0.0^{a}_{A}$	$0.1\pm0.0^{a}_{A}$	0.1±0.0
C20:2	$0.6\pm0.1^{ab}_{A}$	$1.0\pm0.1^{ab}_{B}$	0.8±0.1	$1.0\pm0.4^{bc}_{A}$	$0.9\pm0.0^{a}_{A}$	0.9±0.2	$1.1\pm0.3^{c}_{A}$	$0.8\pm0.1^{a}_{A}$	0.9±0.2	$0.4\pm0.1^{a}_{A}$	$0.9\pm0.1^{a}_{B}$	0.6±0.2
C20:3n3	$0.3\pm0.1^{a}_{A}$	$0.2\pm0.0^{a}_{A}$	0.2±0.0	$0.3\pm0.0^{a}_{A}$	$0.2\pm0.0^{ab}_{A}$	0.2±0.0	$0.6\pm0.0^{b}_{A}$	$0.3\pm0.0^{a}_{B}$	0.4±0.1	$0.2\pm0.1^{a}_{A}$	$0.2\pm0.1^{a}_{A}$	0.2±0.1
C20:4n6	$7.0\pm0.8^{a}_{A}$	$6.2\pm0.4^{ab}_{A}$	6.6±0.6	$7.5\pm0.1^{a}_{A}$	$6.0\pm0.7^{bc}_{B}$	6.7±0.9	$7.3\pm0.7^{a}_{A}$	$6.9\pm0.1^{d}_{A}$	7.1±1.4	$7.7\pm0.8^{a}_{A}$	$7.9\pm0.8^{a}_{A}$	7.8±0.8
C20:5n3	$20.0\pm1.4^{ab}_{A}$	$19.5\pm0.0^{a}_{A}$	19.8±0.8	$20.9\pm1.1^{b}_{A}$	$21.9\pm0.1^{b}_{A}$	21.4±1.6	$17.5\pm0.1^{c}_{A}$	$19.1\pm0.1^{a}_{B}$	18.3±0.0	$18.4\pm0.3^{a}_{A}$	$19.6\pm1.0^{a}_{A}$	19.0±0.2
C22:2	$0.1\pm0.1^{ab}_{A}$	$0.1\pm0.0^{a}_{A}$	0.1±0.0	$0.1\pm0.0^{a}_{A}$	$0.1\pm0.0^{a}_{A}$	0.1±0.0	$0.1\pm0.0^{a}_{A}$	$0.0\pm0.0^{a}_{A}$	0.1±0.0	$0.0\pm0.0^{a}_{A}$	$0.0\pm0.0^{a}_{A}$	0.0±0.0
C22:6n3	$11.4\pm0.9^{ab}_{A}$	$11.8\pm0.2^{ab}_{A}$	11.6±0.3	$11.7\pm1.4^{ab}_{A}$	$12.7\pm0.9^{bc}_{A}$	12.2±0.2	$11.8\pm1.5^{a}_{A}$	$11.6\pm0.4^{ab}_{A}$	11.7±0.5	$10.7\pm1.3^{a}_{A}$	$10.5\pm1.0^{a}_{A}$	10.6±0.2
∑PUFA	$42.3\pm0.9^{bc}_{A}$	$42.0\pm2.9^{a}_{A}$	42.1±0.9	$44.8\pm1.8^{c}_{A}$	$44.6\pm0.6^{ab}_{A}$	$44.8\pm0.2^{*}$	$41.1\pm1.2^{ab}_{A}$	$41.7\pm1.0^{a}_{A}$	41.4±0.1	$40.4\pm0.6^{a}_{A}$	$41.6\pm1.2^{a}_{A}$	41.0±0.9
EPA+DHA	$31.4\pm1.2^{ab}_{A}$	$31.3\pm2.9^{a}_{A}$	31.4±0.5	$32.5\pm0.2^{b}_{A}$	$34.5\pm0.2^{ab}_{B}$	$33.5\pm0.2^{*}$	$29.3\pm0.6^{a}_{A}$	$30.7\pm1.7^{a}_{A}$	29.9±2.6	$29.1\pm1.3^{a}_{A}$	$30.1\pm1.7^{a}_{A}$	29.6±0.1
∑n3	$32.1\pm1.2^{ab}_{A}$	$32.2\pm1.8^{ab}_{A}$	32.2±1.5	$33.0\pm0.2^{bc}_{A}$	$35.5\pm0.2^{c}_{B}$	$34.3\pm1.2^{*}$	$30.3\pm0.3^{a}_{A}$	$31.5\pm1.7^{a}_{A}$	30.9±0.5	$29.9\pm1.4^{a}_{A}$	$30.8\pm1.7^{a}_{A}$	30.4±0.2
∑n6	$9.5\pm0.9^{a}_{A}$	$8.9\pm0.6^{ab}_{A}$	9.1±0.8	$10.7\pm1.4^{a}_{A}$	$8.3\pm0.8^{ab}_{A}$	9.5±1.1	$9.7\pm0.7^{a}_{A}$	$9.4\pm0.2^{a}_{A}$	9.5±0.5	$10.1\pm0.8^{a}_{A}$	$9.9\pm0.8^{a}_{A}$	10.0±0.8
∑n3/∑n6	$3.4\pm0.2^{b}_{A}$	$3.6\pm0.4^{a}_{A}$	3.5±0.3	$3.2\pm0.6^{bc}_{A}$	$4.2\pm0.5^{ab}_{A}$	3.7±0.5	$3.2\pm0.5^{b}_{A}$	$3.4\pm0.6^{ac}_{A}$	3.3±0.6	$3.0\pm0.4^{a}_{A}$	$3.1\pm0.4^{a}_{A}$	3.0±0.4

n=3, ±: standard deviation. Superscript lowercase letters (a, b, c and d) in the same row indicate differences of the same sexes in different seasons ($p<0.05$; One-Way ANOVA). Subscript capital letters (A and B) in the different columns indicate the difference between the male and female belong to similar FA in the same season ($p<0.05$; TUKEY and Mann Whitney U test). '*' indicates significant differences between means in different seasons ($p<0.05$; One-Way ANOVA).

Table 4. Seasonal and sexual variation in the overall mean fatty acids values (including all body parts) of male and female crabs (mg/100g of edible flesh)

	WINTER			SPRING			SUMMER			AUTUMN		
Fatty acid (%)	♂	♀	Mean	♂	♀	Mean	♂	♀	Mean	♂	♀	Mean
C14:0	0.3±0.1$^{a}_{A}$	5.8±1.4$^{b}_{B}$	3.0±0.8	2.8±0.8$^{ab}_{A}$	6.0±1.3$^{b}_{B}$	4.4±1.1	1.4±1.0^{b}	4.4±1.3^{ab}	2.9±1.2	0.3±0.1$^{a}_{A}$	3.2±0.3$^{a}_{A}$	1.8±0.2
C16:0	64.2±4.4$^{a}_{A}$	62.7±6.4$^{a}_{A}$	63.4±5.4	82.1±4.6$^{b}_{A}$	75.9±3.4$^{b}_{A}$	79.0±4.0	68.5±4.4$^{ab}_{A}$	56.8±10.2$^{a}_{A}$	62.6±7.3	63.0±2.6$^{a}_{A}$	59.1±3.5$^{a}_{A}$	61.1±3.0
C18:0	31.8±2.5$^{a}_{A}$	33.9±4.6$^{a}_{A}$	32.9±3.5	44.9±4.8$^{b}_{A}$	40.5±2.5$^{b}_{A}$	42.7±3.7	44.7±5.0$^{b}_{A}$	29.3±3.5$^{a}_{B}$	37.0±4.2	31.7±2.3$^{a}_{A}$	29.8±2.7$^{a}_{A}$	30.8±2.5
C20:0	0.4±0.1$^{a}_{A}$	0.4±0.1$^{a}_{A}$	0.4±0.1	0.3±0.0$^{a}_{A}$	0.6±0.1$^{ab}_{A}$	0.5±0.2	0.2±0.1$^{a}_{A}$	0.2±0.1$^{a}_{A}$	0.2±0.1	0.2±0.1$^{a}_{A}$	0.3±0.1$^{a}_{A}$	0.3±0.1
C22:0	1.6±0.4$^{ab}_{A}$	2.1±0.6$^{b}_{A}$	1.8±0.5	1.1±0.6$^{ab}_{A}$	1.1±1.0$^{ac}_{A}$	1.1±0.8	1.2±0.3$^{ba}_{A}$	0.9±0.2$^{ac}_{A}$	1.1±0.3	0.7±0.1$^{a}_{A}$	0.8±0.1$^{a}_{A}$	0.7±0.1
C24:0	1.0±0.3$^{a}_{A}$	1.4±0.5$^{a}_{A}$	1.2±0.4	0.6±0.4$^{a}_{A}$	1.5±0.6$^{ab}_{A}$	1.0±0.5	0.8±0.3$^{a}_{A}$	0.5±0.1$^{c}_{A}$	0.6±0.2	2.0±0.6$^{a}_{A}$	1.3±0.1$^{a}_{A}$	1.6±1.1
∑SFA	99.3±6.3$^{a}_{A}$	106.2±3.8$^{a}_{A}$	102.7±5.5	134.5±3.4$^{b}_{A}$	125.7±2.7$^{b}_{A}$	130.1±3.0	116.9±5.2$^{bc}_{A}$	92.1±3.9$^{a}_{B}$	104.5±3.6	97.9±2.2$^{a}_{A}$	94.4±5.4$^{a}_{A}$	96.2±3.8
C14:1	3.9±0.3$^{ab}_{A}$	2.9±0.4$^{a}_{A}$	3.4±1.2	3.6±0.8$^{ab}_{A}$	1.1±0.2$^{b}_{B}$	2.3±0.5	3.4±1.1$^{ab}_{A}$	2.5±0.7$^{a}_{A}$	3.0±0.9	2.9±0.6$^{a}_{A}$	4.2±0.5$^{a}_{A}$	3.5±0.2
C16:1	0.3±0.1$^{a}_{A}$	3.1±0.7$^{ab}_{A}$	1.7±0.9	0.3±0.1$^{a}_{A}$	6.9±0.9$^{c}_{B}$	3.6±0.5	0.3±0.1$^{a}_{A}$	4.1±1.0$^{b}_{B}$	2.2±0.5	0.1±0.0$^{a}_{A}$	1.5±0.3$^{a}_{A}$	0.8±0.2
C18:1n9	73.6±10.2$^{a}_{A}$	62.1±4.3$^{ab}_{A}$	67.8±7.2	95.4±8.7$^{b}_{A}$	70.0±5.6$^{bc}_{B}$	82.7±7.2	76.8±4.6$^{a}_{A}$	53.8±3.5$^{a}_{B}$	65.3±4.0	74.2±4.9$^{a}_{A}$	57.0±2.4$^{a}_{B}$	65.6±3.6
C20:1	4.2±0.1$^{a}_{A}$	4.3±0.8$^{a}_{A}$	4.3±0.7	4.4±0.6$^{a}_{A}$	4.7±1.2$^{a}_{A}$	4.5±0.9	3.8±0.5$^{a}_{A}$	4.2±0.9$^{a}_{A}$	4.0±0.7	3.4±0.6$^{a}_{A}$	3.2±1.2$^{a}_{A}$	3.3±0.2
C24:1	2.7±0.1$^{ab}_{A}$	2.5±0.4$^{ab}_{A}$	2.6±0.5	1.6±0.4$^{a}_{A}$	1.8±0.7$^{a}_{A}$	1.7±0.5	2.2±0.5$^{a}_{A}$	1.9±0.3$^{a}_{A}$	2.0±0.4	1.6±0.5$^{a}_{A}$	1.3±0.2$^{a}_{A}$	1.5±0.4
∑MUFA	84.7±10.7$^{a}_{A}$	75.0±5.7$^{ab}_{A}$	79.8±8.2	105.2±8.2$^{b}_{A}$	84.5±7.5$^{bc}_{B}$	94.8±7.9	86.5±4.6$^{a}_{A}$	66.5±4.1$^{a}_{B}$	76.5±4.4	82.2±3.7$^{a}_{A}$	67.2±2.5$^{a}_{B}$	74.7±3.1
C18:2n6	12.8±1.5$^{a}_{A}$	12.2±1.8$^{a}_{A}$	12.5±1.7	19.7±2.6$^{b}_{A}$	13.3±1.1$^{a}_{A}$	16.5±1.8	11.2±1.5$^{a}_{A}$	10.9±0.9$^{a}_{A}$	11.1±1.2	10.8±1.2$^{a}_{A}$	8.9±0.3$^{a}_{A}$	9.8±0.7
C18:3n3	2.6±0.2$^{a}_{A}$	3.8±0.5$^{ab}_{A}$	3.2±1.0	1.5±1.2$^{a}_{A}$	5.3±0.6$^{bc}_{B}$	3.4±0.9	2.0±0.6$^{a}_{A}$	2.9±0.2$^{a}_{A}$	2.4±0.4	2.6±0.3$^{a}_{A}$	2.4±0.5$^{a}_{A}$	2.5±0.4
C18:3n6	0.9±0.3$^{a}_{A}$	2.0±0.9$^{a}_{A}$	1.5±0.6	0.6±0.3$^{a}_{A}$	1.7±0.8$^{a}_{A}$	1.1±0.6	0.7±0.2$^{a}_{A}$	0.8±0.3$^{a}_{A}$	0.7±0.2	0.4±0.1$^{a}_{A}$	0.3±0.0$^{ab}_{A}$	0.4±0.1
C20:2	3.4±0.4$^{b}_{A}$	5.6±1.0$^{a}_{A}$	4.5±0.2	6.5±0.4$^{bc}_{A}$	5.4±0.3$^{a}_{A}$	6.0±0.3	5.2±1.5$^{bc}_{A}$	4.1±0.4$^{a}_{A}$	4.6±0.2	2.0±0.7$^{a}_{A}$	4.1±0.3$^{a}_{A}$	3.0±0.0
C20:3n3	1.4±0.1$^{a}_{A}$	1.2±0.1$^{a}_{A}$	1.3±0.1	1.6±0.2$^{ab}_{A}$	1.1±0.2$^{a}_{A}$	1.4±0.4	2.8±0.3$^{c}_{A}$	1.2±0.1$^{a}_{A}$	2.0±0.1	1.0±0.3$^{a}_{A}$	1.1±0.1$^{a}_{A}$	1.1±0.1
C20:4n6	39.2±4.6$^{a}_{A}$	34.9±2.3$^{a}_{A}$	37.1±3.5	47.7±7.3$^{b}_{A}$	37.9±4.2$^{a}_{A}$	42.8±5.8	35.7±3.8$^{a}_{A}$	34.3±10.5$^{a}_{A}$	35.0±7.2	36.3±3.7$^{a}_{A}$	37.4±3.7$^{a}_{A}$	36.8±3.7
C20:5n3	111.8±2.1$^{b}_{A}$	109.2±4.6$^{ab}_{A}$	110.5±4.8	132.6±7.1$^{bc}_{A}$	138.9±3.3$^{c}_{A}$	135.8±5.2	85.9±3.4$^{a}_{A}$	93.9±2.0$^{a}_{A}$	89.9±2.2	87.2±6.0$^{a}_{A}$	92.6±4.9$^{a}_{A}$	89.9±5.4
C22:2	0.4±0.0$^{ab}_{A}$	0.2±0.1$^{a}_{A}$	0.3±0.1	0.2±0.1$^{a}_{A}$	0.3±0.1$^{a}_{A}$	0.2±0.1	0.3±0.1$^{a}_{A}$	0.2±0.1$^{a}_{A}$	0.2±0.1	0.2±0.0$^{a}_{A}$	0.2±0.0$^{a}_{A}$	0.2±0.0
C22:6n3	63.5±4.8$^{a}_{A}$	65.8±6.7$^{b}_{A}$	64.7±5.8	74.1±9.0$^{b}_{A}$	80.3±5.7$^{c}_{A}$	77.2±7.3	58.2±7.6$^{a}_{A}$	56.8±2.2$^{ab}_{A}$	57.5±4.9	50.6±6.0$^{a}_{A}$	49.5±4.9$^{a}_{A}$	50.0±5.5
∑PUFA	236.1±6.7$^{b}_{A}$	234.9±6.5$^{b}_{A}$	235.5±6.6	284.6±5.6$^{c}_{A}$	284.3±6.2$^{c}_{A}$	284.4±3.9	201.9±5.7$^{bd}_{A}$	205.1±4.9$^{a}_{A}$	203.5±5.3	191.1±2.2$^{a}_{A}$	196.5±5.7$^{a}_{A}$	193.8±8.9
EPA+DHA	175.3±2.3$^{b}_{A}$	175.0±6.6$^{b}_{A}$	175.2±4.5	206.7±14.0$^{c}_{A}$	219.3±4.1$^{c}_{A}$	213.0±4.1	144.1±7.7$^{a}_{A}$	150.7±2.4$^{ab}_{A}$	147.4±3.1	137.7±5.9$^{a}_{A}$	142.1±3.1$^{a}_{A}$	139.9±4.5
∑n3	179.3±2.1$^{b}_{A}$	180.0±5.5$^{a}_{A}$	179.7±3.8	209.8±4.2$^{c}_{A}$	225.7±4.2$^{b}_{A}$	217.7±4.2	148.9±6.4$^{a}_{A}$	154.8±8.6$^{c}_{A}$	151.8±2.5	141.3±6.2$^{a}_{A}$	145.7±3.2$^{c}_{A}$	143.5±2.7
∑n6	52.9±5.4$^{ab}_{A}$	49.1±3.4$^{a}_{A}$	51.0±4.4	68.0±9.1$^{bc}_{A}$	53.0±5.3$^{ab}_{A}$	60.5±7.2	47.6±3.7$^{a}_{A}$	46.1±10.7$^{a}_{A}$	46.8±7.2	47.6±3.9$^{a}_{A}$	46.5±3.8$^{a}_{A}$	47.1±3.9
∑n3/∑n6	19.0±1.4$^{a}_{A}$	20.0±2.3$^{ab}_{A}$	19.5±1.8	20.0±3.7$^{ab}_{A}$	26.5±2.8$^{bc}_{A}$	23.3±3.3	15.5±2.5$^{a}_{A}$	16.7±3.2$^{a}_{A}$	16.1±2.8	14.1±1.7$^{a}_{A}$	14.6±2.0$^{a}_{A}$	14.3±1.8
Unidentifed	138.6±30.1	142.6±2.9	140.6±2.5	111.0±5.8	140.7±0.9	125.9±3.4	86.5±4.7	128.1±1.5	107.3±1.6	101.5±3.4	114.6±1.4	108.0±1.4

n=3, ±: standard deviation,

Superscript lowercase letters (a, b, c and d) in the same row indicate seasonal variation of similar FA of the same sex ($p<0.05$; One-Way ANOVA).

Subscript capital letters (A and B) in the same line indicate the variation of different sexes in similar FAs in the same season ($p<0.05$; TUKEY and Mann Whitney U test).

values corresponded to eicosapentaenoic acid (EPA) with a variation of 15.0%-23.2%, followed by oleic acid (OLE; C18:1n9) and docosahexaenoic acid (DHA) with values as 9.8 - 16.7% and 9.3- 13.6%, respectively, varied depending on the body parts, sex and season. Table 2 shows the seasonal variations in the main fatty acid groups amongst the body parts for both sexes. The highest SFA corresponded to the carapace samples of male crabs in summer at 25.0%. The most dominant fatty acid among the SFAs was palmitic acid (C16:0), which varied from 11.2 up to 13.9% amongst the body parts, sex, and body parts (Table 3 and Supplementary tables 1-4).

While seasonal changes in total monounsaturated fatty acids (MUFA) levels for each body part of male samples usually followed the same trend as SFA, fluctuations have been obtained for the female samples. The highest MUFA was found in the legs of male samples in summer at 21.0% (Table 2). The most dominant MUFA corresponded to oleic acid with a significant variation ($p<0.05$) (Supplementary tables 1-4). Significant fluctuations have occurred in the levels of total polyunsaturated fatty acids (PUFA) from winter to autumn for different body parts within the same-sex groups ($p<0.05$). The highest PUFA was determined in the legs samples of males in spring and females in both spring and winter as 47.0 and 46.1%, respectively, indicating the health benefits of these parts of warty crabs in these seasons (Supplementary tables 1 and 3). Table 3 represents seasonal changes in the mean fatty acid profiles (which were accounted for from all body parts) of crab samples for each sex group, as well as the differences between the genders for the same fatty acid type.

As mentioned above, the main PUFA corresponded to EPA followed by DHA (Supplementary tables 1-4). Total EPA+DHA values in different parts of male samples significantly decreased from winter down to autumn except for leg samples. In contrast, female sample levels decreased from spring to winter with minor exceptions ($p<0.05$). The difference may be attributed to their spawning seasons as well as the differences in the feed availability for different seasons. Significant seasonal variations were also accounted for total n3 and n6 values of each body part ($p<0.05$), although similarities were also obtained, particularly between winter and autumn values for female samples.

Discussion

Proximal Composition

Seasonal variations were obtained in the overall proximate composition of warty crabs, with some exceptions ($p<0.05$). Overall protein contents dropped significantly from winter to summer, then increased ($p<0.05$) while significant fluctuations were obtained in the fat contents amongst the seasons. However, no seasonal changes were obtained in the moisture and ash contents except for summer ($p<0.05$). Moreover, no significant differences were obtained in the proximate composition values amongst the different body parts, with some exceptions. However, significant differences were obtained in some parameters of proximate composition between sexes, particularly in winter for fat contents, summer for protein contents, and autumn for ash contents ($p<0.05$). The results of Kaya et al. (2009) supported our findings for the warty crab samples obtained from a local market and caught from the middle part of the Black Sea. Another study from the same region of the Black Sea was carried out by Demirbaş et al. (2013). They determined the biochemical characteristics of this species during the reproduction period. They reported significant differences between months in crude protein and crude oil values ($p<0.05$). They found that protein values increased from April to June, then decreased in August, and oil values showed fluctuations amongst the months.

Although the results of moisture and ash contents were obtained by Bayraklı (2021) for *E. verrucosa* caught from the Southern Coast Black Sea, he reported higher fat content (1.07-1.67%) and lower protein content (13.52-16.52%) for this species. Similarities were obtained for the proximate composition values of the same species caught from the Adriatic Sea. However, Moronkola et al. (2011) found lower values for the carapace, claws, and legs in crab samples *(Callinectes amnicola*) caught from the Nigeria region except for ash contents.

Fatty Acid Composition

Differences were determined in the proportion of fatty acids in crabs according to gender, season, and body parts ($p<0.05$). Significant differences occurred between sexes within the same seasons, mainly in summer and spring ($p<0.05$) (Table 2 and Supplementary Tables 1-3), with few exceptions. Similarities are usually obtained for the individual fatty acids of the legs and right claw in winter and autumn. The significant variations between sexes in fatty acid profile may be attributed to the warty crab close to its spawning season in this period, as described by Demirbaş et al. (2013).

The most dominant fatty acid among the SFAs was palmitic acid. The results of Kaya et al. (2009), Bayraklı, (2021) and Wu et al. (2010) supported our findings regarding the levels of SFAs. Significant fluctuations have occurred in fatty acid levels during the seasons, with several exceptions ($p<0.05$). Significant seasonal increases occurred in SFA levels of each body part from winter up to summer, and the levels decreased in autumn ($p<0.05$) with few exceptions in female samples.

The overall results indicate that PUFA has been found significantly higher (as 40.4-44.8%) than SFA (as 17.8-23.8%) and MUFA (as 13.4-17.6%) for all sex and seasonal groups. These results obtained in this study were supported by several research carried out on crabs

(Bayraklı, 2021; Ayas and Özoğul, 2011; Barrento et al., 2010; Cherif et al., 2008). Although significant differences were obtained between the genders of different body parts of crabs for different seasons ($p<0.05$) (Supplementary tables 1-4), the values were found insignificant for the overall values of individual fatty acids with few exceptions for each season (Table 3). However, the changes were significant between genders for the overall SFA for summer and MUFA for all seasons. Oleic acid (C18:1n9) was determined as the most dominant fatty acid in MUFAs with a variation of 10.9-15.7% (Table 3). No significant differences were obtained in the overall values of PUFA throughout the year. Similarly, the values of total EPA+DHA, n3, n6, and n3/n6 have followed the same trend with PUFA, with two exceptions in spring. Considering overall mean values of individual fatty acids, the main PUFA was found as EPA followed by DHA within a variation of 18.3-21.4% and 10.6-12.2%, respectively. The highest overall mean EPA and DHA and n3 values were obtained in spring for female sample groups. On the contrary, the highest n6 values were found in autumn. Since various factors affect the fatty acid values in seafood species, high variation in the fatty acid values observed for *E. verrucosa* and other crab species have been reported by past studies such as 20.05-52.18% for PUFA, EPA, DHA, and arachidonic acid (ARA) vary between 7.9-24.5% for EPA, 4.4-14.57% for DHA, and 5.64-11.8% for ARA (Bayraklı, 2021; Ayas and Özoğul, 2011; Barrento et al., 2010; Kaya et al., 2009; Cherif et al., 2008). The results observed in this study were found within the range of the previous finding for this species in other regions. However, so far, no study exists on the seasonal variation of fatty acids of warty crab in the Southeastern Black Sea region; therefore, this study represents new information on both seasonal variation and sexual differences in the fatty acid values of this species for this region.

Polyunsaturated acids (PUFA), particularly eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) have been suggested as a critical component of a healthy diet in humans (Kinsella, 1987; Simopoulos, 1991). In addition, it was reported that a high intake of DHA balances eicosanoids to suppress disease. Therefore, information on DHA levels in edible fish is essential for assessing their health benefit (Osako et al., 2009).

The long chain n3 and n6 fatty acids commonly called PUFAs and their ratios are also (n3/n6) considered to be important (Coetzee & Hoffman, 2002; Pigott & Tucker, 1987). Dyerberg (1986) noted that an increase in the ratio of n3/n6 PUFA increases the availability of n3 PUFAs, which are beneficial for human health. In this study, the n3/n6 ratio of female and male crabs was found to be as high as 3.0-4.2 (Table 3). The results of the research conducted by Bayraklı (2021) on the same species were also found to be similar to the n3/n6 ratios obtained in this study.

In previous studies, the fatty acid profiles of fish species have been commonly reported as % of total FAME. The present study additionally represents fatty acid content as mg of fatty acid per 100 g of edible portion, as given in Table 4. Simopoulos (2003) and Testi et al. (2006) suggested that 4600 mg EPA + DHA should satisfy the weekly requirement of an adult on a 2,000 kcal diet. According to EFSA (2010), this value should be between 200-500 mg daily. The estimated current intake in the European population varies between 80 mg/d to 420 mg/d. Although the results of fatty acids as FAME% determined high for EPA+DHA for each season and different body parts of this species, the values accounted for in 100 g of crab meat varied from 137.7-219.3 mg/100g, which was low due to the low amount of fat contents (Table 4). According to these values, 145-300 g of edible crab meat is required to cover the daily suggested amount of EPA+DHA. Although sexual variation in the values was found to be insignificant between genders, significant differences were obtained amongst the seasons, particularly between spring and other months ($p<0.05$). It was determined that the highest values were found in females in the spring, while the lowest values corresponded to males in the winter season.

Conclusion

This study clearly shows that warty crab has high protein and fatty acid content for both males and females. Furthermore, although the warty crab has very low-fat content, its different body parts (right-left claws, carapace, and legs) contain high amounts of OLE, ARA, EPA, and DHA fatty acids. These results suggest that the meat of the warty crab is very healthy for human consumption and is also suitable for commercial processing into different crab products.

Ethical Statement

No situation required an ethics committee certificate for the study.

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Conflict of Interest

The author(s) declare that they have no known competing financial or non-financial, professional, or personal conflicts that could have appeared to influence the work reported in this paper.

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Suplementary Tables

Supplemental Table 1. Fatty acid variation Between different body parts edible flesh in male and female crabs in Autumn

	AUTUMN							
	Male				Female			
Fatty acid (%)	*Carapace*	*Right Claw*	*Left Claw*	*Legs*	*Carapace*	*Right Claw*	*Left Claw*	*Legs*
C14:0	$0.1\pm0.0_A^a$	$0.1\pm0.0_A^a$	$0.0\pm0.0_A^b$	$0.1\pm0.0_A^a$	$0.7\pm0.0_B^a$	$0.6\pm0.0_B^b$	$0.7\pm0.1_B^{ab}$	$0.7\pm0.1_B^{ab}$
C16:0	$13.1\pm1.0_A^{ab}$	$12.6\pm0.3_A^b$	$13.4\pm0.3_A^a$	$13.7\pm0.4_A^a$	$13.5\pm0.4_A^a$	$12.1\pm0.3_A^b$	$12.1\pm0.3_B^b$	$12.7\pm0.8_A^{ab}$
C18:0	$5.8\pm0.3_A^a$	$7.2\pm0.3_A^b$	$6.4\pm0.3_A^c$	$6.8\pm0.4_A^c$	$6.6\pm0.2_B^a$	$6.2\pm0.3_B^a$	$5.7\pm0.6_A^a$	$6.9\pm0.6_A^a$
C20:0	$0.1\pm0.0_A^a$	$0.0\pm0.0_A^b$	$0.0\pm0.0_A^b$	$0.1\pm0.0_A^a$	$0.1\pm0.0_A^a$	$0.1\pm0.0_B^a$	$0.1\pm0.0_B^a$	$0.0\pm0.0_B^a$
C22:0	$0.2\pm0.0_A^a$	$0.1\pm0.0_A^b$	$0.2\pm0.0_A^a$	$0.1\pm0.0_A^b$	$0.2\pm0.0_A^a$	$0.1\pm0.0_A^b$	$0.2\pm0.0_A^a$	$0.1\pm0.0_B^b$
C24:0	$0.2\pm0.0_A^a$	$0.9\pm0.1_A^b$	$0.2\pm0.0_A^a$	$0.2\pm0.0_A^a$	$0.4\pm0.0_B^a$	$0.3\pm0.0_B^b$	$0.3\pm0.0_B^b$	$0.1\pm0.0_B^c$
∑SFA	$19.4\pm1.3_A^a$	$21.0\pm0.0_A^a$	$20.3\pm0.1_A^a$	$21.0\pm0.7_A^a$	$21.5\pm0.2_B^a$	$19.5\pm0.0_B^b$	$19.1\pm0.8_B^b$	$20.5\pm1.2_A^{ab}$
C14:1	$0.9\pm0.0_A^a$	$0.5\pm0.2_A^b$	$0.5\pm0.0_A^b$	$0.6\pm0.1_A^b$	$1.1\pm0.0_B^a$	$0.8\pm0.0_B^b$	$0.9\pm0.1_B^b$	$0.8\pm0.1_A^b$
C16:1	$0.0\pm0.0_A^a$	$0.0\pm0.0_A^a$	$0.0\pm0.0_A^a$	$0.0\pm0.0_A^a$	$0.4\pm0.0_B^a$	$0.3\pm0.0_B^b$	$0.3\pm0.1_B^{ab}$	$0.3\pm0.1_B^{ab}$
C18:1n9	$13.4\pm1.4_A^a$	$16.3\pm0.4_A^b$	$16.7\pm0.4_A^b$	$14.7\pm0.0_A^a$	$11.4\pm0.4_B^a$	$12.5\pm0.3_B^b$	$12.1\pm0.3_B^a$	$11.9\pm0.3_B^{ab}$
C20:1	$0.9\pm0.0_A^a$	$0.7\pm0.0_A^b$	$0.6\pm0.0_A^c$	$0.7\pm0.1_A^{ac}$	$0.6\pm0.0_B^a$	$0.9\pm0.0_B^b$	$0.3\pm0.1_B^c$	$0.8\pm0.1_A^b$
C24:1	$0.5\pm0.0_A^a$	$0.2\pm0.0_A^b$	$0.3\pm0.0_A^c$	$0.4\pm0.0_A^d$	$0.4\pm0.0_B^a$	$0.3\pm0.0_B^b$	$0.3\pm0.0_A^b$	$0.2\pm0.1_B^{bc}$
∑MUFA	$15.7\pm1.4_A^a$	$17.8\pm0.6_A^b$	$18.1\pm0.3_A^{bc}$	$16.5\pm0.1_A^a$	$14.0\pm0.4_A^a$	$14.8\pm0.2_B^a$	$14.0\pm0.3_B^a$	$14.1\pm0.6_B^a$
C18:2n6	$2.0\pm0.1_A^a$	$2.3\pm0.3_A^{ab}$	$2.4\pm0.2_A^b$	$2.3\pm0.4_A^{ab}$	$1.6\pm0.2_B^a$	$1.9\pm0.0_A^b$	$1.9\pm0.1_B^{ab}$	$1.9\pm0.0_A^a$
C18:3n3	$0.6\pm0.0_A^a$	$0.5\pm0.0_A^b$	$0.6\pm0.0_A^a$	$0.6\pm0.0_A^a$	$0.7\pm0.0_B^a$	$0.5\pm0.1_B^{bc}$	$0.4\pm0.0_B^b$	$0.5\pm0.0_B^c$
C18:3n6	$0.1\pm0.0_A^a$	$0.1\pm0.0_A^a$	$0.1\pm0.0_A^a$	$0.1\pm0.0_A^a$	$0.1\pm0.0_A^a$	$0.1\pm0.0_A^a$	$0.1\pm0.0_A^a$	$0.1\pm0.0_A^a$
C20:2	$0.8\pm0.0_A^a$	$0.2\pm0.0_A^b$	$0.8\pm0.0_A^b$	$0.1\pm0.0_A^c$	$0.8\pm0.0_A^a$	$0.9\pm0.0_B^b$	$0.8\pm0.1_A^{ab}$	$0.9\pm0.1_B^{ab}$
C20:3n3	$0.2\pm0.0_A^a$	$0.2\pm0.0_A^a$	$0.3\pm0.0_A^b$	$0.2\pm0.0_A^a$	$0.3\pm0.0_B^a$	$0.2\pm0.0_A^b$	$0.3\pm0.1_A^{ab}$	$0.2\pm0.0_A^b$
C20:4n6	$7.6\pm0.6_A^a$	$8.0\pm0.2_A^a$	$8.5\pm0.3_A^{ab}$	$6.8\pm0.2_A^c$	$6.5\pm0.4_B^a$	$8.4\pm0.3_A^b$	$8.4\pm0.8_A^b$	$7.5\pm0.6_A^b$
C20:5n3	$18.3\pm1.1_A^{ab}$	$17.6\pm0.5_A^b$	$19.5\pm0.4_A^a$	$18.7\pm2.1_A^{ab}$	$20.7\pm0.9_B^a$	$19.5\pm0.4_B^a$	$18.9\pm0.9_A^a$	$20.1\pm2.0_A^{ab}$
C22:2	$0.0\pm0.0_A^a$	$0.0\pm0.0_A^a$	$0.0\pm0.0_A^a$	$0.0\pm0.0_A^a$	$0.0\pm0.0_A^a$	$0.1\pm0.0_B^b$	$0.0\pm0.0_A^a$	$0.0\pm0.0_A^a$
C22:6n3	$11.2\pm0.2_A^a$	$9.3\pm0.3_A^b$	$10.7\pm0.4_A^a$	$11.9\pm1.7_A^a$	$11.7\pm0.7_A^a$	$9.5\pm0.3_A^b$	$10.0\pm1.1_A^{ab}$	$11.5\pm0.6_A^{ac}$
∑PUFA	$40.9\pm1.8_A^a$	$38.2\pm0.7_A^a$	$42.8\pm0.1_A^a$	$40.7\pm1.1_A^a$	$42.5\pm1.0_A^a$	$41.0\pm0.3_B^{ab}$	$40.9\pm0.6_B^{ab}$	$42.7\pm2.0_A^{ab}$
EPA+DHA	$29.5\pm1.3_A^a$	$26.9\pm0.2_A^b$	$30.2\pm0.1_A^{ac}$	$30.6\pm0.9_A^{ac}$	$32.3\pm1.6_A^a$	$29.0\pm0.7_A^b$	$29.0\pm0.2_B^b$	$31.6\pm2.6_A^{ac}$
∑n3	$30.3\pm1.3_A^a$	$27.5\pm0.2_A^b$	$31.1\pm0.1_A^a$	$31.3\pm0.9_A^a$	$33.4\pm1.6_B^a$	$29.7\pm0.6_B^b$	$29.7\pm0.2_B^b$	$32.3\pm2.5_A^a$
∑n6	$9.7\pm0.5_A^{ab}$	$10.4\pm0.5_A^b$	$11.0\pm0.1_A^c$	$9.2\pm0.2_A^a$	$8.2\pm0.6_A^a$	$10.4\pm0.3_A^b$	$10.4\pm0.7_A^b$	$9.4\pm0.6_A^a$
∑n3/∑n6	$3.1\pm0.0_A^a$	$2.7\pm0.1_A^b$	$2.8\pm0.0_A^b$	$3.4\pm0.3_A^d$	$4.0\pm0.5_B^a$	$2.8\pm0.1_A^b$	$2.8\pm0.2_A^b$	$3.4\pm0.5_A^a$

n=3, ±: standard deviation.
Superscript lowercase letters (a, b, c and d) in the same row indicate differences of the same sexes in body parts ($p<0.05$; One-Way ANOVA).
Subscript capital letters (A and B) indicates the difference between the same body organs in different columns. ($p<0.05$; TUKEY and Mann Whitney U test).

Supplemental Table 2. Fatty acid variation between different body parts edible flesh in male and female crabs in Winter

	WINTER							
	MALE				FEMALE			
Fatty acid (%)	Carapace	Right Claw	Left Claw	Legs	Carapace	Right Claw	Left Claw	Legs
C14:0	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.0\pm0.0_{A}^{b}$	$0.0\pm0.0_{A}^{b}$	$1.4\pm0.0_{B}^{a}$	$1.0\pm0.1_{A}^{b}$	$1.2\pm0.2_{B}^{ab}$	$0.8\pm0.0_{B}^{c}$
C16:0	$12.5\pm0.2_{A}^{a}$	$11.7\pm0.1_{A}^{b}$	$10.9\pm0.2_{A}^{c}$	$10.8\pm0.6_{A}^{c}$	$11.9\pm0.6_{A}$	$9.9\pm0.1_{B}$	$10.7\pm0.1_{A}$	$11.9\pm0.5_{A}$
C18:0	$6.0\pm0.1_{A}^{a}$	$6.2\pm0.1_{A}^{a}$	$5.2\pm0.5_{A}^{b}$	$5.6\pm0.1_{A}^{b}$	$5.3\pm0.2_{B}^{a}$	$5.5\pm0.1_{B}^{a}$	$5.7\pm0.1_{A}^{ab}$	$7.1\pm0.1_{B}^{c}$
C20:0	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.0\pm0.0_{B}^{a}$	$0.1\pm0.0_{A}^{b}$	$0.1\pm0.0_{A}^{b}$	$0.1\pm0.0_{A}^{b}$
C22:0	$0.4\pm0.0_{A}^{a}$	$0.2\pm0.0_{A}^{b}$	$0.3\pm0.0_{A}^{c}$	$0.3\pm0.0_{A}^{c}$	$0.5\pm0.0_{B}^{a}$	$0.4\pm0.0_{B}^{b}$	$0.3\pm0.0_{A}^{c}$	$0.3\pm0.1_{A}^{c}$
C24:0	$0.2\pm0.0_{A}^{a}$	$0.3\pm0.0_{A}^{b}$	$0.2\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{c}$	$0.3\pm0.0_{B}^{a}$	$0.2\pm0.0_{B}^{b}$	$0.3\pm0.0_{B}^{a}$	$0.1\pm0.0_{A}^{c}$
∑SFA	$19.2\pm0.2_{A}^{a}$	$18.5\pm0.1_{A}^{b}$	$16.6\pm0.7_{A}^{c}$	$17.0\pm0.7_{A}^{c}$	$19.5\pm0.8_{A}^{a}$	$17.2\pm0.1_{B}^{b}$	$18.3\pm0.2_{B}^{c}$	$20.4\pm0.7_{B}^{a}$
C14:1	$0.6\pm0.0_{A}^{a}$	$0.9\pm0.0_{A}^{b}$	$0.5\pm0.1_{A}^{ab}$	$0.7\pm0.0_{A}^{c}$	$0.3\pm0.1_{B}^{a}$	$0.4\pm0.0_{B}^{b}$	$0.5\pm0.0_{A}^{c}$	$0.4\pm0.0_{B}^{a}$
C16:1	$0.0\pm0.0_{A}^{a}$	$0.0\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{b}$	$0.1\pm0.0_{A}^{b}$	$1.3\pm0.1_{B}^{a}$	$0.6\pm0.0_{B}^{b}$	$0.4\pm0.1_{B}^{c}$	$0.4\pm0.0_{B}^{c}$
C18:1n9	$14.5\pm0.2_{A}^{a}$	$15.4\pm0.6_{A}^{ab}$	$12.8\pm1.0_{A}^{c}$	$11.0\pm0.3_{A}^{d}$	$11.9\pm0.2_{B}^{a}$	$10.3\pm0.0_{B}^{b}$	$11.9\pm0.3_{A}^{a}$	10.5 ± 0.3^{b}
C20:1	$0.8\pm0.0_{A}^{a}$	$0.8\pm0.1_{A}^{ab}$	$0.7\pm0.1_{A}^{ab}$	$0.6\pm0.1_{A}^{bc}$	$1.0\pm0.0_{B}^{a}$	$0.7\pm0.1_{A}^{b}$	$0.8\pm0.2_{A}^{ab}$	$0.8\pm0.0_{B}^{b}$
C24:1	$0.4\pm0.0_{A}^{a}$	$0.5\pm0.0_{A}^{b}$	$0.7\pm0.0_{A}^{c}$	$0.4\pm0.0_{A}^{a}$	$0.5\pm0.0_{B}^{a}$	$0.5\pm0.0_{A}^{a}$	$0.4\pm0.0_{B}^{b}$	$0.4\pm0.0_{A}^{b}$
∑MUFA	$16.3\pm0.2_{A}^{a}$	$17.5\pm0.5_{A}^{b}$	$14.8\pm1.2_{A}^{c}$	$12.8\pm0.3_{A}^{d}$	$15.1\pm0.2_{B}^{a}$	$12.5\pm0.2_{B}^{b}$	$14.0\pm0.0_{A}^{c}$	12.5 ± 0.4^{b}
C18:2n6	$2.6\pm0.1_{A}^{a}$	$2.4\pm0.1_{A}^{ab}$	$2.1\pm0.3_{A}^{ab}$	$2.3\pm0.1_{A}^{b}$	$2.0\pm0.0_{B}^{a}$	$2.2\pm0.0_{B}^{b}$	$2.4\pm0.0_{A}^{c}$	$2.4\pm0.2_{A}^{bc}$
C18:3n3	$0.6\pm0.0_{A}^{a}$	$0.4\pm0.0_{A}^{b}$	$0.5\pm0.0_{A}^{c}$	$0.4\pm0.0_{A}^{b}$	$1.0\pm0.1_{B}^{a}$	$0.6\pm0.0_{B}^{b}$	$0.9\pm0.2_{B}^{c}$	$0.4\pm0.0_{A}^{d}$
C18:3n6	$0.2\pm0.0_{A}^{a}$	$0.2\pm0.0_{A}^{a}$	$0.2\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{b}$	$0.6\pm0.0_{B}^{a}$	$0.4\pm0.0_{B}^{b}$	$0.4\pm0.1_{B}^{b}$	$0.3\pm0.0_{B}^{bc}$
C20:2 cis	$0.7\pm0.0_{A}^{a}$	$0.6\pm0.0_{A}^{b}$	$0.5\pm0.0_{A}^{c}$	$0.6\pm0.0_{A}^{b}$	$1.0\pm0.1_{B}^{a}$	$0.9\pm0.1_{B}^{a}$	$0.9\pm0.1_{B}^{a}$	$1.2\pm0.0_{B}^{b}$
C20:3n3	$0.2\pm0.0_{A}^{a}$	$0.2\pm0.0_{A}^{a}$	$0.3\pm0.0_{A}^{b}$	$0.3\pm0.0_{A}^{b}$	$0.2\pm0.0_{A}^{a}$	$0.2\pm0.0_{A}^{a}$	$0.2\pm0.0_{B}^{a}$	$0.2\pm0.0_{B}^{a}$
C20:4n6	$7.0\pm0.4_{A}^{a}$	$7.7\pm0.4_{A}^{a}$	$6.4\pm1.1_{A}^{ab}$	$6.4\pm0.2_{A}^{b}$	$5.5\pm0.4_{B}^{a}$	$6.2\pm0.0_{B}^{b}$	$6.5\pm0.9_{A}^{ab}$	$6.3\pm0.1_{A}^{b}$
C20:5n3	$20.8\pm0.3_{A}^{a}$	$21.2\pm0.8_{A}^{a}$	$18.5\pm2.1_{A}^{ab}$	$20.3\pm0.0_{A}^{a}$	$16.7\pm0.9_{B}^{a}$	$19.2\pm0.2_{B}^{b}$	$18.5\pm1.2_{A}^{ab}$	$21.8\pm1.1_{A}^{c}$
C22:2	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.0\pm0.0_{B}^{a}$	$0.0\pm0.0_{B}^{a}$	$0.0\pm0.0_{B}^{a}$	$0.1\pm0.0_{A}^{b}$
C22:6n3	$12.6\pm0.1_{A}^{a}$	$11.7\pm0.4_{A}^{b}$	$10.2\pm0.5_{A}^{c}$	$11.5\pm0.3_{A}^{b}$	$12.7\pm1.0_{A}^{a}$	$10.7\pm0.2_{B}^{b}$	$10.9\pm0.0_{A}^{b}$	$13.5\pm0.4_{B}^{ac}$
∑PUFA	$44.8\pm0.9_{A}^{a}$	$44.5\pm0.7_{A}^{a}$	$38.7\pm4.1_{A}^{b}$	$42.1\pm0.2_{A}^{bc}$	$39.8\pm1.3_{B}^{a}$	$40.4\pm0.5_{B}^{ab}$	$40.7\pm2.0_{A}^{ab}$	$46.1\pm1.9_{B}^{c}$
EPA+DHA	$33.4\pm0.4_{A}^{a}$	$32.9\pm1.2_{A}^{ab}$	$28.7\pm2.6_{A}^{b}$	$31.8\pm0.3_{A}^{ab}$	$29.4\pm1.9_{B}^{a}$	$29.8\pm0.4_{B}^{a}$	$29.4\pm1.2_{A}^{a}$	$35.3\pm1.5_{B}^{b}$
∑n3	$34.2\pm0.4_{A}^{a}$	$33.5\pm1.2_{A}^{ab}$	$29.5\pm2.6_{A}^{c}$	$32.5\pm0.3_{A}^{b}$	$30.6\pm1.8_{B}^{a}$	$30.7\pm0.4_{B}^{a}$	$30.5\pm1.0_{A}^{a}$	$35.8\pm1.5_{B}^{b}$
∑n6	$9.8\pm0.5_{A}^{a}$	$10.3\pm0.5_{A}^{a}$	$8.7\pm1.4_{A}^{ab}$	$8.8\pm0.1_{A}^{b}$	$8.1\pm0.4_{B}^{a}$	$8.7\pm0.0_{B}^{b}$	$9.3\pm0.8_{A}^{ab}$	$9.0\pm0.4_{A}^{b}$
∑n3/∑n6	$3.5\pm0.1_{A}^{a}$	$3.3\pm0.3_{A}^{a}$	$3.4\pm0.2_{A}^{a}$	$3.7\pm0.1_{A}^{a}$	$3.6\pm0.4_{A}^{ab}$	$3.4\pm0.0_{B}^{b}$	$3.2\pm0.2_{A}^{b}$	$3.9\pm0.0_{B}^{ac}$

n=3, ±: standard deviation.
Superscript lowercase letters (a, b, c and d) in the same row indicate differences of the same sexes in body parts ($p<0.05$; One-Way ANOVA).
Subscript capital letters (A and B) indicates the difference between the same body organs in different columns. ($p<0.05$; TUKEY and Mann Whitney U test).

Supplemental Table 3. Fatty acid variation between different body parts edible flesh in male and female crabs in Spring

	SPRING							
	Male				Female			
Fatty acid (%)	*Carapace*	*Right Claw*	*Left Claw*	*Legs*	*Carapace*	*Right Claw*	*Left Claw*	*Legs*
C14:0	$0.5\pm0.0_{A}^{a}$	$0.4\pm0.0_{A}^{b}$	$0.4\pm0.0_{A}^{b}$	$2.3\pm0.7_{A}^{c}$	$1.3\pm0.1_{B}^{a}$	$0.9\pm0.0_{B}^{b}$	$0.9\pm0.0_{B}^{b}$	$0.8\pm0.0_{B}^{c}$
C16:0	$14.3\pm0.4_{A}^{a}$	$12.3\pm0.4_{A}^{b}$	$12.6\pm0.3_{A}^{b}$	$13.6\pm0.3_{A}^{a}$	$12.7\pm0.2_{B}^{a}$	$11.7\pm0.1_{A}^{b}$	$11.3\pm0.1_{B}^{bc}$	$12.2\pm0.2_{B}^{a}$
C18:0	$6.5\pm0.4_{A}^{a}$	$6.7\pm0.2_{A}^{a}$	$7.7\pm0.2_{A}^{b}$	$7.8\pm0.2_{A}^{b}$	$6.3\pm0.3_{A}^{a}$	$6.6\pm0.0_{A}^{a}$	$6.6\pm0.1_{B}^{a}$	$6.5\pm0.1_{B}^{a}$
C20:0	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.0\pm0.0_{A}^{b}$	$0.0\pm0.0_{A}^{b}$	$0.1\pm0.0_{A}^{a}$	$0.0\pm0.0_{B}^{b}$	$0.1\pm0.0_{B}^{a}$	$0.1\pm0.0_{B}^{a}$
C22:0	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.2\pm0.0_{A}^{b}$	$0.2\pm0.0_{B}^{a}$	$0.1\pm0.0_{A}^{b}$	$0.1\pm0.0_{A}^{b}$	$0.1\pm0.0_{B}^{b}$
C24:0	$0.1\pm0.0_{A}^{a}$	$0.0\pm0.0_{A}^{b}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.3\pm0.0_{B}^{b}$	$0.2\pm0.0_{B}^{c}$	$0.2\pm0.0_{B}^{c}$
∑SFA	$21.6\pm0.8_{A}^{a}$	$19.6\pm0.1_{A}^{b}$	$21.0\pm0.0_{A}^{a}$	$24.1\pm1.2_{A}^{c}$	$20.6\pm0.1_{B}^{a}$	$19.8\pm0.0_{B}^{b}$	$19.2\pm0.2_{B}^{c}$	$19.9\pm0.2_{B}^{b}$
C14:1	$0.7\pm0.0_{A}^{a}$	$0.5\pm0.0_{A}^{b}$	$0.5\pm0.1_{A}^{b}$	$0.6\pm0.1_{A}^{ab}$	$0.2\pm0.0_{B}^{a}$	$0.2\pm0.0_{B}^{a}$	$0.2\pm0.0_{B}^{a}$	$0.1\pm0.0_{B}^{b}$
C16:1	$0.0\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{b}$	$0.1\pm0.0_{A}^{b}$	$0.0\pm0.0_{A}^{a}$	$1.1\pm0.0_{B}^{a}$	$1.1\pm0.0_{B}^{a}$	$1.1\pm0.0_{B}^{a}$	$0.9\pm0.0_{B}^{b}$
C18:1n9	$14.7\pm0.4_{A}^{a}$	$15.4\pm0.5_{A}^{a}$	$16.7\pm0.2_{A}^{b}$	$13.3\pm0.2_{A}^{c}$	$12.1\pm0.6_{B}^{a}$	$11.7\pm0.1_{B}^{a}$	$10.8\pm0.1_{B}^{b}$	$9.8\pm0.1_{B}^{c}$
C20:1	$0.8\pm0.0_{A}^{a}$	$0.7\pm0.0_{A}^{b}$	$0.6\pm0.0_{A}^{c}$	$0.6\pm0.0_{A}^{c}$	$0.9\pm0.0_{B}^{a}$	$0.5\pm0.0_{B}^{b}$	$0.7\pm0.1_{A}^{c}$	$0.8\pm0.0_{B}^{c}$
C24:1	$0.3\pm0.0_{A}^{a}$	$0.2\pm0.0_{A}^{b}$	$0.2\pm0.0_{A}^{b}$	$0.2\pm0.0_{A}^{b}$	$0.3\pm0.0_{A}^{a}$	$0.3\pm0.0_{B}^{a}$	$0.3\pm0.0_{B}^{a}$	$0.1\pm0.0_{B}^{b}$
∑MUFA	$16.5\pm0.5_{A}^{a}$	$16.9\pm0.5_{A}^{a}$	$18.1\pm0.1_{A}^{b}$	$14.7\pm0.1_{A}^{c}$	$14.6\pm0.6_{B}^{a}$	$13.7\pm0.1_{B}^{b}$	$13.0\pm0.1_{B}^{c}$	$11.8\pm0.1_{B}^{d}$
C18:2n6	$2.8\pm0.2_{A}^{a}$	$3.1\pm0.0_{A}^{b}$	$3.7\pm0.2_{A}^{c}$	$2.9\pm0.0_{A}^{a}$	$1.8\pm0.1_{B}^{a}$	$2.3\pm0.0_{B}^{b}$	$2.2\pm0.1_{B}^{b}$	$2.0\pm0.0_{B}^{c}$
C18:3n3	$0.3\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{b}$	$0.3\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{b}$	$0.6\pm0.0_{B}^{a}$	$0.9\pm0.0_{B}^{b}$	$0.9\pm0.0_{B}^{b}$	$0.8\pm0.0_{B}^{c}$
C18:3n6	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.2\pm0.0_{B}^{a}$	$0.3\pm0.0_{B}^{b}$	$0.2\pm0.0_{B}^{a}$	$0.2\pm0.0_{B}^{a}$
C20:2 cis	$0.3\pm0.0_{A}^{a}$	$1.2\pm0.1_{A}^{b}$	$1.1\pm0.0_{A}^{b}$	$1.3\pm0.0_{A}^{c}$	$0.8\pm0.0_{B}^{a}$	$0.8\pm0.0_{B}^{a}$	$0.8\pm0.0_{B}^{a}$	$0.9\pm0.0_{B}^{b}$
C20:3n3	$0.1\pm0.0_{A}^{a}$	$0.3\pm0.0_{A}^{b}$	$0.2\pm0.0_{A}^{c}$	$0.4\pm0.0_{A}^{d}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{B}^{a}$	$0.2\pm0.0_{A}^{b}$	$0.2\pm0.0_{B}^{b}$
C20:4n6	$5.6\pm0.4_{A}^{a}$	$8.7\pm0.3_{A}^{b}$	$8.4\pm0.2_{A}^{b}$	$6.7\pm0.2_{A}^{c}$	$5.4\pm0.1_{A}^{a}$	$6.8\pm0.1_{B}^{b}$	$6.3\pm0.1_{B}^{c}$	$5.4\pm0.1_{B}^{d}$
C20:5n3	$19.5\pm0.3_{A}^{a}$	$21.4\pm0.2_{A}^{b}$	$19.7\pm0.3_{A}^{a}$	$22.3\pm0.4_{A}^{c}$	$20.4\pm0.4_{B}^{a}$	$23.2\pm0.1_{B}^{b}$	$22.4\pm0.4_{B}^{c}$	$23.1\pm0.2_{B}^{b}$
C22:2	$0.0\pm0.0_{A}^{a}$	$0.0\pm0.0_{A}^{a}$	$0.0\pm0.0_{A}^{a}$	$0.0\pm0.0_{A}^{a}$	$0.0\pm0.0_{A}^{a}$	$0.1\pm0.0_{B}^{b}$	$0.0\pm0.0_{A}^{a}$	$0.0\pm0.0_{A}^{a}$
C22:6n3	$12.8\pm0.2_{A}^{a}$	$10.7\pm0.3_{A}^{b}$	$10.1\pm0.3_{A}^{b}$	$13.3\pm0.4_{A}^{a}$	$11.3\pm0.1_{B}^{a}$	$12.1\pm0.8_{B}^{ab}$	$12.6\pm0.9_{B}^{bc}$	$13.5\pm0.2_{A}^{c}$
∑PUFA	$41.5\pm0.7_{A}^{a}$	$45.5\pm1.0_{A}^{b}$	$43.6\pm0.7_{A}^{c}$	$47.0\pm0.2_{A}^{d}$	$40.8\pm0.1_{A}^{a}$	$46.6\pm0.9_{A}^{b}$	$45.6\pm0.6_{B}^{b}$	$46.1\pm0.2_{B}^{b}$
EPA+DHA	$32.3\pm0.2_{A}^{a}$	$32.0\pm0.5_{A}^{a}$	$29.8\pm0.6_{A}^{b}$	$35.5\pm0.1_{A}^{c}$	$31.7\pm0.2_{B}^{a}$	$35.3\pm0.9_{B}^{bc}$	$35.0\pm0.5_{B}^{b}$	$36.6\pm0.4_{B}^{c}$
∑n3	$32.7\pm0.2_{A}^{a}$	$32.4\pm0.5_{A}^{a}$	$30.3\pm0.6_{A}^{b}$	$36.0\pm0.1_{A}^{c}$	$32.5\pm0.2_{A}^{a}$	$36.3\pm0.9_{B}^{b}$	$36.1\pm0.5_{B}^{b}$	$37.6\pm0.4_{B}^{b}$
∑n6	$8.5\pm0.5_{A}^{a}$	$11.9\pm0.3_{A}^{b}$	$12.2\pm0.0_{A}^{b}$	$9.6\pm0.2_{A}^{c}$	$7.4\pm0.1_{B}^{a}$	$9.4\pm0.1_{B}^{b}$	$8.7\pm0.1_{B}^{c}$	$7.6\pm0.2_{B}^{a}$
∑n3/∑n6	$3.9\pm0.2_{A}^{a}$	$2.7\pm0.0_{A}^{b}$	$2.5\pm0.0_{A}^{c}$	$3.7\pm0.1_{A}^{a}$	$4.3\pm0.1_{B}^{a}$	$3.8\pm0.1_{B}^{b}$	$4.0\pm0.0_{B}^{c}$	$4.8\pm0.2_{B}^{d}$

n=3, ±: standard deviation.

Superscript lowercase letters (a, b, c and d) in the same row indicate differences of the same sexes in body parts ($p<0.05$; One-Way ANOVA).

Subscript capital letters (A and B) indicates the difference between the same body organs in different columns. ($p<0.05$; TUKEY and Mann Whitney U test).

Supplemental Table 4. Fatty acid variation between different body parts edible flesh in male and female crabs in Summer

	SUMMER							
	Male				Female			
Fatty acid (%)	*Carapace*	*Right Claw*	*Left Claw*	*Legs*	*Carapace*	*Right Claw*	*Left Claw*	*Legs*
C14:0	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.2\pm0.0_{A}^{b}$	$0.6\pm0.1_{A}^{c}$	$0.8\pm0.0_{B}^{a}$	$0.7\pm0.0_{B}^{b}$	$1.2\pm0.1_{B}^{c}$	$0.7\pm0.0_{A}^{b}$
C16:0	$14.2\pm0.0_{A}^{a}$	$15.0\pm0.3_{A}^{b}$	$12.9\pm0.3_{A}^{c}$	$13.3\pm0.5_{A}^{c}$	$14.9\pm0.6_{B}^{a}$	$10.3\pm0.1_{B}^{b}$	$10.4\pm0.0_{B}^{b}$	$10.0\pm0.1_{B}^{c}$
C18:0	$10.0\pm0.0_{A}^{a}$	$8.7\pm0.3_{A}^{b}$	$9.5\pm0.2_{A}^{c}$	$9.3\pm0.2_{A}^{c}$	$7.0\pm0.3_{B}^{a}$	$5.5\pm0.0_{B}^{b}$	$5.7\pm0.2_{B}^{b}$	$5.3\pm0.1_{B}^{c}$
C20:0	$0.1\pm0.0_{A}^{a}$	$0.0\pm0.0_{A}^{b}$	$0.1\pm0.0_{A}^{a}$	$0.0\pm0.0_{A}^{b}$	$0.0\pm0.0_{B}^{a}$	$0.0\pm0.0_{A}^{a}$	$0.1\pm0.0_{B}^{b}$	$0.0\pm0.0_{A}^{a}$
C22:0	$0.3\pm0.0_{A}^{a}$	$0.3\pm0.0_{A}^{a}$	$0.2\pm0.0_{A}^{b}$	$0.3\pm0.0_{A}^{a}$	$0.2\pm0.0_{B}^{a}$	$0.2\pm0.0_{B}^{a}$	$0.1\pm0.0_{B}^{b}$	$0.2\pm0.0_{B}^{a}$
C24:0	$0.3\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{b}$	$0.2\pm0.0_{A}^{c}$	$0.1\pm0.0_{A}^{b}$	$0.1\pm0.0_{B}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{B}^{a}$	$0.1\pm0.0_{A}^{a}$
∑SFA	$25.0\pm0.0_{A}^{a}$	$24.3\pm0.7_{A}^{a}$	$23.0\pm0.5_{A}^{b}$	$23.6\pm0.7_{A}^{ab}$	$23.1\pm1.0_{B}^{a}$	$16.9\pm0.1_{B}^{b}$	$17.6\pm0.2_{B}^{c}$	$16.3\pm0.0_{B}^{bd}$
C14:1	$0.6\pm0.0_{A}^{a}$	$0.9\pm0.0_{A}^{b}$	$0.4\pm0.0_{A}^{c}$	$0.9\pm0.0_{A}^{b}$	$0.5\pm0.0_{B}^{a}$	$0.5\pm0.0_{B}^{a}$	$0.6\pm0.0_{B}^{b}$	$0.5\pm0.0_{B}^{a}$
C16:1	$0.1\pm0.0_{A}^{a}$	$0.0\pm0.0_{A}^{b}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.7\pm0.0_{B}^{a}$	$1.1\pm0.1_{B}^{b}$	$0.8\pm0.0_{B}^{a}$	$0.7\pm0.1_{B}^{a}$
C18:1n9	$15.7\pm0.8_{A}^{a}$	$16.2\pm0.4_{A}^{aa}$	$16.5\pm0.3_{A}$	$14.6\pm0.6_{A}^{b}$	$11.2\pm0.5_{B}^{a}$	$10.8\pm0.0_{B}^{a}$	$10.7\pm0.1_{B}^{a}$	$10.3\pm0.2_{B}^{b}$
C20:1	$0.7\pm0.0_{A}^{a}$	$0.9\pm0.1_{A}^{b}$	$0.8\pm0.1_{A}^{b}$	$0.7\pm0.0_{A}^{a}$	$1.1\pm0.1_{B}^{a}$	$0.9\pm0.1_{A}^{ab}$	$0.6\pm0.0_{B}^{c}$	$0.8\pm0.0_{B}^{b}$
C24:1	$0.4\pm0.1_{A}^{ab}$	$0.4\pm0.0_{A}^{b}$	$0.6\pm0.0_{A}^{c}$	$0.5\pm0.0_{A}^{a}$	$0.4\pm0.0_{A}^{a}$	$0.4\pm0.0_{A}^{a}$	$0.3\pm0.0_{B}^{b}$	$0.3\pm0.0_{B}^{b}$
∑MUFA	$17.5\pm0.8_{A}^{ab}$	$18.4\pm0.3_{A}^{a}$	$18.4\pm0.1_{A}^{a}$	$16.8\pm0.6_{A}^{b}$	$14.0\pm0.7_{B}^{a}$	$13.7\pm0.0_{B}^{a}$	$13.1\pm0.1_{B}^{b}$	$12.5\pm0.1_{B}^{c}$
C18:2n6	$2.0\pm0.0_{A}^{a}$	$2.5\pm0.2_{A}^{b}$	$2.1\pm0.3_{A}^{b}$	$2.3\pm0.4_{A}^{ab}$	$2.4\pm0.2_{B}^{ab}$	$2.3\pm0.0_{A}^{a}$	$2.2\pm0.0_{A}^{b}$	$2.3\pm0.0_{A}^{a}$
C18:3n3	$0.3\pm0.0_{A}^{a}$	$0.4\pm0.0_{A}^{b}$	$0.6\pm0.0_{A}^{c}$	$0.4\pm0.0_{A}^{b}$	$0.6\pm0.0_{B}^{a}$	$0.6\pm0.0_{B}^{a}$	$0.5\pm0.0_{B}^{b}$	$0.6\pm0.0_{B}^{a}$
C18:3n6	$0.1\pm0.0_{A}^{a}$	$0.2\pm0.0_{A}^{b}$	$0.2\pm0.0_{A}^{b}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.2\pm0.0_{A}^{b}$	$0.2\pm0.0_{A}^{b}$	$0.1\pm0.0_{A}^{a}$
C20:2 cis	$1.1\pm0.0_{A}^{a}$	$1.0\pm0.0_{A}^{b}$	$1.2\pm0.1_{A}^{ac}$	$1.3\pm0.1_{A}^{c}$	$0.8\pm0.1_{B}^{a}$	$0.8\pm0.0_{B}^{a}$	$0.9\pm0.0_{B}^{b}$	$0.8\pm0.0_{B}^{a}$
C20:3n3	$0.5\pm0.0_{A}^{a}$	$0.9\pm0.0_{A}^{b}$	$0.7\pm0.0_{A}^{c}$	$0.4\pm0.0_{A}^{d}$	$0.2\pm0.0_{B}^{a}$	$0.4\pm0.0_{B}^{b}$	$0.2\pm0.0_{B}^{a}$	$0.3\pm0.0_{B}^{c}$
C20:4n6	$7.5\pm0.6_{A}^{a}$	$7.7\pm0.2_{A}^{a}$	$7.4\pm0.1_{A}^{a}$	$7.4\pm0.1_{A}^{a}$	$5.5\pm0.1_{B}^{a}$	$6.3\pm0.1_{B}^{b}$	$6.3\pm0.1_{B}^{b}$	$10.6\pm0.8_{B}^{c}$
C20:5n3	$18.7\pm0.8_{A}^{a}$	$15.0\pm0.4_{A}^{b}$	$15.6\pm0.3_{A}^{b}$	$19.6\pm0.2_{A}^{a}$	$15.7\pm0.5_{B}^{a}$	$19.9\pm0.2_{B}^{b}$	$20.7\pm0.8_{B}^{b}$	$19.2\pm0.1_{B}^{c}$
C22:2	$0.1\pm0.0_{A}^{a}$	$0.0\pm0.0_{A}^{b}$	$0.1\pm0.0_{A}^{a}$	$0.1\pm0.0_{A}^{a}$	$0.0\pm0.0_{B}^{a}$	$0.1\pm0.0_{B}^{b}$	$0.0\pm0.0_{B}^{a}$	$0.0\pm0.0_{B}^{a}$
C22:6n3	$12.4\pm0.0_{A}^{a}$	$9.7\pm0.1_{A}^{b}$	$11.0\pm0.3_{A}^{c}$	$13.6\pm0.5_{A}^{d}$	$12.1\pm0.3_{A}^{a}$	$11.3\pm0.3_{B}^{b}$	$11.2\pm0.2_{A}^{b}$	$11.7\pm0.5_{B}^{ab}$
∑PUFA	$42.8\pm1.4_{A}^{a}$	$37.4\pm0.8_{A}^{b}$	$38.8\pm0.5_{A}^{b}$	$45.3\pm0.9_{A}^{c}$	$37.4\pm0.8_{B}^{a}$	$41.9\pm0.6_{B}^{b}$	$42.4\pm1.0_{B}^{b}$	$45.6\pm1.5_{A}^{c}$
EPA+DHA	$31.1\pm0.8_{A}^{a}$	$24.8\pm0.3_{A}^{b}$	$26.6\pm0.0_{A}^{c}$	$33.3\pm0.3_{A}^{d}$	$27.9\pm0.9_{B}^{a}$	$31.2\pm0.4_{B}^{b}$	$32.0\pm1.0_{B}^{b}$	$30.9\pm0.6_{B}^{b}$
∑n3	$32.0\pm0.8_{A}^{a}$	$26.0\pm0.3_{A}^{b}$	$27.8\pm0.0_{A}^{c}$	$34.1\pm0.3_{A}^{d}$	$28.6\pm0.9_{B}^{a}$	$32.2\pm0.5_{B}^{b}$	$32.7\pm1.1_{B}^{b}$	$31.7\pm0.6_{B}^{b}$
∑n6	$9.6\pm0.6_{A}^{a}$	$10.3\pm0.5_{A}^{a}$	$9.7\pm0.4_{A}^{a}$	$9.9\pm0.5_{A}^{a}$	$8.0\pm0.0_{B}^{a}$	$8.8\pm0.1_{B}^{b}$	$8.7\pm0.0_{B}^{b}$	$13.1\pm0.9_{B}^{c}$
∑n3/∑n6	$3.3\pm0.1_{A}^{a}$	$2.5\pm0.1_{A}^{b}$	$2.9\pm0.1_{A}^{c}$	$3.4\pm0.2_{A}^{a}$	$3.5\pm0.1_{A}^{a}$	$3.6\pm0.0_{B}^{a}$	$3.7\pm0.1_{B}^{a}$	$2.4\pm0.1_{B}^{b}$

n=3, ±: standard deviation.

Superscript lowercase letters (a, b, c and d) in the same row indicate differences of the same sexes in body parts ($p<0.05$; One-Way ANOVA).

Subscript capital letters (A and B) indicates the difference between the same body organs in different columns. ($p<0.05$; TUKEY and Mann Whitney U test).