

# Chemical Composition And Morphological Markers Of 35 Cultivars Of Sesame (*Sesamum Indicum*. L) From Different Areas In Morocco

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**Abstract:** In this study, in order to know the variability for a breeding plant genetic diversity and relationships. Proximate composition, physicochemical and morphological analysis were carried out on sesame seeds (*sesamum indicum*), on 35 different cultivars from different areas in Morocco. The seeds were found to be a good source of protein with the values ranged from 26% to 28%, also the results showed that the seeds contained between 95, 25-96, 12% dry matter, 4,5-4,68% ash and 2,32-3,4% soluble sugar, the chlorophylls A, B were ranging between 0,090-0,112 mg/l and 0,115-0,113mg/l. the carotenoids compounds ranged between 0,070- 0,089 and the values of the starch were between 0,87 and 0,89%. The sesame seeds were a good source of dietary fibers yielding between 12,34-15,58% for the insoluble fibers and 5,09 -5,65% for the soluble ones. The traditional morphological descriptors of the seeds shows that the form large oval was predominated, the colour of the raw ranged from yellow to brown. The seeds length, width and thickness were ranging between 2,3-3,2mm, 1,2-2mm, 0,06-0,16mm respectively. Those results strongly suggest that due to its all favourable properties; sesame seeds and oil could be used in either food or cosmetic and pharmaceutical products.

**Keywords:** sesame seeds; protein; sugar; carotenoids; chlorophyll; dietary fiber.

## 1 INTRODUCTION:

Sesame, *sesamum indicum* L., is considered to be one of the first recorded plants for its seed and thought to have originated in Africa, it has been used extensively for thousands of years as a seed of worldwide significance for edible oil, paste, cake, confectionary purposes, Sesame (*Sesamum indicum* L.) is cultivated in several countries such as India, Sudan, China and Burma which are considered as the major producers (60% of its total world production) [1]. In 2010, a total area of about 7.9 million hectares was sown by culture of sesame seeds and global production in seeds was around 4.3 million tonnes, corresponding to an average yield around 5,5 q / ha [2]. India is the largest producer of sesame in the world with a production of about 893,000 t, followed by China, with a production of 587.000t. At 2007, it was reported that the sesame seeds were produced with 3.380.604 million tons, which ranked sixth in the production of oils seeds [3]. Sesame (*Sesamum indicum* L.) is an important oil seed for its edible oil, protein content and quality, vitamins and aminoacids. The oil content in sesame ranges from 34 to 63%, which is highly stable, 4-5% ach and about 25% of protein, which is rich in the sulphur-containing amino acids methionine and cystein [4], [5], [6], [7], [8]. Sesame seeds are valuable in preventing several diseases like asthma, pneumonia, acute and chronic bronchitis; also, they are a good source of magnesium which supports respiratory health. Black sesame seeds, as rich source of iron, are valuable in treating anemia. Sesame oil is known to reduce cholesterol due to high polyunsaturated fat content in oil. It has been reported that the chemical composition of sesame seeds varies with variety and location where the crop is grown [9]. In Morocco, the average production is about 1,800 tonnes per year. The perimeter of Tadla ensures 90% of national production where it is considered a local product, while the area of Meknes and the Safi provide the rest (10%) [10]. This sector remains weak due to several constraints, including lack of improved varieties uses, conventional production techniques, and the low valorisation of production and non-

organization of the distribution chain. For this reason, the farmers need to improve the profitability of sesame which plays an important role in human nutrition. This study includes morphological descriptors and biochemical characterization of 35 cultivars of sesame seeds (*Sesamum indicum*.L) and identification of the compounds in this plant.

## 2 MATERIALS AND METHODS:

### 2.1 Plant material:

In this research work, 35 cultivars of *sesamum indicum*.L seeds obtained in the tadla Azilal, region were evaluated. The accessions studied represented material collected from locations where sesame grows in the area Tadla-Azilal, Morocco (Fig1). The accessions of the sesame (*sesamum indicum*.L) were grown during the rainy season in the year 2012-2013, and their pomological and phisicochemical properties were evaluated.

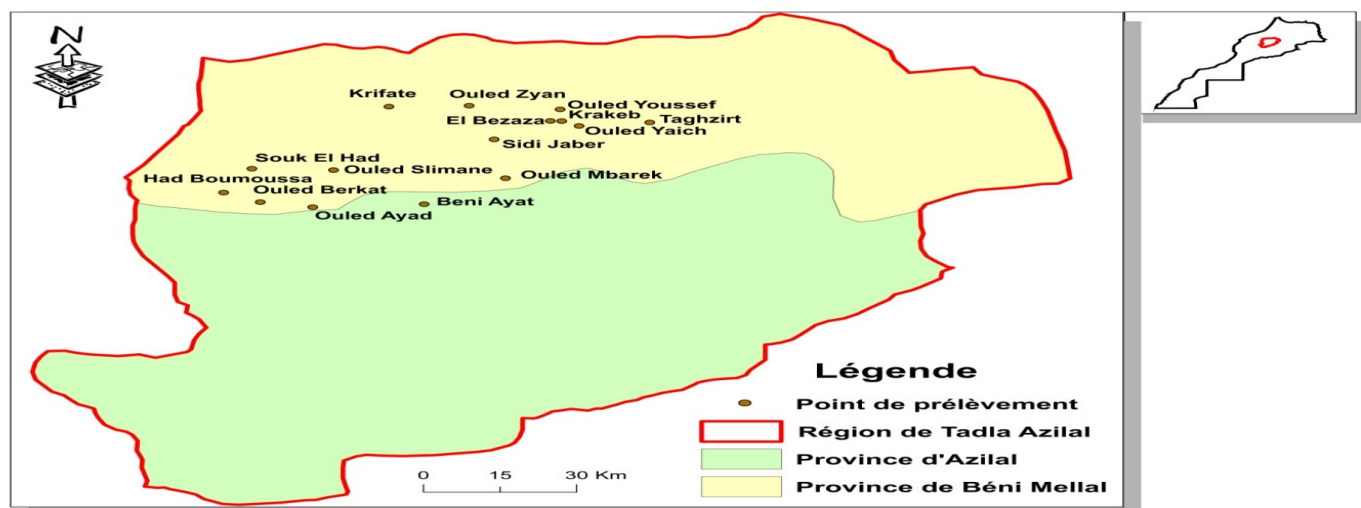


Fig 1: map shows the areas of sampling in the region Tadla-Azilal.

## 2.2 Chemicals and reagents:

The solvents and the chemicals used were of analytical grade, Bradford reagent, perchloric acid, phenol/sulphuric acid reagent, LaCl<sub>3</sub> were stored at prescribed conditions in the laboratory.

## 2.3 Morphological analysis:

At maturity stage, a sample of *sesamum indicum* seeds (100) was taken from each genotype and then the seeds traits were studied. The traditional morphological markers traits were evaluated in natural conditions in the 35 species assayed including fruit length (cm), seed shape, width (mm), colour, fruit weight (g), thickness (mm) (Table 1). Measurements were scored for 100 seeds recorded for each sample, and focused on other traditional characters like the form of the seeds in the different areas (Fig.1).

TABLE1: DESCRIPTION OF SAMPLING SITES, LATITUDE, LONGITUDE AND CHARACTERISTICS OF SEEDS

Name	Sources	latitude	longitude	cultivation method	fruit weight for 20 seeds (g)	seeds shape	color	length (mm)	width (mm)	thickness (mm)
A	bni ayat	32° 12' 14" N	6° 36' 9" W	cultivated 2012	0,063	large oval	cream-yellow brown	2,5	1,5	0,8
B	taghzirt2	32° 26' 31" N	6° 12' 5" W	cultivated 2012	0,064	large oval	white cream-yellow	2,3	1,3	0,71
C	krakeb1	32° 26' 47" N	6° 21' 30" W	cultivated 2012	0,061	large oval	yellow-cream	3	2	0,71
D	krakeb2	32° 26' 47" N	6° 21' 30" W	cultivated 2012	0,065	narrow oval	yellow-white	3	1,5	0,71
E	ouled zian 2	32° 29' 29" N	6° 31' 18" W	cultivated 2012	0,05	oval-narrow oval	yellow-brown	3	1,4	0,71
F	ouled yaich1	32° 25' 55" N	6° 19' 30" W	cultivated 2012	0,061	oval	brown-yellow	3	1,5	0,76
G	ouled youssef	32° 28' 58" N	6° 21' 38" W	cultivated 2012	0,063	oval-narrow oval	yellow-white	2,3	1,5	0,71
H	taghzirt1	32° 26' 31" N	6° 12' 5" W	cultivated 2012	0,057	oval	yellow	2,5	1,2	0,8
I	ouled yaich2	32° 25' 55" N	6° 19' 30" W	cultivated 2012	0,057	oval-narrow oval	cream	2,8	1,4	0,76
J	had boumoussa1	32° 14' 22" N	6° 57' 14" W	cultivated 2012	0,06	oval-narrow oval	cream	3	1,5	0,71
K	had boumoussa2	32° 14' 22" N	6° 57' 14" W	cultivated 2012	0,057	oval-large oval	yellow	3	1,5	0,84
L	ouled barkat1	32° 12' 39" N	6° 53' 33" W	cultivated 2012	0,064	ovale	brown	2,5	1,5	0,75
M	taghzirt3	32° 26' 31" N	6° 12' 5" W	cultivated 2012	0,058	large oval	white cream	2,5	1,5	0,71
N	taghzirt4	32° 26' 31" N	6° 12' 5" W	cultivated 2012	0,058	large oval	cream	3	1,5	0,84
O	souk el had	32° 18' 30" N	6° 54' 16" W	cultivated 2012	0,068	large oval	white-cream	2,5	1,5	0,85
P	taghzirt8	32° 26' 31" N	6° 12' 5" W	cultivated 2012	0,049	oval	yellow-white	3,2	1,5	0,71
Q	lbazaza1	32° 26' 50" N	6° 22' 32" W	cultivated 2012	0,061	oval	white-cream	3	1,5	0,76
R	ouled barkat2	32° 12' 39" N	6° 53' 33" W	cultivated 2012	0,069	oval	white-cream	3	1,5	0,75
S	krifat	32° 29' 21" N	6° 39' 41" W	cultivated 2012	0,057	oval	cream	2,8	1,4	0,76
T	lbazaza2	32° 26' 50" N	6° 22' 32" W	cultivated 2012	0,064	oval-narrow oval	cream	2,5	1,4	0,71
U	ouled zian1	32° 29' 29" N	6° 31' 18" W	cultivated 2012	0,064	oval	cream	3	1,5	0,71
V	taghzirt6	32° 26' 31" N	6° 12' 5" W	cultivated 2012	0,069	oval	white-cream	2,4	1,4	0,71
A'	sidi jaber	32° 23' 44" N	6° 28' 32" W	cultivated 2012	0,058	oval-narrow oval	white-cream	3	1,5	0,8
B'	ouled ayad	32° 11' 45" N	6° 47' 53" W	cultivated 2012	0,065	oval-narrow oval	cream	3	1,3	0,86
C'	taghzirt7	32° 26' 31" N	6° 12' 5" W	cultivated 2012	0,059	oval-narrow oval	cream	3	1,7	0,71
D'	taghzirt5	32° 26' 31" N	6° 12' 5" W	cultivated 2012	0,058	narrow oval	cream	3	1,5	0,76
E'	souk sebt ouled slimane1	32° 18' 13" N	6° 45' 37" W	cultivated 2012	0,059	oval-narrow oval	cream	2,5	1,5	0,71
F'	lbazaza3	32° 26' 50" N	6° 22' 32" W	cultivated 2012	0,065	oval	cream	2,5	1,5	0,77
G'	had boumoussa	32° 14' 22" N	6° 57' 14" W	cultivated 2012	0,062	oval	yellow	2,5	1,5	0,89
H'	ouled mbark	32° 16' 54" N	6° 27' 22" W	cultivated 2012	0,063	oval	white cream	2,8	1,5	0,87
I'	lbazaza4	32° 26' 50" N	6° 22' 32" W	cultivated 2012	0,06	oval	cream	3	1,5	0,74
J'	had boumoussa 4	32° 14' 22" N	6° 57' 14" W	cultivated 2012	0,06	oval	brown-yellow	3	1,5	0,74
K'	krakeb3	32° 26' 47" N	6° 21' 30" W	cultivated 2012	0,065	oval	brown-yellow	3,2	1,3	0,71
L'	krakeb4	32° 26' 47" N	6° 21' 30" W	cultivated 2012	0,066	oval	brown-yellow	3	1,5	0,71
M'	souk sebt ouled slimane2	32° 18' 13" N	6° 45' 37" W	cultivated 2012	0,067	oval	brown-yellow	3	1,5	0,8

## 2.4 CHEMICAL ANALYSIS:

### 2.4.1 MOISTURE:

Moisture, contents of sesame seeds samples were established [11]; the ground samples were dried in an oven at 105°C for 24 h. the percentage loss in weight was expressed as the moisture content.

### 2.4.2 DRY MATTER:

The dry matter of the cultivars was determined by oven drying at 105°C to constant weight [11].

### 2.4.3 ASH:

Ash was determined by combustion of the samples in a muffle furnace at 550°C for 12 h [12].

### 2.4.4 SOLUBLE SUGARS:

Sugars were extracted with ethanol (80%) by centrifuged for 40 min. After the centrifugation, the supernatant was collected and the sugar content was analysed with phenol/sulphuric reagent [13].

### 2.4.5 PROTEINS:

Total protein was determined by the method described [14]. Protein was extracted with phosphate buffer. After centrifugation, the supernatant was collected and the protein content was analyzed with the Bradford reagent.

### 2.4.6 DIETARY FIBRE:

Insoluble and soluble dietary fibres were determined according to the AOAC enzymatic-gravimetric [15]. Briefly, the defatted samples were gelatinized with heat stable alpha amylase (100 °C, pH 6, 15 min) and then enzymatically digested with protease (60 °C, pH 7.5, 30 min) followed by incubation with amyloglucosidase (60 °C, pH 4.5, 30 min) to remove protein and starch. Then, the samples were filtered, washed (with water, 95% ethanol and acetone), dried and weighted to determine insoluble fibre. Four volumes of 95% ethanol (preheated to 60 °C) were added to the filtrate and to the water washings. Then, the precipitates were filtered and washed with 78% ethanol, 95% ethanol and acetone. After that, the residues (soluble fibre) were dried and weighted. The obtained values were corrected for ash and protein. Total dietary fibre was determined by summing insoluble dietary fibre and soluble dietary fibre.

### 2.4.7 STARCH:

After removing sugars with ethanol (80%), starch was isolated by extraction with perchloric acid reagent (52%) twice, from a sugar-free residue [16]. Starch in the extract was determined using the anthrone reagent and colorimetric measurement at 630nm.

### 2.4.8 Determination of total chlorophylls and carotenoids:

Both chlorophylls (A and B) and carotenoids were determined in sesame seeds according to the method [17] as follow: Five grams of each sample were mixed with 30 ml of 85% acetone in dark bottle and left at room temperature for 15 h, then filtered on glass wool into a 100 ml volumetric flask, and made up to volume by 85%

acetone solution. The absorbance of the solution was then measured at 440, 644 and 662 nm using spectrophotometer. A blank experiment using acetone (85%) was carried out. The contents of total carotenoids and chlorophylls were calculated using the following equations:

$$\text{Chlorophyll A (mg/L)} = (9.784 \times E_{662}) - (0.99 \times E_{664}) \quad (1).$$

$$\text{Chlorophyll B (mg/L)} = (21.426 \times E_{664}) - (4.65 \times E_{662}) \quad (2)$$

$$\text{Total carotenoids (mg/L)} = (4.695 \times E_{440}) - 0.369 (\text{chl. A} + \text{chl. B}) \quad (3)$$

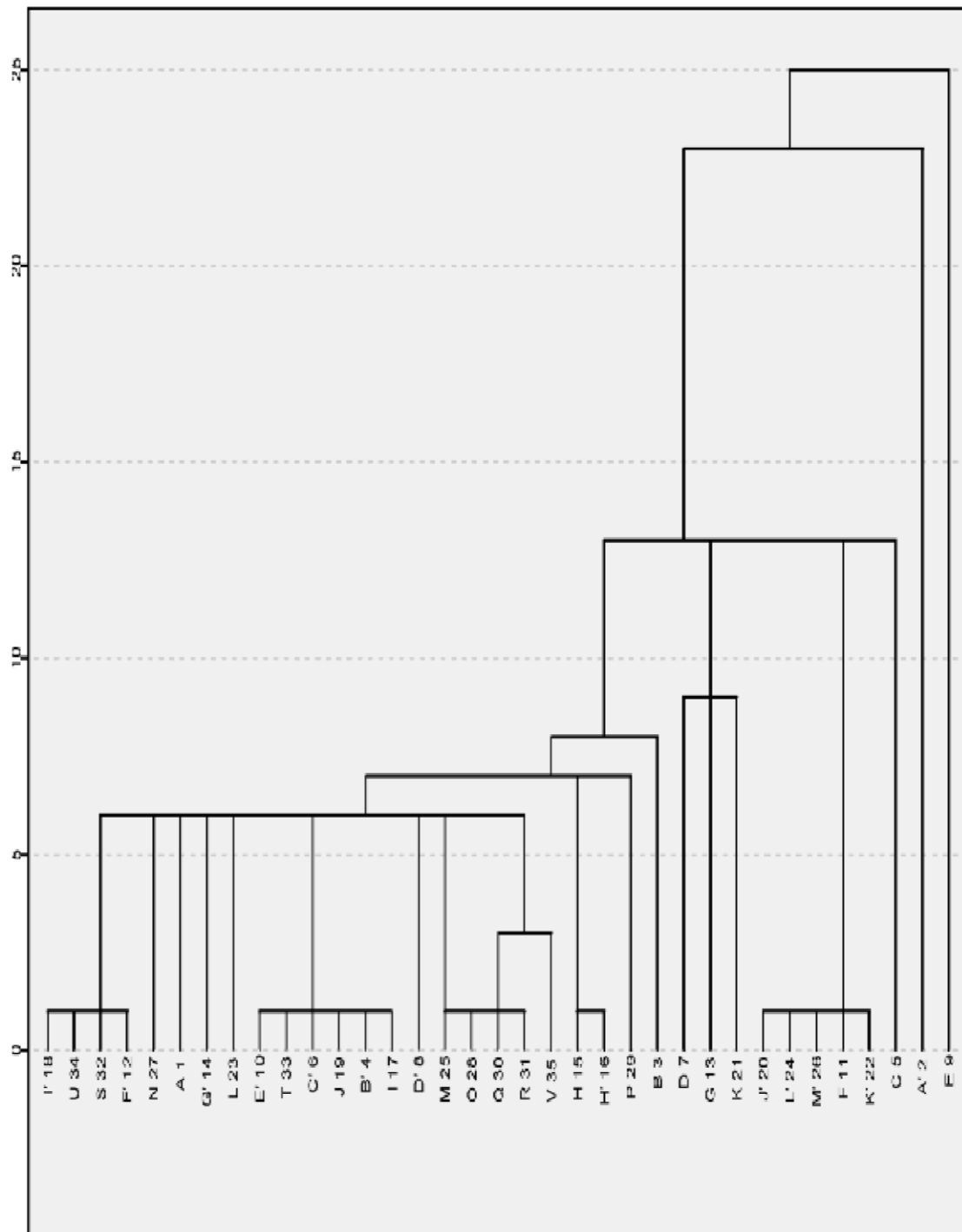
### 2.4.8 STATISTICAL ANALYSES

Analytical determinations reported in this study were the average of triplicate measurements from three independent samples for each sesame seeds genotypes. Statistical differences were estimated from method SPSS method with a test at the 5% level ( $P < 0.05$ ) of significance for all the parameters evaluated.

## 3 RESULTS AND DISCUSSION:

### 3.1 TRADITIONAL MORPHOLOGICAL DESCRIPTORS:

Evaluation of morphological (seed) of Sesamum I, traits in the 35cultivars is presented in Table 1. The overall mean values of all traits showed significant differences between the species indicating a high level for length (2.3- 3mm), 1,2-1,5mm for width of morphological variation. In general, a lower level of morphological variation was found for fruits thickness (0,71-0,8mm), whereas the fruit weight .did not show any significant difference between cultivars being (0,049-0,068g). However results indicated in all the cultivars a good commercial or agronomical value of seed sesame. Analysis of the seeds was considered useful for the aims of identification between the morphological similarities and differences. Traditional biometric parameters mainly concerned qualitative and quantitative variations in the surface of the seeds, and showed few differences. The skins colour ranged from white, cream, yellow and brown. The shape was ranging between spherical, flat, large oval, oval and narrow oval, however, the flat shape of the seeds enables the seeds to slide and this property is important in the development of hopper and dehuller designs for sesame seeds. The hierarchical clustering based on the colour, length, width, and thickness from the cultivars was carried out (Fig2), the resulting dendrogram puts in evidence a clear separation between the 35 cultivars from the regions, cluster analysis distinguished several groups which mean a significant dissimilarity between the populations distribution based on pomological description. We can say that the distinction between these classes is the result of a variation between the physical properties of sesame seeds.



**Fig2:** Dendrogram of 35 *Sesamum indicum* seeds taxonomic groups, relationship between sesame seeds from different areas using morphological descriptor

### 3.2: CHEMICAL COMPOSITION:

Table 2 presents the approximate chemical composition of sesame seeds of the 35 cultivars (*S.indicum* .L). The moisture content of the sesame seeds of the 35 cultivars is low ranging between 3, 85 - 4, 75%. Comparable to that reported for groundnuts [18],[19] and confirm other results found [20] with the value 4, 73%. This shows that sesame seeds have a longer shelf life than most cereals, since the

high moisture content of cereals causes deterioration due to insect and fungal attacks.

**TABLE 2: CHEMICAL COMPOSITION OF SESAME SEEDS OF 35 CULTIVARS.**

samples	protein g/100g	sugar g/100g	ash en%	Moisture %	dry matter %	insoluble fibers %	soluble fibers %	Total fibers %	starch %	chlorophyll A (mg/l)	chlorophyll B(mg/l)	carotenoids (mg/l)
A	27,15±0,15	2,55±0,05	4,6±0,02	4,7±0,03	95,27±0,025	12,46±0,5	5,09±0,5	17,55±0,1	0,88±0,01	0,09	0,115	0,076
B	27,03±0,06	3±0,06	4,65±0,03	4,75±0,02	95,23±0,02	12,78±0,1	5±0,5	17,78±0,2	0,87±0,01	0,095	0,11	0,09
C	27,7±0,26	3,03±0,06	4,52±0,02	4,64±0,04	95,32±0,03	12,98±0,23	5,5±0,4	18,48±0,3	0,9±0,02	0,093	0,13	0,089
D	27,59±0,10	3,1±0,10	3,95±0,03	4,1±0,1	95,99±0,01	12,5±0,24	5,87±0,3	18,37±0,2	0,89±0,09	0,099	0,119	0,072
E	27,03±0,06	3,04±0,08	4±0,01	4,16±0,02	95,84±0,03	13,96±0,2	5,12±0,4	19,08±0,2	0,81±0,07	0,099	0,115	0,079
F	27,41±0,08	3,38±0,03	4,45±0,03	4,45±0,07	95,49±0,01	13,98±0,3	5,06±0,2	19,04±0,09	0,9±0,07	0,098	0,119	0,087
G	27,15±0,15	2,76±0,05	4,49±0,04	4,65±0,04	95,35±0,01	12,66±0,09	5,58±0,1	18,24±0,15	0,9±0,07	0,095	0,112	0,083
H	27,38±0,14	2,96±0,05	4,57±0,03	4,7±0,07	95,24±0,02	13,45±0,1	5±0,2	18,45±0,3	0,82±0,01	0,092	0,111	0,08
I	27,52±0,03	2,52±0,03	4,13±0,4	4,02±0,2	95,99±0,01	14,03±0,25	5,32±0,34	19,35±0,35	0,83±0,02	0,092	0,12	0,07
J	27,47±0,06	2,62±0,07	3,89±0,06	3,9±0,3	96,1±0,01	14,98±0,3	5,37±0,33	20,35±0,25	0,82±0,07	0,092	0,123	0,09
K	27,48±0,03	2,29±0,04	4,01±0,09	3,93±0,05	96,07±0,02	14,67±0,45	5,28±0,44	19,95±0,16	0,81±0,02	0,11	0,129	0,075
L	27,68±0,08	2,56±0,10	4,18±0,15	3,9±0,07	96,1±0,01	13,9±0,54	5,17±0,44	19,07±0,2	0,85±0,01	0,109	0,13	0,072
M	27,1±0,10	2,73±0,05	4,53±0,21	3,97±0,01	96,03±0,03	15,4±0,23	5,44±0,33	20,84±0,15	0,86±0,07	0,099	0,119	0,09
N	27,49±0,09	3,03±0,06	4,5±0,13	4,25±0,05	95,75±0,07	15,3±0,16	5,47±0,2	20,77±0,24	0,87±0,07	0,104	0,127	0,09
O	27,59±0,09	2,55±0,05	4,1±0,23	4,5±0,05	95,46±0,03	14,33±0,27	5,48±0,33	19,81±0,34	0,85±0,02	0,106	0,122	0,089
P	27,12±0,10	2,5±0,04	4,06±0,04	4,43±0,02	95,57±0,02	13,87±0,32	5,14±0,33	19,01±0,35	0,82±0,01	0,095	0,117	0,09
Q	27,56±0,10	2,49±0,01	4,02±0,05	3,95±0,08	96,1±0,01	13,9±0,06	5,1±0,1	19±0,2	0,81±0,02	0,112	0,123	0,073
R	27,81±0,06	2,49±0,01	4,02±0,03	4±0,03	95,99±0,01	12,78±0,2	5,18±0,2	17,96±0,17	0,83±0,05	0,107	0,127	0,077
S	27,69±0,02	3,04±0,07	4,4±0,38	4,67±0,07	95,4±0,01	13,5±0,4	5,32±0,3	18,82±0,36	0,83±0,02	0,096	0,121	0,07
T	27,12±0,1	3,11±0,01	4,23±0,4	4,05±0,05	96±0,06	15,23±0,16	5,57±0,35	20,8±0,34	0,82±0,07	0,112	0,12	0,072
U	27,76±0,05	2,72±0,03	4,3±0,22	4,3±0,04	95,74±0,04	12,54±0,14	5,6±0,24	18,14±0,35	0,83±0,01	0,111	0,124	0,076
V	27,03±0,06	2,99±0,02	4,43±0,03	4,33±0,05	95,67±0,02	13,98±0,12	5,62±0,1	19,6±0,15	0,82±0,07	0,098	0,128	0,073
A'	27,03±0,06	2,58±0,09	4,41±0,01	4,22±0,07	95,78±0,02	14,02±0,12	5,46±0,09	19,48±0,08	0,88±0,01	0,095	0,13	0,89
B'	27,66±0,28	3,16±0,04	4,6±0,13	4,7±0,03	95,27±0,02	15,78±0,12	4,5±0,12	20,28±0,1	0,87±0,02	0,097	0,124	0,83
C'	27,93±0,06	3,2±0,03	4,25±0,38	3,89±0,09	96,11±0,01	12,98±0,11	5,6±0,1	18,58±0,12	0,86±0,01	0,111	0,115	0,08
D'	27,58±0,09	2,83±0,05	4,09±0,06	3,9±0,06	96,12±0,01	12,67±0,11	5,35±0,3	18,02±0,19	0,85±0,03	0,112	0,119	0,09
E'	27,45±0,05	2,52±0,03	4,07±0,04	4±0,02	96,1±0,06	13,5±0,16	5,32±0,2	18,82±0,42	0,86±0,07	0,099	0,129	0,077
F'	27,22±0,08	2,55±0,05	4,34±0,26	4,30±0,05	95,65±0,04	14,9±0,14	5,36±0,2	20,26±0,2	0,85±0,02	0,109	0,13	0,071
G'	27,21±0,06	2,64±0,04	4,19±0,27	3,98±0,04	96,02±0,01	15,09±0,11	5,5±0,1	20,59±0,19	0,84±0,01	0,104	0,123	0,089
H'	27,48±0,03	2,65±0,05	4,24±0,17	4,3±0,03	95,69±0,01	14,07±0,13	5,23±0,15	19,3±0,15	0,83±0,02	0,094	0,116	0,075
I'	26,77±0,67	2,52±0,03	4,14±0,21	3,85±0,12	96,11±0,02	14,9±0,13	5,34±0,15	20,24±0,23	0,82±0,02	0,093	0,115	0,074
J'	27,48±0,03	2,5±0,05	4,2±0,15	3,96±0,09	96,06±0,02	14,45±0,12	5,56±0,15	20,01±0,34	0,81±0,01	0,101	0,128	0,09
K'	27,54±0,03	2,8±0,01	4,59±0,21	4±0,02	95,98±0,02	13,46±0,2	5,21±0,1	18,67±0,3	0,8±0,07	0,107	0,125	0,084
L'	27,53±0,06	2,33±0,06	4,71±0,04	4,69±0,06	95,31±0,02	14,06±0,16	5,34±0,2	19,4±0,25	0,88±0,07	0,096	0,117	0,088
M'	27,52±0,04	3,03±0,06	4,01±0,03	3,98±0,04	96,01±0,01	13,55±0,15	5,5±0,2	19,05±0,17	0,85±0,07	0,099	0,13	0,09

The dry matter and the ash contain different amounts ranging between 95, 23-96, 12% and 4,5-4,68% respectively. Which confirm the results found [21] with the values 95, 48 for dry matter and 4, 88% for the ash. It was reported that the ash of the by-products of sesame seeds contains higher amount of ash than the raw seeds and other by products (wheat bran, rice bran, oat bran, washed peach bagasse, washed orange bagasse with the value 2,6%) which could be used to meet part the nutritional requirement of animal feeds [22]. The sesame seeds of the 35 cultivars were a good source of protein yielding 26 and 27,99% total dry mass. Those values were than those found by [23], this result could be a reflection of variety and location. The sesame seeds generally contains a low percentage of starch and low soluble sugars contents with the values ranging between 0,81-0,9% and 2,29-3,38% dry matter respectively. Those results were similar to those founded [21] Compared to other seeds, the sesame seeds contained higher amounts of dietary fibre in the range of 17, 55 and 20, 84% dry matter that's why we could say that the sesame seeds could be considered as a potential fibre source that could be used in food formulations. Insoluble dietary fibre ranged between 12, 46 and 15, 48%. The soluble dietary fibre contents are relatively high between 4, 5 and 5, 87% compared to cereal derivatives (corn bran, wheat bran, oat bran, rice bran) which have allow soluble dietary fibre (between à 0,4% and 4,1%) [22]. The extracts of sesame seeds of the 35 cultivars were also analyzed for chlorophyll (A, B) and carotenoids; it was found that the seeds shows a very low percentage of this components compared to other plants which can be explain with the colour of the seeds of the

sesame. The values of the chlorophyll A and B were ranging between 0,090-0,112mg/l and 0,115-0,113mg/l respectively. And the percentage of carotenoids ranged between 0,070-0,089mg/l. However, the presence of chlorophylls and carotenoids are highly appreciated as functional components both for its colouring properties and its health benefits for the human consumption. It was reported that the sesame oil comported a high concentration of caroteinds which could be responsible of the antioxidant activity because there are considering like bioactive compounds, the carotenoids have the same function as the provitamin A, yet they could prevent age-related macular degeneration and cataract formation [24].

#### 4 CONCLUSION:

Considering the chemical composition like protein, total sugar, dietary fibre content, chlorophyll and carotenoids, the 35 cultivars of sesame seeds from different areas could be used as part of the nutritional for human being, this is due to its richness in protein, and other compounds and could be considered as an excellent source of dietary fibre may be used as a functional ingredient. The sesame seeds are eaten together with foods such as rice, cereals and various preparations, it helps in supplementing the deficiency of those products on different compounds. The variation in the chemical composition and the morphological characteristics could be due to differences in variety , location. , On the other hand, we have to consider that these morphological traits are affected by environmental conditions edaphoclimatic factors and also could be due to a genetic variance. The sesame

seeds could be part of the nutritional requirement for human and animal feeds considered as an excellent source of natural antioxidants and may be used successfully as a key ingredient in the by-products for its amara, its high seeds yield and oil content and flavour. To our knowledge, this study has been the first on these materials, so the data obtained are a reference to be taken into account.

## Acknowledgement

The support of the farmers of the area Tadla-Azilal is greatly appreciated.

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