

Diána Bánáti¹

Received: October 2020 – Accepted: November 2020

Veggie burgers, vegan meats?

The ruling of the European Parliament paved the way for meat substitutes with meat denominations

Keywords: meat alternatives; meat substitutes; plant-based meat; plant-based diet; lab-grown meat; cellular agriculture; veggie burger

1. SUMMARY

Our food system is no longer fit for the 21st century. The ways we grow food and process it can undermine our health, and are not fit to meet the needs of a growing global population. Cellular agriculture and plant-based alternatives are on the rise. The production of lab-grown meat is gaining momentum and attracts investors. Plant-based diets are gaining importance both for health- and environment-conscious consumers and from sustainability point of view. Demand for plant-based protein products is rapidly expanding beyond just burger analogues to new and novel products in several countries. Alternative meat products, such as ‘vegan burgers’, ‘soy meat’, ‘tofu sausage’ and others continue to evolve.

There has been an intense dispute about names of meat substitute products in the European Union. The question was whether designations like “veggie burgers” or “soy sausages” were misleading. The European Parliament decided recently, that plant-based food products should be allowed to carry names which have traditionally been used for meat of animal origin. However, for the European Parliament, “meat” can be vegetable, milk cannot. Purely plant-based products cannot, in principle, be marketed with designations such as ‘milk’, ‘cream’, ‘butter’, ‘cheese’ or ‘yoghurt’, which are reserved by EU law for animal products.

Hungarian, German, Spanish etc. consumers are traditionally meat-eaters. Eating meat and meat products is part of these countries’ culture. Taken the traditional approach of these consumers to food and the role of meat in their food and gastronomic culture, it is doubtful whether the recent decision of the European Parliament would not result in confusion once an „impossible burger” would be put on their plate.

2. Introduction – Plate and the Planet

Our food system is no longer fit for the 21st century, warned the the World Economic Forum (WEF) [1]. Food is part of our cultural identity and, at the most basic level, essential to our survival. Over the past 200 years we have seen unprecedented development of agriculture and the global food industry, which now brings many people reliable, affordable access to an extraordinary variety of foods. Yet, it is becoming increasingly clear that the ways we grow food and

process it can undermine our health, and not necessarily meets the needs of a growing global population safely. WEF states, that there are no healthy choices in an unhealthy food system. While we are increasingly encouraged to eat more responsibly, we have to acknowledge that the negative health impacts of current food production are mostly unavoidable. Whether you choose an apparently healthy salad or a burger, you are still consuming food that undermines your health and wellbeing.

¹ University of Szeged Faculty of Engineering

From an estimated 7.7 billion people worldwide in 2019, the projection of the United Nations [2], indicates that the global population could grow to around 8.5 billion in 2030, 9.7 billion in 2050, and 10.9 billion in 2100 and we need to feed those people.

3. Sustainable diet

In 2019, the EAT-Lancet Commission [3] developed the world's first scientific targets for healthy and sustainable food systems, including a "planetary health diet" with defined daily consumption ranges for each food group. A "Planetary Health Diet" is a dietary pattern, characterized by a variety of high-quality plant-based foods and low amounts of animal-based foods, refined grains, added sugars, and unhealthy fats.

Compared with current diets, this shift will require global consumption of foods such as red meat and sugar to decrease by 50%, while consumption of fruits, nuts, vegetables, and legumes must double. That said, the Commission emphasizes the importance of tailoring these targets to local situations. For example, while North American countries currently consume almost 6.5 times the recommended amount of red meat, countries in South Asia eat only half the recommended amount.

Undoubtedly, making such a radical shift to the global food system is unprecedented, and will depend on widespread, multi-sector, multi-level action [4].

4. Plant-based diets

If meats are to be replaced in our diet either for environmental, philosophical, ethical, health or other reasons, than proteins of plant origin could be targeted. Plant-based diets are an alternative to high amount of meat consumption.

Plant-based diets are gaining importance both for health- and environment-conscious consumers and from sustainability point of view (plant-based diets have been praised for their benefit to our health and the environment). There is neither an official definition nor consensus on what defines a plant-based diet. It is used to describe a variety of dietary patterns, from the Mediterranean diet to Vegetarian and Vegan diets. The descriptions of plant-based diets mainly focus on the promotion of healthy plant foods, such as fruits, vegetables, bean, pulses, nuts etc., and they do not necessarily exclude the consumption of meat and dairy products, so these are not expecting the total avoidance of products of animal origin. (Flexitarian diets emphasise the importance of eating healthy plant foods and promote a balanced diet, without excluding meat and dairy products, still emphasising the reduction of its quantity and frequency of consumption.)

Plant-based food boom expands beyond the bun [5]. Globally, 56% of plant consumers are trying to

eat more plant-based foods and beverages, pushing alternative proteins into an increasingly mainstream phenomenon. Demand for plant-based protein products is rapidly expanding beyond just burger analogues to new and novel products including alternative seafoods like shellfish and shrimp, plant-based cheeses, ready-to-eat protein snacks and more.

Plant proteins are coming to the forefront in the field of nutrition, with recent surveys highlighting the health benefits of switching to a 100% plant-based diet. But in terms of nutrition, what do consumers really know about plant proteins and their animal counterparts? Do their perceptions line up with reality? [6].

A new generation of plant alternatives to animal meat has exploded on the food scene, distinguished from their predecessors by the intent to mimic animal meat's taste and texture. A US-wide survey [7] (among 1,000 adults) was conducted at the end of 2019. To orient survey takers, the emerging food category was described as "meatless burgers, chicken, fish, sausages and other ground products that attempt to mimic the flavour and texture of animal protein but are made with only plant products." Throughout the survey, these types of foods were collectively referred to as "plant alternatives to animal meat." The survey began by asking participants what type of diet they follow and provided definitions for the following options: omnivore, vegetarian, vegetarian on some days but not all days, vegan and pescatarian. Not surprisingly, the overwhelming majority (66%) of people in the survey identified as omnivores. Nearly half (49%) of survey participants reported having tried these newer meatless products. A lower percentage of omnivores (44%) have tried a plant alternative to animal meat compared with vegetarians (72%), "sometimes" vegetarians (77%), vegans (76%) and pescatarians (75%). Having tried a plant alternative to animal meat was more common among the younger population, with those under 45 years of age being the most likely consumers (62%). While there are a variety of reasons why people have tried plant alternatives to animal meat, the top reason for doing so is liking to try new foods (41%).

There is a gap between what consumers think about the benefits of plant proteins and what plant proteins can actually provide. But what are the facts about plant-based and animal-derived proteins? A survey conducted in 2020 [8] points out, that in addition to the nutritional challenge, there is also the sensory challenge: the texture and taste of all those products are crucial for unlocking the full potential of this new market for plant-based protein. Manufacturers need to bear in mind the current barriers that are holding consumers back from taking the plunge and trying out plant-based products: price is the most significant, but taste is another of the main barriers, along with the composition of the end-product which is coming under increasing consumer scrutiny.

5. Need for meet

According to the World Resources Institute [9], between 2010 and 2050, global meat and dairy consumption is on a course to increase by nearly 70 percent, with beef consumption increasing by more than 80 percent.

The global average per capita consumption of meat and the total amount of meat consumed are rising, driven by increasing average individual incomes and by population growth. Growth rates vary across different regions, with consumption in high-income countries static or declining and in middle-income countries moderately to strongly increasing, whereas in low-income countries, meat consumption is on average low and stable. The average amount of meat consumed per person globally has nearly doubled in the past 50 years, from around 23kg in 1961 to 43kg in 2014. The increase in average individual meat consumption means total meat production has been growing at a much faster than the rate of population growth, increasing four or fivefold since 1961 [10]. Demand for meat has both an economic and cultural basis.

Food consumption will continue to expand due to population growth and higher per

capita income for most commodities with the developing world as the source of most

demand growth over the coming ten years. However, consumption of meat and fish differs significantly across regions according to dietary patterns and income levels. At a global level, total consumption of meat and fish is expected to increase by 15% over the period of 2018-2027 [11].

6. Cellular agriculture and cultivated meat

In order to transform the future of food, cellular agriculture and plant-based alternative proteins could be considered.

Cellular agriculture, the production of lab-grown meat is gaining momentum and attracts investors. The first ever cultured meat hamburger, a hamburger made of lab-grown meat (from stem-cells) was introduced in 2013 in The Netherlands. It had taken five years to develop the technology for large scale production. This early product (approx. 140 g slice) came at a cost of almost €250,000 per burger [12].

Aside from reducing the high costs associated with creating meat that has the same properties as meat from livestock, one of the biggest challenges the company will face is that of regulatory approval. In Europe, such a novel product will need to go through a rigorous „novel foods” regulatory process. This involves demonstrating the safety to the European Food Safety Authority. This process takes at least 18 months.

A San Francisco based company, Memphis Meats produces meat by harvesting it from cells instead of animals. They call it cell-based meat and marketing it as „real meat” [13]. They produce food by sourcing high-quality cells from animals, then cultivate the cells into meat by feeding them necessary nutrients (such as amino acids, sugars, trace minerals and vitamins). They are exploring obtaining cells from a variety of methods, including biopsies from living animals, eggs, fishing, and recently slaughtered animals who were already a part of the food system. They have already debuted the world’s first cell-based beef meatball, chicken and duck and are also working on other meat types.

The Israeli Aleph Farms is a food-tech startup, founded in 2017, that grows meat cuts from beef cells using a 3D tissue engineering platform. Their production method of cultivated beef steaks also relies on mimicking a natural process of muscle-tissue regeneration occurring inside the cow’s body, but under controlled conditions. They announced in October 2019, that the company had successfully grown meat on the International Space Station [14, 15] too.

7. Plant-based meat alternatives, “Impossible burgers”

In July 2016, a California-based company launched its first meat analogue product, the ‘*Impossible Burger*’, which is made from material derived from plants. Heme, or soy leghemoglobin (an oxygen-carrying heme-based compound found in certain butterfly-flowering plants; Ed.), is the ingredient said to set the Impossible Burger apart from other plant-based burgers. It adds to the flavor and color of the burger and makes it “bleed” like a beef burger does when cut. It’s a controversial ingredient in the ‘*Impossible Burger*’. Unlike the heme found in beef, the heme in the ‘*Impossible Burger*’ is genetically engineered by adding soy protein to genetically engineered yeast (*Pichia pastoris*) [16]. The company claims that making it uses 95% less land and 74% less water, and it emits about 87% less greenhouse gas than making a ground beef burger patty from cows [17].

A fast-food restaurant chain tested a vegetarian version of its type of burger. It was such a success that the chain was planning to roll the *Impossible* burger out US-wide [18].

A huge American pizza chain also joined the plant-based protein trend with a pizza topped with non-meat sausage [19]. The pizza chain was testing out the Impossible Supreme pizza – topped with a meatless sausage made by Impossible Foods – in different US states with huge success.

Other veggie burgers on the market usually contain similar ingredients. However, some contain more whole-food-based ingredients like lentils, quinoa, hemp, and black beans.

The California-based Beyond Meat [20] uses pea protein and beets to make plant-based burgers that taste like the real. Beets are used to mimic the colour of real meat. The protein comes from peas. Coconut oil and potato starch make the burgers juicy [21]. No GMOs, soy, or gluten are used by Beyond Meat. They identify molecules in plants that create a „meaty aroma and taste”.

Another burger chain started to sell a vegan burger in Germany, one of its five leading overseas markets in 2019. Nestle is making the meatless patty for it. The meatless burger is made with soy and wheat protein, and uses beet, carrot and bell pepper extracts to help create a meaty look and texture. Two years earlier [22] the company announced the launch of a burger, made with a soy patty, in Finland and Sweden.

Givaudan [23] has hailed plant-based fish products as “the next big thing” in alternative proteins. The Swiss flavor giant has unveiled its latest research paper conducted in collaboration with the University of California, Berkeley, US, highlighting the opportunities and challenges for manufacturers and future market development. While the same macro trends are driving the sector for meat substitutes, the interest in fish and shellfish alternatives reflects some of the fishing and shellfish industry’s specific challenges, explains the author.

8. Meat substitutes on the market

A vegan with high cholesterol sounds almost as paradoxical as a hamburger without meat. However, not only do both of these exist, but they both share common ancestors – Beyond Meat and Impossible Foods [24].

Alternative meat products, such as vegan burgers, soy meat, tofu sausage and others also continue to evolve, with new technologies like 3D printing and protein fermentation playing a role in driving innovation.

So plant-based meat alternatives are manifold. There are heme-based burgers (for example the Impossible Burger, using a proprietary leghemoglobin “heme” soy protein to imitate the bloodiness of a traditional beef burger), other soy-based burgers (done for decades) and other plant-protein-based burgers (some are made using pea protein as the base ingredient, instead of soy).

New plant-based „meats” on the horizon include whole-muscle products like steak and chicken breast, lunch meat, bacon and more. The dairy alternative category, an early leader in the plant-based nutrition space, is growing to encompass other formats such as yogurt, ice cream, butter, spreads and creamers. To stand out in the dairy aisle, products must deliver more protein than traditional dairy, and feature a nutritional label fortified with vitamins and minerals or functional ingredients like probiotics.

When it comes to health, 90 percent of customers purchasing plant-based products are meat-eaters who believe the products are more healthful and better for the environment [25]. Millennials, born 1981-1996, are the top consumers of plant-based meat alternatives, finds „The Future of Plant-based Snapshot” study. This generational group has adopted plant-based meat alternatives as a way to indulge sensibly while addressing their long-term health goals and animal treatment concerns. Generation Xers, born 1965-1980, are also a core consumer group of plant-based meat alternatives, and because many in this group are parents of Generation Zs, born 1997 to present, they raised their Gen Z children on plant-based beverages and foods.

New products are always a risk and new categories are even more so. But they usually attract customers. Do meat substitute processors react to a hype or a permanent category shift?

According to the research firm Euromonitor International (EI), meat substitutes recorded USD 19.5 billion sales globally in 2018 [26]. By 2023, the US meat-substitute retail market could reach \$2.5 billion, compared to \$1.4 billion last year. Globally, the market could grow from about \$18.7 billion in 2018 to \$23 billion in 2023 [27].

9. Insects

Insects as protein sources are also widely considered, however European consumers would undoubtedly perceive insects being non-conform with their diet and culture. The length of this study does not allow further discussion on this topic, but the author should draw the attention to concerns raised regarding their potential allergenicity.

10. The debate – Pros and cons

There has been an intense dispute about names of meat substitute products in the European Union.

EU member states already had the power to issue their own food labelling laws in a bid to prevent consumers from being misled. Early 2020, France passed a legislation to ban the use of meat nomenclature for vegetarian and vegan substitutes. However, the Dutch government announced in 2019 that plant-based meat producers can use terms such as “chicken” as long as it was clearly marked that it was a vegan or vegetarian product. A move to stop plant-based meat producers from using meat-related nomenclature is also spreading across in the US, with individual states considering or passing legislation. However vegan food companies and campaigners are launching legal challenges against such laws in the federal courts [28].

The names of food products were on the agenda of the European Parliament in October 2020, as part

of the debate about a major agricultural reform. The question was whether designations like “veggie burgers” or “soy sausages” were misleading. The European Parliament had to vote to decide whether plant-based food products should be allowed to carry names which have traditionally been used for meat and dairy.

„Misleading names given to meat substitute products” was the title of a question submitted by an Italian Member of the Parliament for a written answer to the European Commission in the European Parliament [29]. He claimed, that the popularity of vegetarian, vegan and other diets has created a market for new food products. Supermarket shelves are increasingly featuring vegetarian and vegan products which are packaged to look like meat and given inventive names such as ‘vegan bresaola’, ‘vegan mortadella’, and ‘vegan T-bone steak’. The Liaison Centre for the Meat Processing Industry in the European Union (CLITRAVI) has long been calling for EU measures, similar to those already in place in the dairy sector, to prevent these products from being given names which refer directly to meat types, cuts, or meat-based products. So the MEP posed the following questions: Does the Commission think that a problem of this kind should be tackled as a matter of urgency? What steps is it taking to protect consumers against the problems caused by misleading product names and to safeguard the status of meat producers’ own products?

Food businesses, green groups, farmers and researchers were all lobbying away to shape the discussion on whether vegetarian products can be called by meat-related terms, like “veggie burger” or “veggie sausage”. Farmers argued “No”. Environmentalists said “Yes”.

Before the vote, Europe’s largest farmer association Copa-Cogeca argued these types of names hurt farmers and promote “misleading and unfair” marketing. “The European livestock sector is not trying to fight this development, we simply call for the work of millions of European farmers and livestock sector workers to be acknowledged and respected,” said Jean-Pierre Fleury, chairman of the Copa-Cogeca’s working party on beef and veal, in a statement [30]. “I am not afraid to say that this is an obvious case of cultural hijacking. They launched a campaign called „ceci n’est pas un steak” (this is not a steak). The communication campaign is aiming to raise fundamental questions about consumer information, cultural heritage and the power of modern marketing, which blithely amalgamates big business interests and values, as Copa Cogeca states.

The Austrian Federal Economic Chamber viewed the proposal as misleading customers, while NGOs and producers of vegetarian products feared that a ban on these product names could hinder the “change toward sustainable food [31].

Prior to the vote, Greenpeace took to Twitter to oppose the proposal to ban the names. “Seems very petty, but the industrial meat lobby wants the European Parliament to ban the word ‘veggie burger’ because they say it’s confusing,” the tweet said before concluding: “If they’re confused by the word ‘veggie burger’... what do they think a ‘hot dog’ is? – he added.

The European Alliance for Plant-based Foods (EAPF) [32] called on Members of the European Parliament to request a separate vote on and reject Amendments 165 and 171. They point out, that these amendments would strongly hamper the further development of innovative, plant-based foods that have a key role to play in enabling citizens to make healthier and more sustainable food choices.

To somewhat surprisingly, a senior food policy officer, C. Perrin at the European Consumer Organization (in French: Bureau Européen des Unions de Consommateurs – BEUC) stated, that “Consumers are in no way confused by a soy steak or chickpea-based sausage, so long as it is clearly labelled as vegetarian or vegan.” It’s “common sense”, she said [33]. BEUC had informed MEPs [34] ahead of the vote that most consumers are not confused by a veggie ‘burger’, so long as it is clearly labelled as vegetarian or vegan. This is one of the findings of a survey BEUC published [35] earlier in 2020 with 12 of its member organisations (conducted in 11 countries in parallel). They argued, „that most consumers do not appear to be concerned about the naming of veggie ‘burgers’ or ‘sausages’, as long as the products are clearly identifiable as vegetarian or vegan. On average, only 1 in 5 consumers (20.4%) think the use of ‘meaty’ names should never be allowed on vegetarian or vegan products. Most respondents (42.4%) believe these names should be permitted provided that the products are clearly labelled as vegetarian or vegan. In addition, 1 in 4 respondent (26.2%) does not see any problem at all with using such names, and 11% have no opinion.”

The proposal divided MEPs in the European Parliament, Greens calling their fellow MEPs to vote against the proposal, others painted the picture of open war between meat lobbyists and those who „get it” [36]. The European Parliament vote on the terminology of plant-based food products stole attention from some of the EU’s most important climate decisions, from the CAP discussions [37]. While most headlines focused on veggie burgers and sausages, the EU also addressed the Common Agricultural Policy. CAP has long been criticised for being lacking in terms of both biodiversity and climate action, and as it covers about 30% of the total EU budget, it also contributes greatly to EU farmers’ income.

11. The decision

As the European Parliament (EP) voted on the mammoth Common Agricultural Policy (CAP) reform package at the end of October 2020, including the

denomination of vegan meat substitutes, MEPs rejected the proposals (Amendments 165 and 171) seeking to reserve meat-related names for products containing meat. The Parliament said yes, in a decisive vote against a measure that would ban plant-based meat alternatives from being referred to by the names of their meat counterparts. This will allow vegetarian meat alternatives, like the Impossible Burger, to retain meat-like names. A veggie burger can be called burger.

MEPs also rejected proposals to recognise steak, sausage, escalope, burger and hamburger as exclusively meat-based products. The EP decided that soy hamburgers and steaks made from vegetable proteins can continue to be called burgers or steaks. Nothing will change for plant-based products and the labels used for their sale.

According to Die Presse, the European Parliament was likely surprised by the public interest in this issue and the growing criticism that the EU wants to protect consumers from a problem that barely exists in reality [38]. ‘Veggie burgers’ to remain ‘burgers’ thanks to EU Parliament vote” – this is how BEUC commented the decision of the EP [39].

Volkskrant.nl commented [40] on the vote in the European Parliament to change the name of veggie burgers and sausages, as they allegedly create confusion among consumer.

The motion to reserve the terms sausage, schnitzel or hamburger exclusively for animal products did not find a majority. Some referred to the debate as the Burger-Krieg (or Burger-War), such as R. Hank in a commentary in Frankfurter Allgemeine Sonntagszeitung. According to Mr Hank, vegan supporters should rejoice over the burger battle. He observes that diet is eminently a political topic in today’s society [41].

However, for the European Parliament, “meat” can be vegetable, milk cannot. A few days after rejecting the proposals seeking to reserve meat-related names for products containing meat, the EP was called to deliberate on the vegetable alternatives of milk. After the green light for the terms referring to meat for vegetable products, the European Parliament has instead decided for a stricter measure regarding the denominations of dairy products. With a vote of the plenary assembly, the assembly decided to reiterate the opposition to the use of the name milk for products based on soy, almond and other derivatives of non-animal origin.

Since 2017, with the decision of the European Parliament to protect milk production in Europe, it is forbidden in all EU countries to use names such as soy milk, oat milk and the like on the labels of products on the market, just as the names of butter, yogurt or cheese associated with ingredients of plant origin. But with the recent vote, Parliament has decided on a

further tightening that also prohibits “evocations and imitations: for example, the use of expressions such as a drink such as milk or milk substitute”, reads the words of the president of Assolatte (Associazione Italiana Lattiero Casearia), P. Zanetti, reported by Il Sole 24 Ore [42]. In short, while the reasons for the meat industry have not been heard, the European Parliament has maintained a hard line on the protections for the milk industry.

A preliminary ruling of the European Court of Justice states, that purely plant-based products cannot, in principle, be marketed with designations such as ‘milk’, ‘cream’, ‘butter’, ‘cheese’ or ‘yoghurt’, which are reserved by EU law for animal products [43]. The same is true if those designations are accompanied by clarifying or descriptive terms indicating the plant origin of the product concerned. However, there is a list of exceptions. The German company TofuTown produces and distributes vegetarian and vegan foods. In particular, it promotes and distributes purely plant-based products under the designations ‘Soyatoo Tofu butter’, ‘Plant cheese’, ‘Veggie Cheese’, ‘Cream’ and other similar designations. A German association, responsible for combatting unfair competition, brought an action against TofuTown for a prohibitory injunction before the Regional Court, Trier, Germany, because of the infringement of the EU legislation on designations for milk and milk products. In that context, the Regional Court asked the Court of Justice to interpret the relevant EU legislation. The Court observed that, in principle, for the purposes of the marketing and advertising in question, the relevant legislation reserves the term ‘milk’ only for milk of animal origin. In addition, that legislation reserves designations like ‘cream’, ‘chantilly’, ‘butter’, ‘cheese’ and ‘yoghurt’ solely for milk products, that is products derived from milk.

12. Hungarian consumers

Hungarian consumers are traditionally meat-eaters. The meat consumption per capita is not amongst the highest ones in Europe, but several traditional dishes (such as stuffed cabbage (töltött káposzta), (potato casserole) paprikás krumpli, Goulash soup (gulyásleves), Chicken paprika (csirke paprikás) all contain meat. Eating meat and meat products is part of the Hungarian gastronomic culture. The annual Hungarian meat consumption per capita is 65 kg. (It used to be 78 kg/person annually in 1961.) The consumption increased by 3.5 kg between 2004 and 2016 [44].

Multinational food processor companies and fast food chains do adapt their products to local markets. One of the best-known fast food restaurant system has world-wide adverts. Some of those promote meat replacement products, such as *Veggie Burger* [45]. However, in a country of meat-eaters, like Hungary, the company actively promoted „real meat” for „meat lovers” (*húsimádók*) during the Fall of 2020 in various TV channels (*Figure 1.*).

As the European Consumer Organisation argued (see above) that „consumers are in no way confused”, their survey only covered 12 countries, excluding Hungary. Taken the traditional approach of Hungarian consumers to food and the role of meat in their diet and culture, it is doubtful whether the recent decision of the European Parliament would not result in confusion once an „impossible burger” would be put on their plate.

Editorial Note: *Since the arriving of the manuscript, new events have taken place in the topic of the production and distribution of meat-type foods of plant or laboratory origin, which the author could not cover due to the printing turnaround time.*

13. References

- [1] WEF (2020): Our food system is no longer fit for the 21st century. Here are three ways to fix it. World Economic Forum. 24 Jan 2019. Ellen MacArthur. <https://www.weforum.org/agenda/2019/01/how-to-build-a-circular-economy-for-food/> (Hozzáférés / Aquired: 02.16.2020.)
- [2] UN (2019): World Population Prospects 2019. New York, 2019. ISBN: 978-92-1-148316-1. eISBN: 978-92-1-004235-2. https://population.un.org/wpp/Publications/Files/WPP2019_Highlights.pdf (Hozzáférés / Aquired: 02.21.2020.)
- [3] Willett W, Rockström J, Loken B, Springmann M, Lang T, Vermeulen S, et al. (2019): Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet*. 2019 Jan 16.
- [4] Harvard School of Public Health (2020): The Nutrition Source – Sustainability – Plate and the Planet. <https://www.hsph.harvard.edu/nutritionsource/sustainability/plate-and-planet/#:~:text=Defining%20a%20%E2%80%9CPlanetary%20Health%20Diet%E2%80%9D&text=This%20dietary%20pattern%E2%80%94characterized%20by,%2C%20traditions%2C%20and%20dietary%20preferences.> (Hozzáférés / Aquired: 06.05.2020.)
- [5] ADM (2020): Top Five Global Trends that will Shape the Food Industry in 2021. *Nutraceuticals Now*. Wednesday, 28 October, 2020. <https://www.nutraceuticalsnow.com/articles/2020/10/28/top-five-global-trends-will-shape-food-industry-2021/>.
- [6] H. Defert (2020): Animal vs. plant-based proteins: consumer insights open up new markets. Sept. 17, 2020. <https://www.linkedin.com/pulse/animal-vs-plant-based-proteins-consumer-insights-open-hubert-defert/> (Hozzáférés / Aquired: 10.02.2020.)
- [7] IFIC (2019): Consumer Survey on Plant Alternatives to Meat Shows That Nutrition Facts Are More Influential Than the Ingredients List. *Food Insight*. JANUARY 30, 2020. <https://foodinsight.org/consumer-survey-plant-alternatives-to-meat/> (Hozzáférés / Aquired: 04.09.2020.)
- [8] H. Defert (2020): Animal vs. plant-based proteins: consumer insights open up new markets. Sept. 17, 2020. <https://www.linkedin.com/pulse/animal-vs-plant-based-proteins-consumer-insights-open-hubert-defert/> (Hozzáférés / Aquired: 10.12.2020.)
- [9] WRI (2020): Without Changing Diets, Agriculture Alone Could Produce Enough Emissions to Surpass 1.5°C of Global Warming. World Resources Institute. October 17, 2018. <https://www.wri.org/blog/2018/10/we-cant-limit-global-warming-15c-without-changing-diets> (Hozzáférés / Aquired: 09.02.2020.)
- [10] H.C.J. Godfray et al. (2018): Meat consumption, health, and the environment. *Science*. Vol. 361, Issue 6399, 20 Jul 2018. DOI: 10.1126/science.aam5324. <https://science.sciencemag.org/content/361/6399/eaam5324> (Hozzáférés / Aquired: 10.02.2019.)
- [11] OECD-FAO (2018): OECD-FAO Agricultural Outlook 2018-2027. OECD, 03 Jul 2018. OECD Publishing, Paris/Food and Agriculture, Organization of the United Nations, Rome. https://doi.org/10.1787/agr_outlook-2018-en. https://www.oecd-ilibrary.org/agriculture-and-food/oecd-fao-agricultural-outlook-2018-2027/world-meat-projections_agr_outlook-2018-table111-en (Hozzáférés / Aquired: 10.02.2019.)
- [12] L. Cowen (2020): Huge €47M Series B Boost for Mosa Meat’s Cell-Based Burgers. *Labiotech.eu*. 02/10/2020. <https://www.labiotech.eu/food/mosa-meat-alternative/> (Hozzáférés / Aquired: 10.02.2020.)
- [13] <https://www.memphismeat.com/> (Hozzáférés / Aquired: 09.07.2020.)
- [14] CNN (2019): October 8, 2019. This company just grew meat in space for the first time. <https://edition.cnn.com/2019/10/08/health/aleph-farms-space-meat-intl-hnk-scli/index.html> (Hozzáférés / Aquired: 01.19.2020.)
- [15] Cision (2019): Aleph Farms Successfully Completed the First Slaughter-free Meat Experiment in Space. *Cision. PR Newswire*. 07 Oct, 2019. <https://www.prnewswire.com/il/news-releases/aleph-farms-successfully-completed-the-first-slaughter-free-meat-experiment-in-space-300932806.html> (Hozzáférés / Aquired: 11.25.2019.)
- [16] Y. Jin et al. (2018): Evaluating Potential Risks of Food Allergy and Toxicity of Soy Leghe-

moglobin Expressed in *Pichia pastoris*. *Mol Nutr Food Res*. 2018 Jan; 62(1): 1700297. Published online 2017 Oct 17. doi: 10.1002/mnfr.201700297

- [17] Impossible (2020): <https://buy.impossible-foods.com/> (Hozzáférés / Aquired: 10.15.2020.)
- [18] CNN (2019): Burger King plans to roll out Impossible Whopper across the United States. *CNN Business*. April 29, 2019. <https://edition.cnn.com/2019/04/29/business/burger-king-impossible-rollout/index.html> (Hozzáférés / Aquired: 12.14.2019.)
- [19] abc15 (2019): Little Caesars is testing out an Impossible pizza. abc15 Arizona. May 20, 2019. <https://www.abc15.com/news/national/little-caesars-is-testing-out-an-impossible-pizza>; abc15 Arizona. May 20, 2019 (Hozzáférés / Aquired: 10.11.2020.)
- [20] Beyond Buzz (2020): <https://www.beyondmeat.com/about/press/> (Hozzáférés / Aquired: 11.03.2020.)
- [21] Insider Presents (2018): Beef patties made from plants. July 19, 2018. Video. Facebook. <https://www.facebook.com/insiderpresents/videos/1033777520107554/> (Hozzáférés / Aquired: 10.16.2018.)
- [22] CNN (2019): McDonald's joins the meatless burger trend in one of its biggest markets. May 8, 2019. <https://edition.cnn.com/2019/05/07/business/mcdonalds-meatless-burger-germany/index.html> (Hozzáférés / Aquired: 12.02.2019.)
- [23] FoodIngredientsFirst: Givaudan tips plant-based fish to make waves in alternative proteins. 17 Sep 2020.
- [24] CNBC (2019): Beyond Meat, Impossible Foods and the plant-based burger of the summer. Here are the diet facts you need to know. JUL 4 2019. <https://www.cnbc.com/2019/07/04/beyond-meat-impossible-foods-and-the-diet-truth-of-the-summer-burger.html> (Hozzáférés / Aquired: 02.18.2020.)
- [25] NPD (2019): Plant-based Foods: Will They stay or Will They Go? October 28, 2019. <https://www.npd.com/wps/portal/npd/us/news/press-releases/2019/plant-based-foods-will-they-stay-or-will-they-go/> (Hozzáférés / Aquired: 12.02.2019.)
- [26] EI (2019): Meat Substitutes Recorded USD 19.5 Billion Sales Globally in 2018. *Euromonitor International*. 05/17/2019. <https://blog.euromonitor.com/meat-substitutes-recorded-usd-19-5-billion-sales-globally-in-2018/> (Hozzáférés / Aquired: 12.02.2019.)
- [27] EI (2019): The Future of Meat. Strategy Briefing. Aug. 2019. In: abc15 (2019): Little Caesars is testing out an Impossible pizza. abc15 Arizona. May 20, 2019. <https://www.abc15.com/news/national/little-caesars-is-testing-out-an-impossible-pizza> (Hozzáférés / Aquired: 11.10.2019.)
- [28] Financial Times (2020): Debate over vegan 'sausages' and 'burgers' heats up ahead of EU vote. Emiko Terazono in London and Mehreen Khan in Brussels. October 18 2020. <https://www.ft.com/content/f583d3f2-38a2-4f7a-9538-9899971413ec> (Hozzáférés / Aquired: 10.06.2020.)
- [29] EP (2020): Misleading names given to meat substitute products. Parliamentary questions. 7 June 2017. Question for written answer E-003755-17. https://www.europarl.europa.eu/doceo/document/E-8-2017-003755_EN.pdf (Hozzáférés / Aquired: 10.17.2020.)
- [30] Copa Cogeca (2020): Enough with surrealistic meat and dairy denominations! European livestock organisations are launching a campaign against the misuse of meat denominations. Press Release. 06/10/2020. (Hozzáférés / Aquired: 10.17.2020.)
- [31] Dispute about names of meat substitute products. Dispute about names of meat substitute products / Burger für mündige Bürger km-Kleine-Zeitung-AT , Page: 16-17 , Info: by Andreas Lieb, 21 Oct 2020, 00:00. EU will Veggie-Burgern heute eins überbraten km-Heute-Austria-AT, Page: 1,6 , 21 Oct 2020, 00:00. EU stimmt über Verbot von „Veggie-Burger“ ab km-Wiener-Zeitung-AT, Page: 11 , 21 Oct 2020, 00:00. EU-Abstimmungsmarathon rund um den Veggieburger km-Kronen-Zeitung-AT , Page: 17, Info: by Matthias Lassnig , 21 Oct 2020, 00:00. km-DNS-AT - 21 Oct 2020 - Summary
- [32] EAFP (2020): The European Alliance for Plant-based Foods. https://plantbasedfoodalliance.eu/wp-content/uploads/2020/10/Joint-Letter-to-MEPs-Aligning-CMO-with-Farm-to-Fork_8-October-2020.pdf (Hozzáférés / Aquired: 10.15.2020.)
- [33] NPR (2020): Veggie Burgers Can Be Called Burgers, European Parliament Says. Interview with Camille Perrin. October 23, 2020 5:51 PM ET <https://www.npr.org/2020/10/23/927278172/veggie-burgers-can-be-called-burgers-european-parliament-says?t=1604079302917> (Hozzáférés / Aquired: 09.28.2020.)
- [34] BEUC (2020a): Plenary vote on meat and dairy denominations for plant-based products. 14 October 2020. Ref.: BEUC-X-2020-095/CPE/cm. https://www.beuc.eu/publications/beuc-x-2020-095_plenary_vote_on_meat_and_dairy_denominations_for_plant-based_products.pdf (Hozzáférés / Aquired: 09.04.2020.)

- [35] BEUC (2020b): One bite at a time: consumers and the transition to sustainable food, An analysis of a survey of European consumers on attitudes towards sustainable food, June 2020. <https://www.beuc.eu/publications/one-bite-time-consumers-and-transition-sustainable-food> (Hozzáférés / Aquired: 09.04.2020.)
- [36] Proposal to change terminology for plant-based food products, news and opinion. 1) Soy sausages can become soy tubes - the EU proposal awakens criticism / Sojakorv kan bli sojatub – EU-förslaget väcker kritik km-Svenska-Dagbladet-SE , Page: 14 , 22 Oct 2020, 00:00. 2) Products should be what they claim to be / Produkterna ska vara vad de utger sig för km-Aftonbladet.se-SE, 21 Oct 2020, 00:00. km-DNS-SE - 22 Oct 2020 – Summary. (Hozzáférés / Aquired: 10.27.2020.)
- [37] Veggie burger discussion stole attention from CAP (analysis). Was the debate on the „vegetarian burger” a distraction? / Var debatten om ”vegoburgaren” en distraktion? km-Svenska-Dagbladet-SE , Page: 28 , 30 Oct 2020, 00:00. km-DNS-SE - 30 Oct 2020 - Summary
- [38] No EU ban for „tofu sausage” and „veggie burgers”. No EU ban for „tofu sausage” and „veggie burgers” / Kein EU-Verbot für „Tofuwurst“ und „Veggieburger“ km-Presse-Austria-AT , Page: 1,9, Info: by Oliver Grimm, 24 Oct 2020, 01:00. „Veggie burger” will survive / „Veggieburger“ wird überleben. km-Wiener-Zeitung-AT, Page: 10 , Info: by keine Autorenangabe, 24 Oct 2020, 01:00. Veggie-Burger darf weiter so heißen km-Kurier-AT , Page: 9, 24 Oct 2020, 00:00. Auf EU-Ebene ging es um die Wurst km-Standard-AT , Page: 29 , 24 Oct 2020, 00:00. Veggie-Wurst und Ärger über Abstimmung km-Kleine-Zeitung-AT , Page: 15, 24 Oct 2020, 00:00. Veggie-Burger bleibt km-Kronen-Zeitung-AT, Page: 1,18, Info: by Martina Münzer, 24 Oct 2020, 00:00. Veggie-Burger und Sojaschnitzel sind gerettet km-Salzbürger-Nachrichten-AT, Page: 21, Info: by Monika Graf, 24 Oct 2020, 00:00. km-DNS-AT - 26 Oct 2020 – Summary.
- [39] BEUC (2020c): ‘Veggie burgers’ to remain ‘burgers’ thanks to EU Parliament vote. 28 October 2020. <https://www.beuc.eu/press-media/news-events/%E2%80%98veggie-burgers%E2%80%99-remain-%E2%80%98thanks-eu-parliament-vote> (Hozzáférés / Aquired: 10.28.2020.)
- [40] EU voted on „meat names”. km-DNS-NL - 22 Oct 2020 - Summary
- [41] R. Hank (2020): European Parliament reaches decision on vegan meat substitutes. *Burger War / Burger-Krieg* km-Frankfurter-Allgemeine-Zeitung-DE , Page: 20. km-DNS-DE - 01 Nov 2020 - Summary
- [42] <https://www.sportsgaming.win/2020/10/for-european-parliament-meat-can-be.html> (Hozzáférés / Aquired: 10.28.2020.)
- [43] ECJ (2020): Purely plant-based products cannot, in principle, be marketed with designations such as ‘milk’, ‘cream’, ‘butter’, ‘cheese’ or ‘yoghurt’, which are reserved by EU law for animal products. Court of Justice of the European Union. Press Release No 63/17 Luxembourg, 14 June 2017. Judgment in Case C-422/16. <https://curia.europa.eu/jcms/upload/docs/application/pdf/2017-06/cp170063en.pdf> (Hozzáférés / Aquired: 10.12.2020.)
- [44] AKI (2018): Sertésinformációs rendszer. Agrárgazdasági Kutatóintézet. <https://sertesinfo.aki.gov.hu/publikaciok/kuldes/a:638/Az+egy+f%C5%91re+jut%C3%B3+h%C3%BAsfogyaszt%C3%A1s+alakul%C3%A1sa+Magyarorsz%C3%A1gon> (Hozzáférés / Aquired: 11.03.2019.)
- [45] McDonalds (2020): Veggie Burger. <https://www.mcdonalds.com/kw/en-kw/product/veggie-burger.html> (Hozzáférés / Aquired: 11.07.2020.)