

**WHAT ABOUT MEAT WITHOUT MEAT?  
THE EXPLORATION OF THE PULL AND PUSH FACTORS FOR TUNISIANS  
CONCERNING THE CONSUMPTION OF CULTURED MEAT**

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**AT WITHOUT MEAT?**

## **THE EXPLORATION OF THE PULL AND PUSH FACTORS FOR TUNISIANS CONCERNING THE CONSUMPTION OF CULTURED MEAT**

Abstract : Consumption of red meat in Tunisia is currently declining despite its nutritional intake. This fall is mainly due to the rise in meat prices and the deterioration of purchasing power. On the other hand, the red meat production system is ranked among the most polluting and one of the largest consumers of green land and water. Thus, attention has been directed to possible substitutions that can replace natural meat and thus limit the harmful effects of this industry. The purpose of this research is to understand the motivations and the obstacles to the consumption of meat without meat in Tunisia.

Keywords : Meat without meat ; Motivations ; Obstacles ; Tunisia

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## Introduction

Red meat has a prominent place in the agricultural and agri-food economy with a contribution that amounted to 38% of the agricultural gross domestic product (GDP) in 2018, 16% of the value of total agricultural production and 42% of the value of breeding supplies according to the National Agricultural Observatory. Meat is thus considered to be a strategic food product that has a major influence on the balance of the different agricultural production systems, with the national and international socio-economic challenges (M'hamdi & Lanouar, 2014). However, despite this important economic contribution, the average Tunisian consumes 11 Kg of red meat annually (INC, 2019). According to the same source, this rate is very low compared to neighboring countries such as Morocco whose annual consumption of red meat amounts to 16 Kg per person, or France which is ranked 8th in the European Union with an annual consumption rate of 28 Kg per person. Moreover, Tunisia is ranked as the country with the lowest meat consumption in the Maghreb in 2019 (espacemanager.com).

According to GIVLAIT (the Interprofessional Grouping of Red Meat & Milk), this decline in red meat consumption is explained by multiple factors: first by the deterioration of the Tunisian purchasing power which led to a change in food consumption habits, second by the poor performance of the red meat sector with the rise in production costs leading to a price increase of more than +20% between 2011 and 2012 (Mota et al, 2019), and third by the illegal trade in livestock with neighboring countries. The combination of these factors has made both meat production and consumption in Tunisia a real issue, despite the deterioration of red meat image since the 1980s (Higgs, 2000). Nevertheless, meat remains a vital food for human nutrition, a major source of micronutrients such as iron which is frequently deficient, especially for children and pregnant women (Mota et al, 2019). However, the production of animal meat is also linked to several environmental problems due to its high consumption of forage and water (Bhat & Bhat, 2011).

In this context, attention has been directed to possible alternatives that can substitute the production of natural meat, and therefore limit the adverse effects that may result while keeping its nutritional value, hence the birth of the “*Meat-Without-Meat*”, also known as the Cultured Meat (Hocquette 2016b), in vitro meat (Thompson 2014) or green meat (Mohebalizadehgashti, Zolfagharinia & Amin 2020). Therefore, the challenge for both producer and supplier of this meat is to be able to ensure the pleasure associated with the consumption of natural meat such as the case in the Tunisian culture which gives prominence to meat. The main objective of this paper is to understand the motivations and challenges to the consumption of cultured meat in Tunisia. To meet this objective, we start by briefly presenting our main concept Meat-Without-Meat. Then, the field of Facebook research as qualitative methodology for the research is explained; the results are outlined and then discussed. Finally, we will present some limitations and the future research avenues.

## Meat-without- meat

Tunisian people love meat because of its high nutritional value, the pleasure it offers to them and its importance in the economy (Houchati, Aloulou & M'Sadak, 2016). However, the red meat production system is considered as one of the major pollutants and the largest consumers of green land and water. Thus, 30% of the land's surface is used for livestock

production and 70% of fresh water is used in growing food products (Bhat & Bhat, 2011). On the other hand, between 15% and 24% of global greenhouse gas emissions come from meat production (Steinfeld et al., 2006; Turini, 2015). Thus, there has been an urgent need to look for other alternatives that can substitute the production of natural meat, which has led to the birth of the “Cultured Meat” (Hocquette, 2016b) concept.

Early research on this concept in Western countries dates back to the 1960s (Taraldgis et al., 1960; Hsieh, Pearson, & Magee, 1980). Initially, the objective was to provide solid and granular structures containing more than 15% plant protein from different plants such as soybeans and sunflowers (Hocquette et al., 2013). This was followed by the emergence of the Cultured Meat manufactured in Vitro (Thompson, 2014). Finely textured lean beef, for example, is a product which was developed in the 1980s. It derives from the flesh of cattle that remains on the bone after the butchering process ; The flesh is removed through a heated centrifuge in order to separate the flesh pieces from the bone so that they can be pureed through a sieve, where they are collected and used in food products. The Industrial processing is finally completed by block packaging, thus preparing it for human consumption (Thompson, 2014).

The principle of this Cultured Meat is based on the extraction of “*cells by enzymatic digestion of the connective tissue from the muscle taken from an animal (fetus or adult)*” (Hocquette et al. 2013, p. 365). For this to be successful, two challenges must be overcome: the isolation of the appropriate cells on the one hand, and the formulation of culture media on the other (Carlhian, 2013). It should be pointed out that consumer involvement and motivation are essential to the success of this project. Thus, to encourage Cultured Meat consumption, food companies need to sensitize their customers to its benefits in terms of environmental friendliness compared to the production of other pork, beef or chicken meat (Shen & Chen, 2020). Yet, it is also important to remember that both acceptance and rejection of Cultured Meat is linked to people’s ethical aspect. Indeed, meat consumption depends on the individual’s ethical and cultural beliefs (Perry & Grace, 2015).

Moreover, European consumers are not too enthusiastic about these new food technologies (Verbeke, 2011). This attitude is explained by several factors, including the “unnatural” production process, which once revealed, can lead to consumers' disgust and reluctance (Bhat & Bhat 2011). Similarly, consumers have concerns about the safety, the nutritional value and the price . Besides, they need to find persuasive answers to questions about the social, the economic and the cultural implications of the cultured meat production (Rutsaert et al., 2015). Hence, the supporters of cultured meat are banking on the consumers’ interest in getting involved in the ecological and sustainable food consumption (Vanhonacker et al, 2013).

### **The research methodology**

This paper seeks to understand the perception of Meat-Without-Meat by Tunisian consumers through the analysis of the motivations (Pull factors) and obstacles (Push factors) that’s why, we used a qualitative method through an individual semi-structured interviews. In other words, the questioning during an interview is usually distinguished by a non-directive attitude on the part of the interviewer towards the interviewee. The principle of non-directivity also implies an empathetic attitude on the part of the interviewer who will accept the interviewee’s frame of reference on an emotional level (Thiétart, 2014). Thus, 30 individual interviews were conducted with men and women between the age of 23 and 65, living in Tunis. The decision to stop conducting interviews was made after reaching the

thematic saturation (Evrard et al., 2009). A manual vertical and horizontal content analysis was carried out (Evrard et al., 2009; Thiétart , 2014).

## Results

To better understand the Tunisian consumption of Meat-Without-Meat, it is necessary to begin by analyzing his consumption of the natural meat. The majority of respondents (24) stated that they consume meat (beef or sheep) once or twice a week. According to these participants, this average is explained by the high price on the one hand and by the deterioration of the purchasing power on the other, which prevents them from consuming meat more frequently. These comments were accompanied by discontent due to the inability to consume meat with the desired frequency. In this regard, one of the respondents stated: *“Unfortunately we are no longer able to eat meat often. It is becoming a luxurious food.”* Another participant said: *“Meat is no longer as accessible as it used to be. Personally, I can afford it once a week. Other people cannot due to its very expensive price. It is sad.”* *“Why do you like to eat meat?”* The answers to this question focus on 3 basic areas: (1) **Taste:** According to 27 respondents, meat is considered as one of the most delicious and tasty foods: *“I love to eat meat because it is simply very delicious”*; *“For me, meat is the most delicious food. I enjoy eating it.”* (2) **Nutritional value:** Meat is a primary source of several nutrients essential to human health, including iron and protein. Moreover, *“it is often recommended to pregnant women because of its important value to both mother and baby”*. (3) **A cultural culinary element:**

17 Participants stated that this preference for meat is due to the fact that it represents one of the Tunisian culinary cultural foundations. According to them, meat is always present in important events. Nevertheless, this great appreciation of meat does not negate the risks associated with its consumption. Thus, according to respondents, excessive meat consumption can negatively impact human health by increasing blood cholesterol, high blood pressure, obesity, and cancer. After analyzing the habits associated with meat consumption, the focus was on the Meat-Without -Meat. The first step was to ensure knowledge and proper assimilation of the concept. However, none of the respondents has heard of the Meat-Without-Meat. After the explanation, the respondents expressed their surprise for this new type of meat: *“I have never heard of this meat”*, *“How long has this meat existed? I don’t know it!”* Yet, the answers to the question *“What do you think of this concept?”* were different.

18 respondents appreciated the concept and said they were ready to try it as it presents an innovation that can solve problems related to the consumption of natural meat such as high costs and health problems.

7 respondents did not really like the idea. They claim that the consumption of this meat will depend on several factors such as price and availability. They are also wondering whether it will substitute or just co-exist with the natural meat.

The remaining 5 participants refused the concept because, for them, Cultured Meat doesn’t have the same value as the natural meat.

It is now appropriate to ask about the reasons for substituting products of animal origin for products of plant origin. Arguments presented by respondents are: (a) **Taste:** 30 respondents suggest that the main challenge for this Cultured Meat is taste. If they both taste the same, the latter will therefore have the chance to compete with the natural meat: *“If this manufactured meat tastes exactly like the natural meat, I will be motivated to try it and maybe*

become a consumer. To me, that's a key factor." (b) **Price:** The second factor to consider is price. 28 participants argued that if the taste is the same and the price of the Cultured Meat is lower than the natural meat, they will be encouraged to give up the latter to replace it with the former: *"If Cultured Meat has the same taste as natural one, yet sold at a lower price, I will certainly consume it. Price reduction changes everything."*

**Appearance:** 17 respondents affirmed that having a natural appearance that resembles animal meat is an essential condition for accepting its consumption. *"It is important to have a natural appearance. When I see it on the plate, I don't want to feel or remember that it's a manufactured substance coming out from a machine"*.

**Availability:** 14 participants stated that the availability of this cultured meat would directly affect its consumption. Indeed, respondents are not ready to travel or make an effort to look for it, because in this case they will be satisfied with the natural meat even if there is a big difference in price. *"Personally, I am not ready to travel 20 or 30 kilometers just to get it. I am not going to earn anything right now and I'd better go and buy the natural meat from the nearest butcher's shop "*.

**Protection of animal rights:** Few respondents believe that this Meat-Without-Meat can contribute to the minimization of animal suffering by reducing the number of slaughtered animals: *"This meat will be beneficial especially to animals. There will be two identical types of meat from two different sources. I think this will reduce the number of lambs or cows slaughtered."*

Assuming that all previously factors were met, what would prevent the consumption of this meat? Answers to this question can be classified into 2 categories: (a) **Health:** 26 respondents indicated that Meat-Without-Meat must have a nutritional value close or equal to the natural's meat and essentially, it mustn't cause any harm to health. Thus, even if it is delicious, available and not very expensive, Cultured Meat will be rejected in case it harms human health or doesn't succeed in substituting the iron and protein intakes of natural meat: *"I'm not going to replace natural meat with some manufactured substance that will affect my health or that won't be able to substitute the intake of usual meat. At this point, I prefer natural meat with all its risks"*. (b) **Religious approval:** Three respondents stated that they need to make sure that this Cultured Meat is *"HALAL"* before they consume it. A religious verification is thus essential to decide about the consumption of this meat: *"I must make sure that this Meat-Without-Meat is HALAL. It's a manufactured food; therefore I need to make sure I 'am allowed to consume it."*

## **Discussion**

The results of this research highlight the important position of meat in Tunisian eating habits. The analysis reveals that meat is not considered as a simple food, but it is rather a symbol of the Tunisian culinary culture.

Findings confirm that the deterioration of purchasing power and the high price of natural meat are factors that play in favor of the Cultured Meat. Nevertheless, it is important to address two main challenges: sensory characteristics such as taste as well as appearance, and price. Also, changes in lifestyles, health concerns, and awareness of the impact on the environment, the issue of animal welfare and the increase in the selling price are all factors that could explain the drop in consumption of meat products in the world (Tavoularis & Sauvage, 2018). One must bear in mind that the Cultured Meat addresses the ecological issues

related to animal suffering and the harmful environmental effects of farming (Hocquette, 2016a; Shen and Chen, 2020; Hocquette et al., 2021). However, results show that animal and natural motives don't really make a considerable incentive encouraging the substitution of the animal meat by a cultured one. In fact, consumers consider farm animal welfare as an attribute of the food quality concept with increasing importance over other attributes (Blokhuys et al., 2008; Grunert, 2006). Despite of consumers in the United Kingdom, Italy, Ireland, France and Germany were concerned about health, safety, and quality of food, they did not prioritize farm animal welfare over other food concerns (Harper & Henson, 2001).

The cultural variable also marks its presence and shows that an acceptance of Cultured Meat consumption draws its explanation from a set of factors that differ from one culture to another (Birlouez, 2012). For the respondents to this study, the objective of this innovative technology is to meet the need for meat consumption through an identical product at a significantly lower price.

### **Conclusion, limitations and future research**

The adoption of the qualitative approach through individual interviews provided interesting data. However, further qualitative and quantitative studies are essential to have a clear and global idea on the suitability of the Tunisian market for Cultured Meat with profiles belonging to different socio-demographic classes. Moreover, many factors may influence the choice to consume or to give up Cultured Meat. Nevertheless, the results of this research provide a springboard for a better understanding of the decision-making process of meat consumers, whether natural or cultured.

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## **Appendices:**

### **Appendix 1: Interview Guide**

#### **Natural meat Consumption**

1. How often do you eat meat?
2. Why do you like to eat meat?
3. In your opinion, what are the risks of eating meat?

#### **Meat -Without-Meat**

4. Have you ever heard of Meat-Without-Meat (also called green meat or cultured meat)?  
If yes: go to question 5  
If no: define and explain the concept of Meat-Without -Meat to the interviewee.
5. What do you think of this concept? Why?

#### **Motivations and concerns related to the consumption of Meat-Without-Meat**

6. What factors can lead you to eat meat without meat? Why?
7. What factors can make you reject the consumption of Meat-without-Meat? Why?
8. Do you have anything else to add?

**Thank you for your cooperation.**

### **Appendix 2: Interviewees' profiles**

<b>N°</b>	<b>Name</b>	<b>Age</b>	<b>Profession</b>
1	Abderrazek	63	Retaired
2	Aida	54	Housewife
3	Abir	32	Professor
4	Mehdi	35	Ingeneer
5	Ameni	27	Associate Professor
6	Malek	23	Student
7	Tarek	65	Docteur
8	Iheb	26	Computer Scientist

9	Anouar	33	Mecanic
10	Lamia	46	Associate Professor
11	Taher	49	Business men
12	Souhir	42	Financial
13	Mohamed	50	Lawyer
14	Imen	59	Housewife
15	Wajdi	37	Policeman
16	Habib	25	Student
17	Talel	28	Warehouseman
18	Sarra	31	Coach
19	Ali	60	Security agent
20	Henda	54	Saleswoman
21	Mounir	40	Chef
22	Dorra	27	Employee at a call center
23	Mohamed	34	Manager in a bank
24	Salma	39	Accounting
25	Rachid	61	Retaired
26	Hassen	47	Waiter
27	Linda	23	Student
28	Amina	36	Pharmacist
29	Nour	32	Chef
30	Hedi	30	Unemployed

### Appendix 3: Summary of the main records

Ideas	Terms	Occurrence	Records
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Meat is a culinary cultural element	Culture	17	<i>“Meat is an essential constituent of our culture.”</i>
	Habits	17	<i>“Meat belongs to our habits and traditions.”</i>
	Marriage ceremony	15	<i>“We never celebrate a wedding without slaughtering a sheep and inviting people to eat meat.”</i>
	Funerals	12	<i>“We even offer the meat at funerals. It is present even in hard times.”</i>
Emotions related to the inability to consume meat regularly	Dissatisfaction - Disappointment	20	“I am not able to buy meat regularly. It really hurts.”
	Frustration	14	“We can no longer meet our food needs properly.”
	Wrath	11	“The situation is becoming unbearable! I think that in few months, we will be content to eat bread and drink water.”
Emotions related to the presentation of meat without meat	Surprise	22	“Meat of plant origin?! How? I can’t believe it!”
	Curiosity	18	“How long has this meat existed? “ “What is it made of? Does it really look like our usual meat? “
	Distrust	3	“Is this plant-based meat edible? I’m not really convinced that it doesn’t have any natural piece of meat.”
	Disgust	1	“I don't know this meat but I'm sure it's disgusting. Anyway, it can't be as good as the natural meat.”