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Physicochemical quality of artisanal oils produced in Ouagadougou: case of four small companies of cottonseed oils and crude groundnut oils taken in the markets

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ABSTRACT

Artisanal oils dominate in the diet of the Burkinabe population.Among the food products, artisanal oils represent important sources of potential health risks. The objective of this study is to evaluate the quality of artisanal oils produced in Ouagadougou. A total of 30 samples of cottonseed oil and groundnut oil were collected on the sites of production and markets of Ouagadougou. The physicochemical parameters (refractive index, acid value, peroxide value, iodine value, saponification value, residual soap content, water and volatile materials content, β-carotene content, sterols and mineral oil) were determined by standard methods. The physicochemical parameters determined the case of non-compliance observed in the iodine and saponification values. The cottonseed oil showed 88.58 ± 11.86 g of iodine / 100 g. This average is below *the codex alimentarus*standard value. Sterols were detected in all samples. However no sample of oil showed traces of mineral oils. The averages of the physicochemical parameters according the type of oil presented significant variations ($p < 0.05$)exceptedthose of the iodine value, the residual soap content, the water and volatile materials content. The overall analysis of the different results showed a general conformity with the *Codex* permissibility level for named vegetable oils. This compliance allows concluding that the quality of artisanal oils from Ouagadougou is quite good. It appears from this study that local producers have a mastery of the manufacturing process. But obtaining high quality of artisanal oil requires more strict application of good hygiene and manufacturing practices.

Indexing terms/Keywords

Keywords: Cottonseed, Groundnut, Artisanal oil, quality

Academic Discipline and Sub-Disciplines

Food analysis

SUBJECT CLASSIFICATION

Food sciences

TYPE (METHOD/APPROACH)

Quasi-Experimental

INTRODUCTION

Malnutrition and the deficiencies in micronutriments remain the major public health problems in the majority ofWest Africa countries [1]. In Burkina Faso, notwithstanding, its nutritional contribution, oil remains a foodstuff with potentialhealth risks. Oils and vegetable fats present significant role in the food thanks to the energy contribution which they provide and their wealth in essential fatty acids and vitamins. In addition to this role of feeder agent, the oils and vegetable fats have therapeutic applications because of their interesting biological properties [2,3].They have also a significant role while making food pleasant with the taste [4]. The oilseeds and nuts transformed by the food industry in Burkina Faso are cottonseed, nuts of shea tree, the groundnut and sesame [5]. Since the development of the cotton culture, an increase in the number of small artisanal units of production of "refined" oils of cotton seeds has been observed, causing a reduction

of the quality because of bad practices and often falsifications of packing [6].An artisanal production of groundnut oil is also noted. So different artisanal oils are sold in the markets of Ouagadougou. Many efforts aremade these last years by health authoritiesto improve quality of the edible oils sold on the markets, but these efforts seem to be insufficient.

The fats and oils subjected to oxidation lose their nutritional values and forms several harmful products of oxidation [7, 8]. Oxidation is the principal cause of modification of the lipids which is likely to occur at all the stages of the transformation, the conservation and the use of the foodstuffs containing of the unsaturated lipids, since they are exposed to rises in temperature or are exposed to the light in the presence of oxygen. Also, the mechanical treatments contribute to dissociate the protective native structures and to put in contact substrates and pro-oxidants agents of all natures [9].Previous studies in Burkina Faso showedsome anomalies on the level ofsome physicochemical characteristics which couldbe due to a bad conditions during storage. The majority of the oils used in cracklings in Ouagadougou did not answer the regulation as described in the legislation in force.In addition, unexpected controls of the National Laboratory of Public health (LNSP) between 2005 and 2006 showed the presence on the markets of some oils produced clandestinely and not answering to anycriteria of quality according to *CodexAlimentarius standard* [6]. This study also has drawn up one problem of the quality of oils by the local production. The objective of this studywas the determination of the physicochemical quality of the artisanal oils produced and consumed in Ouagadougou. The refractive index, acid value, peroxide value, iodine value, saponification value, residual soap content, water andvolatile materials content, carotenoids content, sterols in equivalent of cholesterol content and detection of mineral oil traces were determined.

1. MATERIAL AND METHODS

1.1. Sampling

All oil samples analyzed were collected in Ouagadougou. Crude groundnut oils were taken in eight (08) markets and cottonseed oils in five (05) manufacturing units based in the industrial park.On the whole, thirty (30) samples were collected including fifteen (15) cottonseed oils and 15 of groundnut oils. Each sample (330 mL) was placed in can, conveyed at the laboratoryand stored at the ambient temperature and safe from the light.

1.2. Physicochemical analysis

The physicochemical analysiscarried out on groundnut and cottonseed oils samples includes:

The refractive index at 20 °C determination according toISO [10]. A drop of each oil was placed on the sample sensor on the refractometer and readings displayed value was then recorded.

The acid value determinationby alkalimetry in ethero-alcoholic medium according to ISO [11] by using 10 g oil, a mixture ethanol ether diethylic, phenolphthalein and a solution of alcoholic KOH.

The water and volatilematerials content determinationby differential weighing accordingISO [12]. 10 g oil were put the drying oven at105°C during 1 hour and repetition all 30 min until obtaining of a constant mass.

The iodine valuedetermination by method AFNOR [13]: using 0.2 g oil, the reagent of *Wijs*, carbon tetrachloride, a solution of 10 % m/v of potassium iodide, sodium thiosulfate in the presence of starch like indicator.

The peroxide value determinationby titrimetric according to AFNOR [14] by using 2 g oil with chloroform, acetic acid, the potassium iodide, the potassium thiosulfate in the presence of starch paste.

The saponification value determination according to ISO [15] by using 2 g oil, an ethanolic solution of potassium hydroxide and titration after heating using a solution of chloridric acid in the presence of phenolphthalein;

The residual soap content determinationaccording to French standard [16] was determined by titrimetric using 40 g oil in the presence of acetone with 3 % of water, the bromophenol blue, the soda and a solution of chloridric acid.

The carotenoids content determinationaccording the method described by Mosquera-Minguez *et al*.[17] while using cyclohexane in the presence of 2 g oil and the reading of the absorbance at 470 nm using a spectrophotometer.

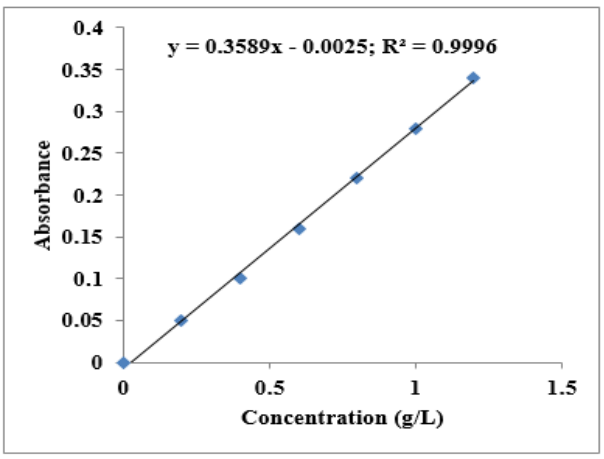
The detection of mineral oils according toAOAC [18] by saponification using a mixture of 1 mL oil, a solution of ethanol and potassium hydroxide.The sterols content (in equivalent of cholesterol) while following the test of Liebermann-Burchard described by Burke *et a*l. [19]after dilution to the 1/30 of a volume of 1 mL each oil; 1 mL of this dilution was added to 2 mL of the reagent of Liebermann-Burchard then coloring developed and was stabilized during 25 mn at darkness. The absorbance of each solution was measured to 640 nm at spectrophotometer. Then the cholesterol concentrations were given using the curves spread out obtained using standard cholesterol solution at 2 g/mL.

1.3. Data analysis

Data were entered into Excel 2010. The statistical analysis of data was performed with SPSS Statistics Version 20 software.The tests of Fisher were used to compare the different parameters analyzedvaluesto the threshold of probability of p = 5 % (significant if p <0.05 and no significant if p>0.05).

2. RESULTS AND DISCUSSION

The absorbance of each standard solution was measured three times at 640 nm following the proceduredescribed earlier. The calibration curves for the determination of the concentrations in cholesterol are given by figures 1 and 2 for groundnut oils and the cottonseed oils respectively. The equation of the calibration curve was obtained from the resulting absorbance versus concentration (g/L) curve of cholesterol.



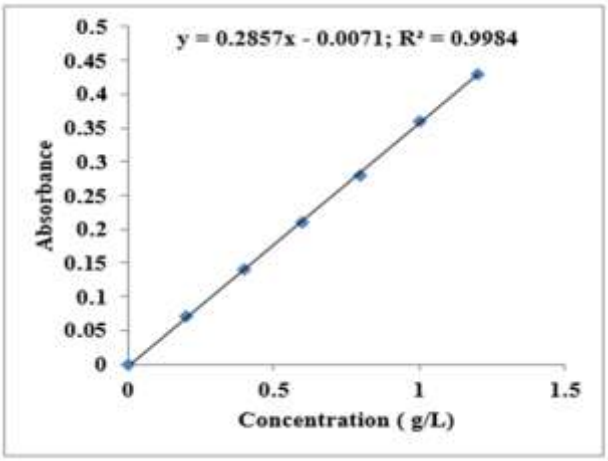


Figure1: Calibration curve for the cottonseed oils

Figure2: Calibration curve for the groundnut oils

The results of physicochemical parameters measured are presented in tables 1 and 2 respectively for groundnut oils and cottonseed oils and their averages presented in table 3.

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Table 1: Physicochemical parameters of groundnut oils

Markets	Samples	Averages								
		water and materials volatile content (%)	Acid Value (mg KOH/g)	Peroxide Value (MEq. O_2 /Kg)	Iodine Value (g iodine/ 100 g)	Saponification value (mg KOH/g)	Residual soapcontent (ppm)	Refractive index at 20° C	Carotenoids Content (ppm)	Sterols Content (cholesterol g/100 mL)
Zone I	E1	0.04	1.00	7.11	91.94	191.60	15.19	1.471	2.59	0.97
	E10	0.05	0.37	11.84	88.79	193.00	17.09	1.471	3.98	0.80
Gounghin	E2	0.05	1.77	7.73	90.05	186.34	7.59	1.471	3.26	1.03
	E13	0.08	0.58	7.10	85.96	197.34	7.59	1.471	6.12	0.94
Baskuy	E3	0.04	0.68	11.34	88.70	198.25	13.29	1.471	3.11	1.02
	E12	0.04	0.39	11.21	87.12	193.39	22.791	1.472	2.57	0.96
Pissy	E4	0.04	0.47	12.97	91.22	201.05	9.49	1.471	3.38	0.96
	E11	0.05	0.46	11.09	85.33	194.45	22.79	1.471	4.01	0.89
Nabiyar	E5	0.04	0.71	10.95	89.11	198.40	5.69	1.471	2.14	1.00
Katreyar	E6	0.04	1.26	10.96	91.22	195.71	22.79	1.471	2.07	0.99
	E15	0.06	0.57	9.98	85.33	190.59	7.59	1.471	5.80	0.82
Dassasgho	E7	0.04	0.49	10.60	91.14	190.99	22.79	1.471	3.09	0.91
	E9	0.04	0.34	10.20	88.76	198.00	13.29	1.471	4.14	0.86
Benego	E8	0.05	0.91	8.47	88.19	195.20	5.69	1.472	2.16	1.06
	E14	0.07	0.61	10.86	87.85	187.44	3.79	1.472	7.40	1.02
Codex standard		**0.2**	**4.00**	**15**	**100-115**	**187-196**	**50**	**1.468-1.472**	**25**	**0-3.8**

Table 2: Physicochemical parameters of cottonseed oils

Industries	Samples	Averages								
		Water and materials volatile content (%)	Acid value (mg KOH/g)	Peroxyde value (mEq. O_2 /kg)	Iodine value (g iodine/ 100g)	Saponification value (mg KOH/ g)	Residual soap Content (ppm)	Refractive index at 20° C	Carotenoids Content (ppm)	Sterols Content (cholestérol g/ 100 mL)
UIA	E2	0.04	0.39	3.11	80.49	189.14	17.09	1.473	3.64	1.30
	E3	0.04	0.25	3.98	72.15	182.53	0.00	1.473	2.98	1.22
	E4	0.05	0.37	4.73	74.94	186.39	0.00	1.473	4.15	1.08
	E5	0.04	0.25	2.49	77.02	190.94	0.00	1.473	4.18	1.15
	E6	0.02	0.31	2.99	74.31	184.38	13.28	1.473	3.50	1.46
	E7	0.05	0.30	3.11	76.58	191.34	15.19	1.473	3.44	1.19
UIB	E8	0.07	0.15	2.61	99.12	185.08	13.29	1.472	7.63	1.21
	E9	0.08	0.21	3.12	101.71	189.89	22.79	1.472	8.61	1.19
	E10	0.06	0.15	4.48	98.76	196.90	26.58	1.472	8.44	1.07
	E11	0.07	0.16	5.10	100.88	188.49	34.19	1.473	5.86	1.06
	E12	0.08	0.12	5.74	98.42	182.18	15.19	1.473	4.35	1.03
UIC	E1	0.04	0.46	8.72	79.46	196.25	30.39	1.472	8.05	1.58
	E13	0.06	0.16	5.74	93.85	185.34	18.99	1.472	3.92	0.94
UID	E14	0.06	0.09	4.73	101.58	189.99	7.59	1.473	4.63	1.02
	E15	0.06	0.12	5.11	99.51	181.57	3.79	1.472	6.00	1.10
Codex standard		**0.2**	**0.6**	**10**	**100-115**	**189-198**	**50**	**1.470-1.473**	**25**	**0.7-2.3**

UIA: Unit industrial A ; UIB : Unit industrial B ; UIC : Unit industrial C ; UID : Unit industrial

Table 3: Averages of the physicochemical parameters of the cotton seed oils and groundnut oils

Physicochemical parameters	Averages		F	P
	Groundnut oils	Cottonseed oils		
Water and materials volatile (%)	0.05 ± 0.01[a]	0.06 ± 0.01[a]	2.634	0.110
Acid value (mg KOH/g)	0.71 ± 0.38[a]	0.23 ± 0.11[b]	42.441	0.0001
Peroxide value (mEq 0_2 / kg)	10.16 ± 1.73[a]	4.25 ± 1.65[b]	181.990	0.0001
Refractive index at 20°C	1.471 ± 0.000[a]	1.472 ± 0.000[b]	889.107	0.0001
Iodine value (g iodine/100 g)	88.72 ± 2.34[a]	88.58 ± 11.86[a]	0.004	0.943
Saponification value (mg KOH/g)	194.12 ± 4.14[a]	188.03 ± 4.64[b]	28.697	0.0001
Residual soap Content (ppm)	13.17 ± 7.03[a]	14.56 ± 10.79[a]	0.350	0.556
Carotenoids content (ppm)	3.72 ± 1.56[a]	5.29 ± 1.95[b]	11.800	0.001
Sterols content (cholesterol g /100 mL)	0.95 ± 0.08[a]	1.17 ± 0.18[b]	37.925	0.0001

F = F of Fisher; Values of p (significant if p<0.05 and no significant if p>0.05); a, b: The values with different superscripts in a line do not present a significant difference according to the test of Fisher at the threshold of 5%.

2.1.Mineral oils

Mineral oils were not detected in the groundnut and the cottonseed oils. That proves that analyzed oils are not contaminated by mineral oils. However, the studies of Neukom *et al*. [20],Reich *et al*. [21], Wagner *et al*. [22] and of Moret *et al*. [23] reported the presence of hydrocarbonsin vegetable oilsabout a few hundred of milligrams to approximately a hundred milligrams per kilogram. Wagner *et al*. [22] made a study on the contamination of vegetable oils by mineral oils on more than 200 samples of unrefined and refined oils and the concentrations vas between 30 and 150 mg/kg. The analysis for the detection of mineral oils is important. These last years, the investigations in Burkina Faso allowed to seize tens oil barrels of draining distilled and sold like foodstuffs in Ouagadougou. These oils distributed in all the countryare dangerous for the consumer health.

2.2. Water and volatile materials content

The water and volatile materials contents of groundnut and cotton seed oils samples were all in conformity codex standard permissibility level (0.20 %).That reveals a rather good control of the technique of drainage of water and volatile matters during the process of drying of oils. The average of the water and volatile materials content of groundnut oils was 0.05 % against 0.06 % for the cottonseed oils. These averages were statistically no significant (p > 0.05). This variation allows affirming that the water and volatile materials don't depend on the types of oils but rather on the manufacturing process in particular drying of oils. These averages were different from those obtained by Koudougou et Dicko [6] which were respectively 0.09 % and 0.04 % for the cottonseed oil but almost identical to the average of 0.06 % reported by Soumanou *et al*. [24].Soumanou *et al*. [24] obtained an average of 0.43 % for the groundnut oil. The water and materials volatile content of oil must be most reduced possible because it is responsible of the fast degradation of oils (rancidity in less than one month)[25].Water is responsible of the acidification of vegetable oils and the development of the micro-organisms.

2.3. Acid value All the results for the groundnut oils and cottonseed oils were in conformity codex standard permissibility level (groundnut oil < 4.0 mg KOH/g and refined oils case of cotton seed oils < 0.6 mg KOH/g) [26]. These results could prove that groundnut oils did not undergo the phenomenon of hydrolysis and a

good neutralization of the free fatty acids was carries out during the refining. The average of the acid value of cottonseed oils and groundnut oils analyzed was 0.23 mg KOH/g and 0.71 mg KOH/grespectively. These averages were statistically very significant ($p < 0.0001$). The average of the groundnut oil samples is higher. This observation confirms the idea according to which unrefined vegetable oils had the acid values higher than the acid values of refined oils [27]. The presence of free fatty acids by hydrolysis is probably caused by a variety of agents: presence of moisture in oil, a high temperature (above the ambient temperature) and, more significant still, lipases (enzyme) coming from the source or contaminant micro-organisms [27]. Concerning the groundnut oils, the results of this study are lower than the averages obtained by other authors. Soumanou *et al*. [24] obtained an average of 4.84 mg KOH/g. For the cottonseed oil, the average obtained is lower than that the study [28] which reported 7.57 mg KOH/g, and Koudougou et Dicko [6] which was 0.30 mg KOH per Kilogram for the study carried out in 2005 but slightly higher than value 0.20 mg KOH/g of Soumanou *et al.*[24] and that obtained by Koudougou et Dicko [6] for the study of 2006.

2.4. Peroxide value

Peroxide values of all the oil samples were in agreement with the maximum Codex standard peroxide value (10 mEq O_2/Kg for refined oils case of the cotton seed oil and 15 mEq O_2/Kg for the unrefined oils case of the groundnut oil [26]. We can affirm that the cotton seed oil is not oxidized. The high values of groundnut oils prove the no refining but also the conditions of storage and conservation misfit during the production and marketing. The averages of the peroxide value are statistically very significant ($p< 0.0001$) and are respectly 10.16 mEq O_2 / Kg for groundnut oils and 4.25 mEq O_2/Kg for the cotton seed oils. Comparatively to the data of the literature, the results of this study for groundnut oils are largely higher than the average 5.43 mg/Kg found byChabiri *et al*. [29]. The average of the cottonseed oil obtained higher than the averages 0.60 mEq peroxide/Kg and 3.85 per Kilogram obtained respectively by Dimberu [28] and Chabiri *et al*. [29] and lower than the averages of studies of 2005 and 2006 which was respectively 8.90 mEq O_2 / kg and 7.0 mEq O_2 / kg of Koudougou et Dicko [6]. The peroxide value allows appreciating the first stages of an oxidative deterioration of oil [4]. It is also useful indicator of the first stages of rancidity occurring under moderated conditions, freshness of the lipidic matrix. It is about a measurement of the products of primary oxidation of the lipids.

2.5. Refractive index

Refractive indexes obtained were in conformity codex standard permissibility level [26] which stipulates that refractive index of the groundnut oil must range between 1.468 and 1.472. The refractive indexes of cottonseed oils must range between 1.470 and 1.473 [26].The averages of the refractive indexes for groundnut oils and of the cottonseed oils are respectively 1.471 and 1.472. The averages are statistically very significant ($p<0.0001$).The results are conformity British Standard permissibility level[30] which allows the refractive indexes for vegetable oils vary between 1.450 and 1.480 at the temperature of 20-50 °C. The average of refractive index of the cotton seed oils corroborates at the study ofChabiri *et al*. [29] which had obtained 1.472. The average of the refractive index of the cotton seed oils corroborates at the 1.472 obtained by Chabiri *et al*. [29]. According to Wolff [31]no siccative oils have refractive indexes between 1.467 and 1.472; semi-siccative oils 1.470 and 1.478; siccative oils 1.481 and 1.482. According the indexes obtained, we can affirm that the cotton seed oil is semi-siccative oil and the groundnuts oil no siccative oil. In general, the indexes of the two types of oil obtained are conformity with their identity according the codex standard permissibility level. The refractive index and the relative densities values some oils are physical measures of adulteration of vegetable oils, since different oils have characteristic density and refractive index. Studies have shown that the contamination of vegetable oils with particulate matters and other chemical adulterants such as potassium hydroxide brings chemical reaction with fatty acids of vegetable oils with the production of soap which alter the optical activity of the vegetable oils and increases the susceptibility of the vegetable oils to become rancid or spoiled [32].

2.6. Iodine value

Iodine values of the groundnut oil analyzed were in conformity with codex standard permissibility level (86-107 g iodine/100 g). This conformity is due to the fact that the groundnut oil is classified among no siccative oils because its iodine index is lower than 100 and it resists to oxidation [31]. Among the samples of cotton seed oils analyzed, 07 samples have indexes largely lower than the standard of the *codex Alimentarius* (100-115 g iodine/100 g). These low values could be due to an oxidation of the unsaturated fatty acids. In addition, the average of the iodine values of groundnut oils is 88.72 g iodine/100 g oil against 88.58 g iodine/100 g for the cotton seed oil. The variation is not significant ($p > 0.05$). Thus, the average obtained is lower than the average of 98.60 g iodine/oil 100g obtained by *Chabiri et al*. [29]. For the cotton seed oil, the average obtained is lower than the average 111.90 g iodine/100g oil found by Chabiri *et a*l. [29].The iodine index measures the degree of non-saturation of vegetable oil. Some studies showed that more the degree of non-saturation is high more the value of the iodine index is high and vegetable oil becomes rancid by oxidation [33].

2.7. Saponification value

On the whole, 09 out the 15 samples of groundnut oils analyzed were in conformity codex standard permissibility level [26], except 06 samples which had superscripts than the codex standard permissibility level (187-196 mg KOH/g).Thus, the saponification values were sufficiently high. For the cottonseed oil samples, 06 samples were in conformity with the codex standard permissibility level (189-198 mg KOH/g). The saponification values of the cottonseed oil were high. The cottonseed oils could be contain fatty acids whose molecular weights are relatively low. The average of the saponification values of the groundnut oil analyzed was 194.12 mg KOH/g against an average of 188.03 mg KOH/g for the cottonseed oils. The variations of the averages were statistically very significant ($p < 0.0001$). The average obtained for the cotton seed oils was lower than the average of Codex [26] which reported 228.55 mg KOH/g. The saponification values of the cottonseed oil were lower than those of the groundnut oil. The cotton seed oil contains fatty acids whose molecular weights are slightly higher compared to the fatty acids of the groundnut oil. The saponification value is an indication than the triglyceride molecular weights in oils. More the molar mass is high the saponification value is low. Thus, it allows to control the purity of oil but also its aptitude for saponification. A higher value of the saponification value indicates a strong proportion of lower fatty acids. Moreover the saponification value is inversely proportional to the weight or the average length of the chains molecular of the fatty acids [34].

2.8. Residual soap content

All samples analyzed presented soap traces except 03 samples of cotton seed oil. All the samples had lower residual soap content and were in conformity with the codex standard permissibility level [26] which is fixed at 50 ppm. The fatty acids can contain basic elements in small quantity, either naturally (example of calcium soap in tallows of bone or phospholipids in the rough greasy substances), or accidentally when oil was not well refined (for example sodium soap) [35]. The presence of soap trace in the cotton seed oils translates an insufficiency of the washing process of oil after the stage of neutralization (neutralization of the free fatty acids of oil by potash addition). The averages of the residual soap content of samples are respectively 13.17 ppm for groundnut oils and 14.56 ppm for the cottonseed oils (no significant variation: $p > 0.05$). The results obtained for the cottonseed oils don't corroborate with the averages 32.90 ppm and 21.70 ppm obtained respectively in 2005 and 2006 by Koudougou et Dicko [6]. A soap content too weak could mean that the zone of separation moved towards the heavy phase and that there is risk of oil loss in the "pastes" whereas a too raised content can disturb the operations of washing by creating emulsions [36].

2.9. Carotene content

The β-carotene contents were in conformity with the codex standard permissibility level. The β-carotene average was 3.72 ppm for the groundnut oil and 5.29 ppm for the cottonseed oils (significant variation: p<0. 05). These results show that the cotton seed oil is richer in carotenes than the groundnut oil. The carotenes are natural chemical substances implied in the mechanismsofoiloxidation of. Their presence in sufficient quantity in oil allows to delay the phenomenon of the photo-oxidation and to preserve the parameters of quality of oil during the storage [37].

2.10. Sterols content

The sterols content (equivalent of cholesterol) of the samples varied from 0.82 g/100 mL to 1.06 g/100 mL of groundnut oil analyzed. According to *codexAlimentarius* [26], the cholesterol content in groundnut oils should not exceed 3.8 % of total sterols. On the other hand the sterols content (equivalent of cholesterol) in the cottonseed oil samples varied between 0.94 and 1.58 g/100 mL. The regulation of the *codex Alimentarius* [26] requires that the cholesterol content in the cottonseed oils have to range between 0.7 and 2.3 % of total sterols. The averages of sterols (equivalent of cholesterol) are statistically very significant (p< 0.0001) with respectively 0.95 g/100 mL and 1.17 g/100 mL for the groundnut oil and the cottonseed oil. The results obtained were higher than the values obtained by others authors. Okpuzor *et al*. [38] obtained an average of 1.39 mg/mL for the groundnut oil and Dimberu [28] obtained 131.90 mg/l for the cottonseed oil. These high values could be justified by the fact that the samples which they analyzed are samples of marks, but also an interference with others made up having chemical structures similar to the sterolic structure, the methyl's sterols, alcohols triterpenic, the vitamin D and beta-carotene. The presence of sterols (equivalent of cholesterol) in the oil samples analyzed corroborates with the assertions ofShulka *et al*. [39] which stipulates in their study that cholesterol was detected in vegetable oils, where it could constitute 5 % of total sterols and a relatively high quantity of cholesterol was described in the oil of caméline (approximately 200 mg/kg). Cholesterol has essential functions in the body. This compound provides elements essential with the membrane and is used as precursor with the synthesis of the biliary acids, the steroid hormones and by vitamin D. The cholesterol consumption in our food increases the level of lipoproteins of low density [28]. The hypercholesterolemia represents a factor of risk in the progression of the atherosclerosis. Quantitatively, the variations of lipids which characterize the hypercholesterolemia are the rise in the cholesterol of the basic density lipoproteins, cholesterol of the very low density lipoproteins and the reduction of the cholesterol of the high density lipoproteins. Moreover particles of the low density dense lipoproteins belong to the atherogenicity lipoproteins, whose circulating concentrations are closely associated the risk of cardiovascular diseases [40]. Contrary to the popular belief cholesterol is present in the plants [41].

CONCLUSION

The results indicate a certain control of the manufacturing process of oils by the local producers.The groundnut oil produced artisanalement would be of better quality if it were refined. It would be the ideal oil for consumption but the cottonseed oil is also appropriate for consumption. In addition the β- carotenes and sterols content in equivalent of cholesterol of the cotton seed oil are higher than those of the groundnut oil. This study confirms the data of the literature which stipulate that cholesterol is quite present in the vegetable oils sold on the markets.

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RÉFÉRENCES

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