Fatty acid composition of fat depot in 11 month old slaughtered ostriches, *Struthio camelus* L.

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Now-a-days, the production of ostrich meat and oil has been steadily increasing. The ostrich oil is a source of various commercial products includes moisturizing creams, body lotion, soap and lip balm (Grompone, *et al.* 2005; Elhashmi *et al.* 2011). Ostrich oil is high quality oil with high similarity to human skin lipid. The triglyceride as a main composition of ostrich oil (around 100%) cause facility for suitable absorption of ostrich oil by human skin. Also, absence of phospholipids makes ostrich oil highly penetrating and allows it to absorb through the skin more easily (Margaret 2003). About studies conducted on medicinal aspects of emu oil, Hao *et al.* (2011) had reported that dietary emu oil can cause hypolipidemia in mice model. Because of its low cholesterol content and suitable fatty acid profile, ostrich oil is utilizing in foods. In food industry, mixing ostrich oil with sunflower oil could increase the stability and hence improved the quality of sunflower oil during frying process, and caused sensory characterizes and palatability of food (Amany *et al.*, 2011). Cholesterol and fatty acid composition of ostrich meat is variable in different sub-species of ostriches (Horbañczuk *et al.*, 1998). Regardless to genetics of bird, nutrition is another affected factor in fatty acid composition of ostrich fat (Beckerbauer, 2001). In this regard, dietary soybean oil caused more polyunsaturated than did the tallow-fed emus (Beckerbaue,r 2001), but from anatomical approach, Matlhoko *et al.* (2010) showed that fatty acid composition of ostrich oil did not differ between different anatomical fat depots in the carcass. Observations of Horbańczuk *et al.* (2003) suggested that age-related positive correlation for cholesterol and fatty acid composition of ostrich oil. With attention to conducting their study (Horbańczuk *et al.* 2003) on 5-year old ostriches, the aim of present study was to analyze fatty acid composition of fat depot of young ostriches (11 months old). This study was conducted in summer 2011. Ostriches were kept on a farm at Shabestar region – East Azerbaijan province, Iran. Fat samples (approximately 15 g from each bird) were collected after slaughter from breast region of seven males culled at the age of 11-months old. The samples were immediately vacuum-packed in bags and then stored at -20°C until analyzed. For determination of fatty acids the samples of frozen fat were freeze-dried and extracted with chloroform-methanol-water mixture (4:2:1, v/v). Derivatization reaction was carried out according to Czauderna and Kowalczyk (2001). The derivative samples were filtered through a 0.2 μm membrane filter. The filtrates were injected onto chromatographic columns on Spheri-5RP-18, 5 μm, 220 × 4.6 mm. Dibromoacetophenacyl esters of fatty acids

were identified on a HPLC system Series 200 (Perki n Elmer, USA). Elution was performed using methanol (MeOH) and acetonitryl-water (ACN: H2O, 40:60, v/v) 9:1, v/v mixture. Obtained data for fatty acids composition arise from gas chromatography's result were recorded as percentage. The column temperature was maintained at 35°C. Obtained data were recorded in excel software sheets as percentage. The fatty acid profile of 11-month old male ostrich is presented as Fig. 1 and also in table1 for comparison of present findings with past similar reports.

Table 1: Fatty acid composition (based on % of fatty acids) of 11-months old male ostrich

Age of bird / Fatty acid	11-months old (present study)	14-months old (Horbańczuk 2004)	60-months old (Horbańczuk et al., 2003)
C14:0	0.04 ± 0.01	2.27± 0.35	0.73 ± 0.14
C14:1n5	0.75 ± 0.11	0.07 ± 0.02	0.03 ± 0.01
C16:0	24.73 ± 1.21	27.11 ± 1.36	20.25 ± 0.93
C16:1n7	4.82 ± 0.44	4.48 ± 0.77	0.41 ± 0.13
C18:0	4.43 ± 1.01	1.48 ± 0.28	0.55 ± 0.10
C18:1n9	28.03 ± 3.09	25.02 ± 4.01	36.39 ± 1.16
C18:1n7	1.51 ± 0.55	-	-
C18:2n6cis	21.19 ± 2.18	10.58 ± 1.54	16.20 ± 2.36
C18:3n3	9.1 ± 0.49	22.17 ± 4.43	15.98 ± 2.18
C18:3n6	2.16 ± 0.41	-	-
C18:4n3	0.09 ± 0.01	-	-
C20:0	0.04 ± 0.01	-	-
C22:0	0.06 ± 0.02	-	-
C20:5n3	0.52 ± 0.09	-	-
C20:4n6	1.29 ± 0.10	5.67 ± 0.70	6.65 ± 1.23
C22:5n6	0.06 ± 0.01	-	-
C22:6n3	0.05 ± 0.01	-	-

Table 1 showed that two saturated fatty acids (C14:0 and C16:0) in 11 months old ostrich oil are less than ostrich oils obtained from 14 months old ostrich, where C16:0 is considerably higher than those of reported for 60 months old ostrich's oil. MUFA (C14:1n5, C16:1n7, C18:1n9 or C18:1n7) for 11 months old is more than those of reported for 14 months old ostrich's oil, whereas PUFA in present study with exception to C18:2n_6 was lower than 14- and 60-months old ostrich's oil.

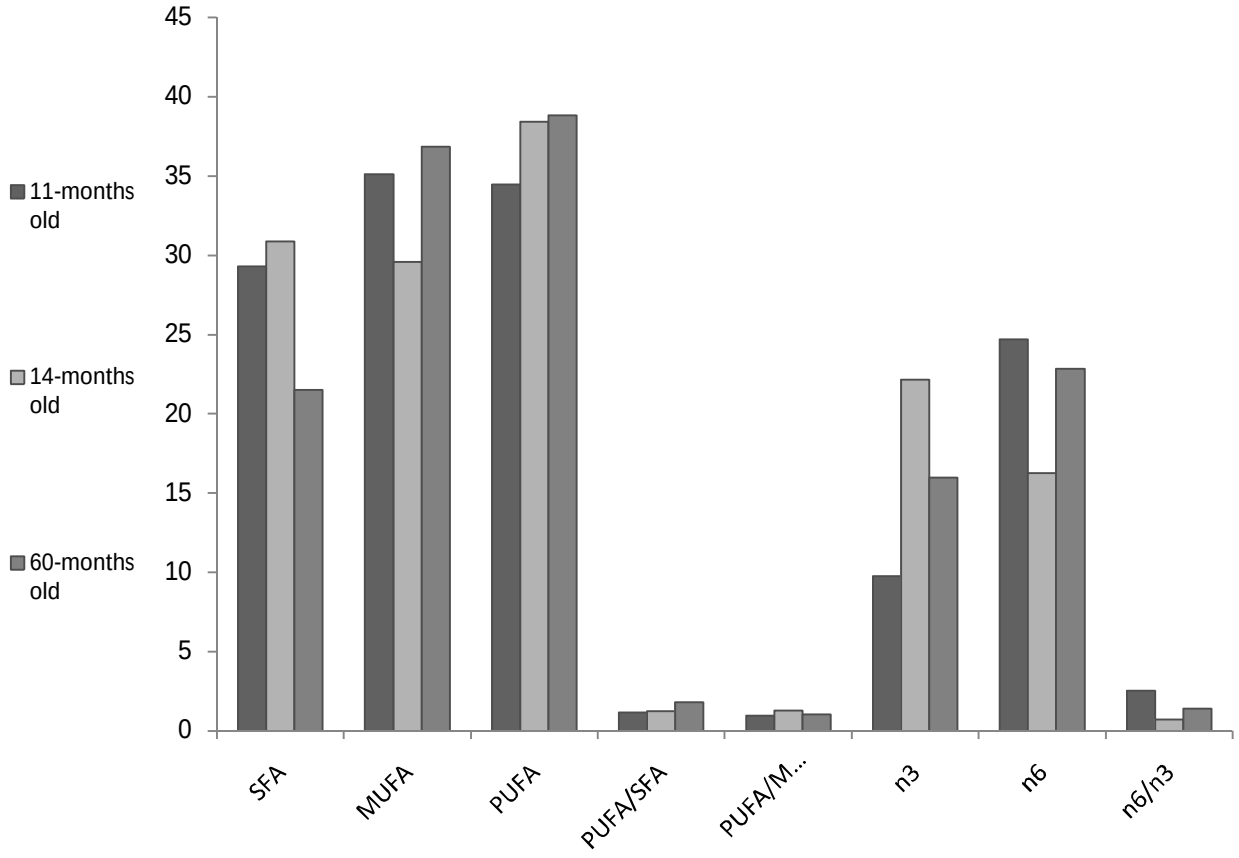

Fig. 1: Fatty acids (SFA), MUFA, PUFA, n3 and n6 rates of ostrich oil at different ages (data obtained by present study and Horbańczuk et al., 2003, 2004) (Based on % of fatty acids).

The n-6 fatty acids concentration of 11-day old ostrich's oil is more than those obtained from 14- or 60-months aged bird (Fig. 1). About n3- fatty acids, present analysis for 11- months is considerably lower than 14 and 60 months old ostrich's oil.

In present study, in contrary to Horbańczuk *et al.* (2003, 2004) reports, the PUFA proportion is not considerably high. It seem that the fatty acids profile of 11months ostrich is not sufficiently enriched with PUFA that is the goal of nutritional researches, slightly after this ages the fatty acids composition of ostrich will be skewed to PUFAs more than MUFA or SFA. With attention to figure.1, the MUFA is high in younger birds (11 than 14- months old). The fatty acid profile of 11-months old ostrich's oil is enriched with UFA specially MUFA and n-6 rather than PUFA and n-3 fatty acids. When the approach of ostrich oil production is obtaining more MUFA or n-3 fatty acids, it is suitable to go for slaughtering at 14-60 months old ostriches.

The completive experimental studies with attention to role of nutritional factors (Matlhoko *et al.* 2010) are needed to clarify the optimum age of bird for optimum oil yield.

CONCLUSION

Fat samples of 11 month old Ostrich collected after slaughter from breast region of seven males culled revealed that the n-6 fatty acids concentration of ostrich's oil is more than those obtained from 14- or 60-months aged bird. Regarding n-3 fatty acids, present analysis for 11months is considerably lower than 14- or 60- months old ostrich's oil. In present study, the poly unsaturated fatty acid (PUFA) proportion of oil is not considerably high. In conclusion, the fatty acid profile of 11-months old ostrich's oil is enriched with unsaturated fatty acid (UFA) especially mono unsaturated fatty acid (MUFA) and also n-6 rather than n-3 fatty acids. It was concluded that the fatty acid profiles at a young age that most SFA has changed with the increasing age profile and fatty acid composition is altered to concentration of PUFA.

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[MS received 07 July 2012;
MS accepted 19 September 2012]