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The Role of Quality Standards in Preparing Nutrition Fact Sheets for School Feeding

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Abstract

Building on the achievements of the programs of the African Union Commission on school nutrition on the one hand, and striving to achieve the quality standards approved by the United Nations included in the program "Changing the education", and through a review of the health and nutrition literature, using a content analysis guide to extract implications for school feeding, and consultation with nutritionists to develop practical mechanisms that take into account of the peculiarity of Algerian nutrition, using and a semi-directed interview guide. This study aims to strengthen efforts to improve school feeding in Algeria by creating a model of technical sheets for school feeding in order to prepare healthy meals (lunch / collation), of high quality for school children all over Algeria.

Keywords: Nutrition, School Feeding, Lunch, Collation

1. Introduction

Over the past three years, the world has experienced a slowdown in development due to the Covid-19 pandemic, which has disrupted many development programs in general and in Africa in particular. And among these development programs what is related to food security on the African continent and its relationship with the promotion of health and nutrition of children in order to ensure an appropriate school environment and to overcome the difficulties that prevent the access to education, as well as increasing the retention rate in schools.

Based on the results of the seventh edition of Africa School Nutrition Day, organized by the Department of Education, Science, Technology and Innovation of the African Union Commission, on 1 March 2022, in partnership with the United Nations World Food Programme, under the slogan "Nutrition and Human Capital Development in Africa through Increased Investment in Local School Feeding", the recommendations of the seventh edition of the Africa Day of School Nutrition were represented in nine (09) points, mainly focused on encouraging to continue to increase the funding of school feeding programs according to the capacities of each country, to restore the gains made before Covid-19, such as the goal of reaching the threshold of 60 million school children benefiting from the daily school meal.

This was noted by the Minister of National Education in Algeria, through his speech on the occasion of the African Day of School Feeding, where he spoke of the efforts made by the Algerian State in terms of promotion of school

nutrition, to which the President of the Republic, Mr. Abdelmadjid TEBBOUNE, pays great attention, where the State has drawn up an ambitious policy with a view to generalizing the benefit of school nutrition based mainly on construction programs and renovation of canteens, generalizing school nutrition and making it available to all primary school children. The number of school canteens increased by 36%, with a notable increase in the number of schoolchildren benefiting by 66%. On the other hand, the State has decided to increase the cost of meals by (44%) during the 2022-2023 school year, considering the school canteen as a complement to the educational act.

And on the basis of the commitment of the Algerian State to contribute to the efforts of the African Union to promote school nutrition in Africa and its support for all mechanisms that would develop school nutrition based on local products, for a development sustainability of the African continent. The Ministry of National Education works in collaboration with several ministerial sectors to embody and develop these systems, either in the field of scientific research, as is the case with the Ministry of Higher Education and Scientific Research and the Ministry of Health and Hospital Reform, either in the field of program implementation with both the Ministry of the Interior, Local Authorities and Regional Planning, the Ministry of National Solidarity of the Family and the Status of Women and the Ministry of Youth and Sports.

Thus, the issue of this study sheds light on the practical mechanisms that would contribute to raising the quality of local school feeding in Algeria by strengthening the achievements of the programs of the African Union Commission on the one hand, and by striving to achieve quality standards endorsed by the United Nations and included in the Changing Education agenda, which envisions the embodiment of a transforming education system, prioritizes investment in learning and the learner. Among these devices, we find the technical sheets of school canteens, which will determine the specifications and the health standards to be respected in the preparation either of lunches for schoolchildren, or of a light meal (collation). By asking the following question:

How to integrate quality standards into technical data sheets for school feeding in the Algerian education system?

1.1 General hypothesis

The quality standards are embodied in the technical sheets for both lunch and collations in the Algerian school through the application of the specific program to food groups and their relationships with age groups and the number of calories. for each age group.

1.2 Objectives of the study

This study aims to strengthen efforts to improve school feeding in Algeria using high quality local food products. As well as creating templates for school feeding data sheets to use as a reference to prepare healthy, high-quality meals for schoolchildren across Algeria.

1.3 The importance of the study

The interest of the study lies in the evaluation of applied policies and field practices in the development of references for the preparation of school canteens in Algeria, as well as in the correction of the cognitive course used in the basis of these references.

2. Methodological framework

2.1 Notions

2.1.1 Nutrition

According to the World Health Organization, it is a set of processes implemented by the living human body to maintain the life, vitality, growth and proper functioning of organs and proteins, that's to say a term for insufficient, excessive or unbalanced consumption of food components (wilcock 2003, 23).

2.1.2 Nutrients

Food is transformed into composite nutrients by digestive juices. There are approximately 40 essential nutrients. They are essential for growth, reproduction and a healthy life and finally for productive and academic performance. Nutrients can be grouped into two broad categories: (Guğu 2021)

- Macronutrients which are proteins, carbohydrates and lipids required by the body in large quantities and available to be transformed into energy;
- Micronutrients which are vitamin and mineral substances, with no specific energy value, but necessary in very small quantities (milligrams or micrograms).

2.1.3 School feeding programs

School plays a very important role in efforts to create a world in which opportunities for economic growth reach poor children everywhere; As it is the place where the personalities of future leaders among scientists, politicians, thinkers and economists are formed. In the school, school feeding programs are presented as an attractive element that encourages students to attend them, and also, continuing to provide these nutritional programs on a daily basis to teachers who are going through the growth phase helps to keep them school, and therefore strong support for the mechanisms for achieving educational objectives on the other hand (Word food programme 2022).

In addition, the Committee on the Rights of the Child, in its interpretation and implementation of Article 24, and in General Comment No. 15, has stated that school feeding is desirable to ensure that all students receive a full meal every day, which also increases the children's standard of living. Interest in learning and school attendance. The Committee also recommended that this be combined with nutrition and health education (UNESCN 2017, 7).

This is why researchers and specialists have stressed the need for food education for schoolchildren, and to start early; To positively influence one's eating habits, it is necessary to plan one's diet appropriately, according to healthy basics of health; This has been confirmed by the American Food Association (ADA) and the School Nutrition Association (SNA) regarding the consolidation of nutritional education concepts from primary school onwards, in order to ensure the improvement of nutritional status. , health and education. Teachers and the community as a whole, provided that this involves nutrition education for the family, teachers and the promotion of comprehensive and integrated nutrition services in schools (Marilyn 2010, 366).

2.1.4 School meal

It is about ensuring that every child in school has the opportunity to have a healthy and nutritious meal in schools (AFRICAN UNION 2022).

2.2 Method used

The nature of this study is to establish scientific content that meets the need of school nutrition administrators to prepare hot and light meals for teachers, using the analytical method of reference literature in the field of health and nutrition, as well as the consultation of nutritionists with the objective of enriching theoretical knowledge with practical mechanisms that take into account the intimacy of Algerian society.

2.3 Research community

The study contains two research communities, the first community is the literature related to healthy eating in general and school children's nutrition in particular. Based on content from the United Nations World Food Programme, under the slogan "Nutrition and Human Capital Development in Africa through Increased Investment in Local School Feeding", and a collection of group-specific scientific articles of foods and their relationship to age groups and the amount of calories for each of these groups.

As for the second research community, they are doctors specializing in nutrition (three doctors, including a dentist), who have contributed to meeting the requirements of the nutrition technical sheets by the high-quality factor as well as the particularities and customs of Algerian society.

2.4 Scientific research tools

In addition to the scientific observation used by the research team, two other tools were used: a content analysis guide to extract implications for school feeding and a semi-structured interview guide which was used in sessions with health professionals.

3. Results

3.1 Basic nutritional needs according to age groups

3.1.1 Basic macronutrient needs

The basic needs in energy, proteins and lipids are expressed in the table below

Table 1: Macronutrient requirements by Age and Sex

Age (years)	Gender	Energy (Kcal)	Protein (g)	Lipids (g)	Carbohydrate (g)
06-10	M / F	2 350	77	79	375
11-13	M	2 750	90	92	390
	F	2 500	82	84	355
14-17	M	3 000	100	100	425
	F	2 600	90	90	360

Source: (Guğu 2021) (modified)

The average energy value for school children (06-15 years) is 2600 Kcal, divided by 5 rations: Breakfast; Collation No. 01; Lunch; Collation No. 02; Dinner. According to the following table:

Table 2: Percentage of meal rations

Energy (Kcal)	Rations	Percentage %	Energy (Kcal)
2600	Breakfast	30	700
	Collation N° 01	11.5	300
	Lunch	23	600
	Collation N° 02	11.5	300
	Dinner	24	600

Source: (Bouaoud 2020) (Guğu 2021)

3.1.2 Micronutrient requirements

Since individual micronutrient needs are extremely variable, recommended dietary intake levels have been set for most vitamins and minerals, by population category. The requirements in micronutrients (mineral element) for illustrative purposes are recorded in the table below:

Table 3: Requirements for micronutrients (mineral element) according to age and sex

Age (years)	Gender	Mineral element (mg)				
		Ca	Mg	P	Fe	Zn
07-10	M / F	1 100	250	1 650	12	10
11-13	M	1 200	300	1 800	15	15
	F	1 200	300	1 800	15	15
14-17	M	1 200	300	1 800	15	15
	F	1 200	300	1 800	15	15

Source: (Guğu 2021)

Illustrative micronutrient (vitamin) requirements are listed in the table below:

Table 4: Micronutrient (vitamin) requirements by age and gender

Age (years)	Gender	Vitamins				
		A (µg)	B1 (mg)	B2 (mg)	B3 'PP' (mg)	C (mg)
07-10	M / F	700	1,2	1,4	15	60
11-13	M	1000	1,4	1,4	18	70
	F	800	1,3	1,5	17	70
14-17	M	1000	1,5	1,8	20	70
	F	800	1,3	1,5	17	70

Source: (Gufu 2021)

3.2 Recommendations from nutrition specialists

Following working sessions with nutrition specialists, the research team drew up a list of recommendations that will help in the development of technical data sheets. These recommendations are summarized as follows:

- ✓ Ensure a good nutritional balance by favouring complex carbohydrates and fibers at the expense of lipids and simple carbohydrates;
- ✓ Whole wheat pasta, brown rice, hulled barley, millet, whole wheat couscous, whole wheat bread and other whole grain products, which are more nutritious than white and are also economical;
- ✓ Eliminate (or limit as much as possible) sticky treats (caramel);
- ✓ Prefer beneficial combinations of bread + cheese + fruit for collations;
- ✓ Preferably choose fruit juices “without added sugar” reserved for collations;
- ✓ Water is the only drink at lunch;
- ✓ Minimize sugar in food;
- ✓ Order of food ingestion (order of food service) and preferences to preserve oral health:
 - During a meal, the last food ingested has a great impact on the duration of post-prandial acidification of dental plaque;
 - Thus, cheese consumed after a sweet dessert decreases the production of acids from carbohydrates. Casein and other dairy proteins in cheeses protect the tooth by reducing its demineralization.
- ✓ Take child pathologies into account in school nutrition programs;
- ✓ Provide physical and cultural activities for children.

3.3 The Five Food Groups

Specialists have divided nutrients into five groups: (docteurlic 2022)

1. Milk and milk derivatives
2. Other products of animal origin
3. Plants (fruits and vegetables)
4. Fats, fatty substances
5. Starches and sugars

To these five food groups are added micronutrients (mineral element and vitamins) and a few special cases such as charcuterie (pies, poultry, sausages), chocolate and dried fruits.

By applying these standards on local school nutrition, and in consultation with medical consultants, it was possible to develop five food groups adapted to the Algerian school environment: (James et Schofield 1990) (Galmiche 2011) (Bouaoud 2020).

The 1st food group: it contains red meat such as beef and mutton, white meat such as chicken and turkey, fish, whole cheeses and yoghurt. By calculating the quantity needed per pupil to acquire the energy essential for the normal growth of the child.

The 2nd food group: in the second group we find a variety of plant products such as legumes (chickpeas, lentils, dry beans) we also find some starches such as rice and kousskous. We add to this group the Green Olive. Legumes have many nutritional benefits. They are particularly rich in vegetable proteins, fibers, minerals and vitamins, and low in lipids; which gives them many benefits for our health, to the point that the National Agency for Food, Environmental and Occupational Health and Safety (ANSES) even recommends eating them twice a week. (apivia 2022)

The 3rd Food Group: The third group contains high calorie starchy foods such as Pasta, Bread and Potato. They are an essential fuel for our body but on the other hand they are accused of promoting weight gain (docteurbonnebouffe 2021).

The 4th food group: the fourth group contains fats and fatty substances, such as butter; oil and semen. Their richness in calories helps to prepare meals balanced in food.

The 5th food group: in the fifth group we find the vegetables of the Mediterranean soup (Carrots, Zucchini, Turnip, green salad...). And also, we find local fruits and according to the season like dates, orange and apples.

Out of groups: we add to these five food groups some ingredients essential to Algerian cuisine, where we find the spices of the region (RAS-ELHANOUT, cumin, cinnamon, parsley, coriander powder, spicy or sweet red pepper, etc.), canned tomato and salt.

Note that all food products must be of good quality.

4. Discussion

4.1 Weekly food plan

Following the previous data, a weekly food program for canteen meals and school collations has been prepared. For the canteen, we combined the five food groups in order to reach the 600 Kcal for lunch. And in the same way, reach 300 Kcal for each collation of the eight combinations offered. The goal of which is to have 900 Kcal between the two meals (lunch / collation).

The meal of the 1st day consists of a varied salad, lentils, two hard-boiled eggs, a seasonal fruit and bread. Which gives us 550 Kcal. On the other hand, for the 2nd day there are 640 Kcal, spread over a varied salad, pasta with beef, seasonal fruit and bread. And like the 1st day, at 550 Kcal, the meal of the 3rd day is composed of a varied salad, TADJINE ZITOUNE (Green olive), chicken, cheese and bread. On the other hand, the energy balance of the 4th day exceeded 600 Kcal, where we find 665 Kcal spread over a dish of rice with fish, a varied salad, seasonal fruit and bread. And we end the canteen meal program with the traditional Algerian dish: KOUSKOUS with mutton and Mediterranean vegetables, a varied salad and yogurt. Which gives us 589 Kcal of energy.

This canteen food program tried to respect the energy value for lunch (600 Kcal). And the shortcomings of meals with less than 600 Kcal were compensated by the food program of the collation, where there are eight combinations, their energy values varied between 250 and 382 Kcal. These collations contain basic foods such as bread, butter, jam, boiled eggs, yogurt, cheese. And it also contains foods of higher nutritional quality such as chocolate, dates, nuts (almonds, walnuts, hazelnuts, etc.) and nut biscuits.

4.2 Lunch / collation formulas

Combinations between the different rations of lunch (600 Kcal) and collation (300 Kcal), and to have an average of 900 Kcal per day, have given the following lunch / collation formulas:

Table 5: LUNCH / COLLATION formulas

Lunch	Energy (Kcal)	Collation	Energy (Kcal)	Total
1 st day	550	2 nd collation	382	932
		7 th collation	320	870
		8 th collation	375	925
2 nd day	640	1 st collation	266	906
		3 rd collation	290	930
		4 th collation	290	930
		5 th collation	250	890
		6 th collation	290	930
3 rd day	550	2 nd collation	382	932
		7 th collation	320	870
		8 th collation	375	925
4 th day	665	1 st collation	266	931
		3 rd collation	290	955
		4 th collation	290	955
		5 th collation	250	915
		6 th collation	290	955
5 th day	589	2 nd collation	382	971
		7 th collation	320	909
		8 th collation	375	964

Source: (synthesis)

5. Closing

The need for mainstreaming quality standards in school feeding fact sheets is highlighted by the United Nations Changing Education program guidelines, and the African Union Commission program guidelines on school nutrition. This integration of quality standards has made it possible to develop combinations between the different rations of lunch (600 Kcal) and collation (300 Kcal) to have an average of 900 Kcal per day.

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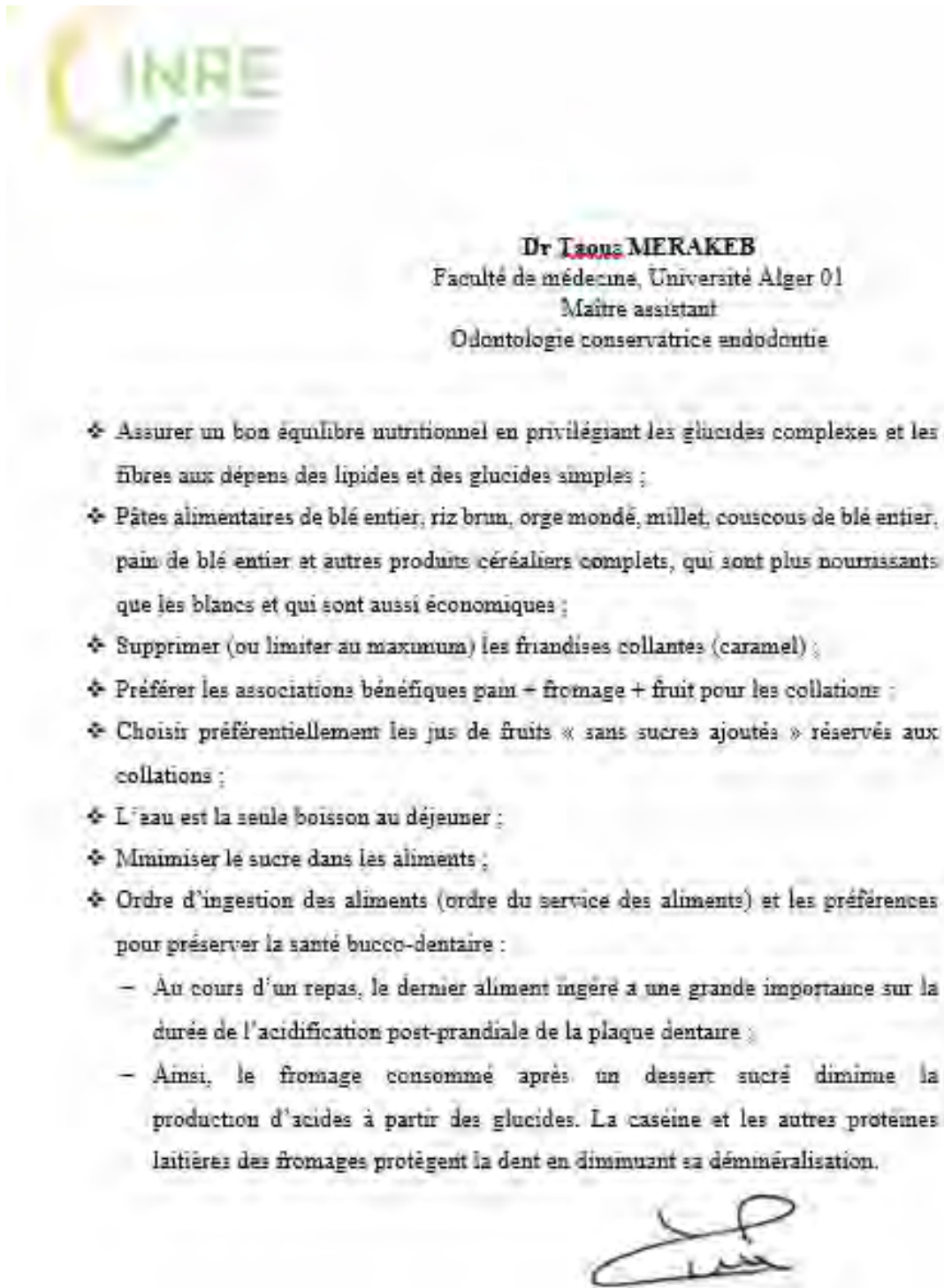
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Appendices

11.1 Appendix N° 01: Recommendations from nutrition specialists





7. ANNEXES

D^r OUMD HANNOU ALI

- ① - Apport énergetique
 Jusqu'a 15 Ans 1800 - 2200 kcal/j
 plus de 15 ans 1800 - 2500 kcal/j
- ② - Tenir compte de Pathologie
 - Maladie Coelique (intolerance au gluten)
 - Diabete Insulino Dependout
 - Allergie Alimentaire
 - obesite
- ③ - J'erie dans le cadre de l'el.



7. ANNEXES

D^r Loufa. Benyettou.

- Je reconnoude une alimentation saine sans sucre industriel.
- le sucre naturel est present dans les fruits.
-

11.2 Appendix N° 02: WEEKLY FOOD PROGRAM (Canteen)

1st day (Summary)

Food group		Quantity	Energy (Kcal)	Observation
1 st GROUP	Egg	02	160	
2 nd GROUP	Lentil	100 g	120	
3 rd GROUP	Bread	1/3 baguette	80	
4 th GROUP	Oil	07 g	60	
	Black olive	15 g	30	
5 th GROUP	Carrots	20 g	08	
	Onion	10 g	05	
	Garlic	02 g	03	
	Mixed salad	50 g	20	
	Seasonal fruits	01	60	
OUT OF GROUPS	Canned tomato	10 g	02	
	Salt	02 g	00	
	Spices	0.50 g	02	
		Total	550	600

2nd day (Summary)

Food group		Quantity	Energy (Kcal)	Observation
1 st GROUP	Beef	20 g	50	
2 nd GROUP	Pasta	100 g	125	
3 rd GROUP	Bread	1/4 baguette	60	
4 th GROUP	Oil	07 g	60	
	Black olive	15 g	30	
5 th GROUP	Carrots	20 g	08	
	Onion	10 g	05	
	Garlic	02 g	03	
	Mixed salad	50 g	20	
	Seasonal fruits	01	275	Datte
OUT OF GROUPS	Canned tomato	10 g	02	
	Salt	02 g	00	
	Spices	0.50 g	02	
		Total	640	600

3rd day (Summary)

Food group		Quantity	Energy (Kcal)	Observation
1 st GROUP	Chicken meat	40 g	60	
	Triangular white cheese	03 portion	100	
2 nd GROUP	Green olive	100 g	120	
3 rd GROUP	Bread	1/3 baguette	80	
4 th GROUP	Huile Oil	07 g	60	
	Black olive	15 g	30	
5 th GROUP	Carrots	20 g	08	
	Onion	10 g	05	
	Garlic	02 g	03	
	Mixed salad	50 g	20	
	Seasonal fruits	01	60	
OUT OF GROUPS	Canned tomato	10 g	02	
	Salt	02 g	00	
	Spices	0.50 g	02	

		Total	550	600
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4th day (Summary)

Food group	Quantity	Energy (Kcal)	Observation
1st GROUP	Fish	40 g	60
2nd GROUP	Rice	100 g	355
3rd GROUP	Bread	1/4 baguette	60
4th GROUP	Oil	07 g	60
	Black olive	15 g	30
5th GROUP	Carrots	20 g	08
	Onion	10 g	05
	Garlic	02 g	03
	Mixed salad	50 g	20
	Seasonal fruits	01	60
OUT OF GROUPS	Canned tomato	10 g	02
	Salt	02 g	00
	Spices	0.50 g	02
	Total	665	600

5th day (Summary)

Food group	Quantity	Energy (Kcal)	Observation
1st GROUP	Mutton	20 g	50
2nd GROUP	Kouskous	100 g	120
	Chickpeas	10 g	70
3rd GROUP	Bread	1/4 baguette	60
	Potato	50 g	40
4th GROUP	Oil	07 g	60
	S'men	05 g	35
	Black olive	15 g	30
5th GROUP	Carrots	20 g	08
	Zucchini	20 g	03
	Turnip	20 g	06
	Onion	10 g	05
	Garlic	02 g	03
	Mixed salad	50 g	20
	Yogurt	01	75
OUT OF GROUPS	Canned tomato	10 g	02
	Salt	02 g	00
	Spices	0.50 g	02
	Total	589	600

11.3 Appendix N° 03: WEEKLY FOOD PROGRAM (Collation)❖ **1st Collation (Summary)**

Food	Quantity	Energy (Kcal)	Observation
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Bread	1/5 baguette	40	
Jam	20 g	56	
Butter	10 g	70	
Milk (plain/ strawberry/ chocolate)	Small model (200 ml)	100	
Total		266	300

❖ 2nd Collation (Summary)

Food	Quantity	Energy (Kcal)	Observation
Bread	1/5 baguette	40	
Chocolate	03 servings	342	
Total		382	300

❖ 3rd Collation (Summary)

Food	Quantity	Energy (Kcal)	Observation
Biscuits with (almonds, walnuts, hazelnuts...)	A small ration model	200	
Fruit juice "no added sugar"	Small model (200 ml)	90	
Total		290	300

❖ 4th Collation (Summary)

Food	Quantity	Energy (Kcal)	Observation
Nuts (almonds, walnuts, hazelnuts)	30 g	200	
Fruit juice "no added sugar"	Small model (200 ml)	90	
Total		290	300

❖ 5th Collation (Summary)

Food	Quantity	Energy (Kcal)	Observation
Bread	1/5 baguette	40	
Hard-boiled egg	02	120	
Fruit juice "no added sugar"	Petite model (200 ml)	90	
Total		250	300

❖ 6th Collation (Summary)

Food	Quantity	Energy (Kcal)	Observation
Bread	1/5 baguette	40	
Whole triangular cheese	03	100	
Fruit	01	60	
Fruit juice "no added sugar"	Small model (200 ml)	90	
Total		290	300

❖ 7th Collation (Summary)

Food	Quantity	Energy (Kcal)	Observation
Yogurt	01	60	
Fruit	01	60	
Galette / Biscuits with (almonds, walnuts, hazelnuts)	A small ration model	200	
Total		320	300

❖ 8th Collation (Summary)

Food	Quantity	Energy (Kcal)	Observation
Date	07 dates (50 g)	275	
Milk (plain)	A small model (250 ml)	100	
Total		375	300