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► **To cite this version:**

Valentin Drigon. A dairy non-dairy mixed product to help the transition towards a plant-based diet ?. Food and Nutrition. 2020. hal-03340156

HAL Id: hal-03340156

<https://hal.inrae.fr/hal-03340156>

Submitted on 10 Sep 2021

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Master 2 Physiological and Psychological Food Choice Determinants P²Food
2019-2020

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Literature Review

A dairy non-dairy mixed product to help the transition towards a plant-based diet?

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Table of content

1. Introduction	1
2. Transition towards a more plant-based diet	2
2.1. Intention to change	2
2.2. Barriers	3
3. Dairy products alternatives	4
4. Product mixing animal and plant proteins to help the transition?	5
4.1. Consumers expectations	5
4.2. Target consumers	6
4.3. New plant protein source	6
5. Conclusion	7
References	

1. Introduction

The overall demand for animal protein sources such as meat, milk, and eggs is increasing fast, driven by the growing populations and rising incomes (Steinfeld et al., 2006). Meat-based and dairy products are the main protein sources in the human diet (Henchion et al., 2017). However, livestock farming and activities affect the environment in an important way and are responsible for the production of greenhouse gases and other pollutants contributing significantly to climate change. Besides, meat and animal product consumption has substantial effects on long-term health (Godfray et al., 2018). Therefore, it is needed to feed the growing population with more sustainable food, and dietary changes towards more sustainable food habits may be attractive for both public health and environmental perspectives.

Meat products consumption per capita is not foreseen to increase a lot in the next coming years (Alexandratos and Bruinsma, 2012). However, animal protein intake is commonly recommended to be reduced in favor of vegetable proteins that are known to have better health effects and lower environmental impacts (Rizkalla et al., 2002; Stehfest et al., 2009).

Elzerman et al. (2011) and many other authors have focused on plant-based meat substitutes acceptance of consumers and it also exists many of these products on the market as well as plant milk and vegan cheese. The non-dairy products market is growing fast, however dairy products consumption remains high. Therefore, it is needed to understand consumer's attitudes towards non-dairy products in order to create new products that could help the transition towards more sustainable diets.

The aim of this literature review is, first, to figure out what are the leading factors towards a more sustainable diet that would be more plant-based and also what are the main barriers to achieve it. Then, as a second part, figure out what are the consumers' attitudes towards non-dairy products already existing. Finally, this will lead to a third and last part that tries to figure out what could be a potential product that would help consumers to decrease their dairy products consumption in a way that wouldn't force them to change but help them to do it by themselves.

2. Transition towards a more plant-based diet

Meat-based and dairy products are commonly consumed and are the main sources of protein in modern societies. However, there is a growing public concern about the adverse effects of their consumption on health and environment as well as animal welfare and slaughtering among others (Niva et al., 2017). Therefore, some consumers try to tend to reduce their meat product consumption to increase their plant-based product intake.

2.1. *Intention to change*

To help people throughout the transition to a generally more sustainable diet, it is a priority to know to what extent people are ready and willing to replace animal proteins with plant ones.

There are some indications showing a growing interest and acceptance of plant-based protein and there is an increasing number of recipes for vegetarian and vegan dishes. Consumers tend to think that vegan food is better for health (Brückner-Gühmann et al, 2019).

Familiarity plays an important role in consumer's acceptance of plant products and their frequent consumption that is likely to increase in people that already consume them (Jallinoja et al., 2016). In a study 2011, Elzerman and colleagues have shown that consumers' acceptance of substitutes based on soy protein were influenced by their evaluation of how much the substitute looks compared to the regular one.

People that are undergoing a dietary change towards more plant proteins show more natural concerns, health social image and price than people that are already in a diet that includes plant products. Moreover, natural concerns, health, and weight control motives are important for adopting and maintaining more sustainable diets (Vainio et al., 2016).

In their review of 2017, Niva and colleagues deal with the adoption of a new diet that becomes more and more rich in plant proteins. It requires to replace old behaviors with new ones. Therefore, when it comes to replacing animal products with plant-based ones, consumers become more and more aware of the benefits of replacing meat products and they be will questioning themselves about the role of animal products in their diet as well as they will begin to look for

plant-based substitutes in supermarkets for instance. The repetition of those behaviors will make them more automatic and unconscious. Changing one another behavior is therefore the key point in the increasing consumption of new plant-based products that are dependent on consumers' motivations to do it.

Despite growing motivations to move towards more sustainable diets, plant protein consumption remains stable (De Boer et al., 2006). Therefore, some barriers to increased plant-based protein consumption still exist.

2.2. Barriers

Here, we are dealing with the issues making people complicated to increase their plant product intake and lower their animal product consumption. The most important factor that influences consumers' acceptability of new food is sensory characteristics. Those characteristics are taste, texture, appearance, and odor. They are distinct between plant-based and meat products, explaining the difference between their acceptability and may be a barrier to increase plant protein intake (Niva et al., 2017).

Evidence has been found that convenience and price motives are barriers to animal products substitution with plant-based ones, and more generally in climate-friendly food choices, especially in people that usually consume meat products (Vainio et al., 2016).

Concerning environmental and ethical issues, not all the consumers know very well the link between global warming and livestock herding and people that are skeptical about climate change are less willing to reduce their meat-eating. Moreover, consumers consider that buying local food and consume seasonal fruits and vegetables is more efficient in reducing the carbon footprint than reducing their animal product consumption (De Boer et al., 2016).

The phenomenon called *neophobia* could also be an important point regarding the acceptance of a new product. Indeed, when it comes to trying new food, consumers may reject it just because they are not familiar with it and may even expect it to have a bad taste. Therefore, advertising in plant-based substitutes is a major key point (Jeske et al., 2018).

3. Dairy products alternatives

Dairy products are a considerable part of the human diet for thousands of years and provide important nutrients, such as calcium and proteins, that are difficult to obtain in a dairy-free diet. They are also part of the dietary recommendations in many countries (Rozenberg et al., 2016). Nonetheless, there is a growing demand for dairy products alternatives, from both consumers and companies, driven by the rising milk allergies, lactose intolerance as well as environmental and ethical issues (Haas et al., 2019).

Plant-based milk is a water extract of legumes, cereals or seeds (Kim et al., 2012). Cow milk is more and more decried due to its environmental, health and ethical considerations. Still, the product image of cow milk is better than the plant-based milk one. In a 2019 review, Haas et al. deal with consumers' attitudes towards cow versus plant milk. The main highlights were that cow milk was perceived as a good source of nutrients with a good taste, convenient to use and with good sensory quality as well as its protein and calcium content. It was better evaluated than soy milk regarding its taste. The negative perceptions were concerning the high cholesterol content.

Despite that, plant milk was attributed as naturally sweetened, and being lactose-free was reported as important. It has been reported that consumers find the switching to plant product diet was done because of a lifestyle change such as lactose intolerance or going to a vegetarian diet.

In a study with soy-milk yogourt, the overall acceptance was lower than in regular dairy yogourt whereas it was higher when respondents believed that it was good for their health (Wu et al., 2005).

One way to introduce unfamiliar foods is to combine them with existing foods (Wansink, 2002). As a result, combining new products like non-dairy products with already existing and well known and used products. Therefore, the idea of a product mixed of both regular dairy yogourt with added plant protein gel making a homogeneous final product in which consumers would find what they like and what they already know and are used to would help them to move toward a more plant-based diet.

4. Product mixing animal and plant proteins to help the transition?

Nowadays, supermarkets already sell a variety of products marketed as dairy substitutes such as plant milks and yogourts, made of soy, oat, almond, among others. The market for plant-based substitutes is of interest but it needs to progress.

4.1. Consumers expectations

The reduction - and also the replacement - of dairy products by plant-based substitutes is an interesting option that is only realistic when consumers accept these new products. Consumers expect plant-based substitutes to be similar as the animal product. Thus, they expect to find as similar as possible dairy substitutes that mimic dairy products.

For instance, consumers' acceptance of meat substitutes requires that they can recognize it as a product that should be eaten instead of meat and that 'form and usage should not be too different from meat' (Elzerman et al., 2011). Moreover, everyday products purchase is driven by price, quality, and convenience (Bucic et al., 2012).

The overall liking of gels (that can serve as a plant-based yogurt alternative) is mainly related to the sensory attributes: sweetness, moisture, softness, and smoothness (Brückner-Gühmann et al., 2019). As a result, for dairy products substitutes such as plant yogurt, consumers want new products like gels that keep the same organoleptic qualities such as taste, texture, odor. Therefore, to fit as much as possible to consumers' expectations, marketers should sell products that are very familiar to them.

As previously seen, price is a key point in the substitution of animal products to plant-based ones. Hence consumers' expectations regarding the price of a new kind of product should not differ too much with the price of the already existing dairy products.

4.2. *Target consumers*

The market for plant-based dairy products is gaining popularity and developing fast. However, even if the targeted consumers are every one of them, it seems that most of them feel like they are not concerned and those kinds of products are mostly for vegetarians or people allergic to dairy products.

Consumers that have positive attitudes towards sustainable consumption claim to pay attention to the packaging, the origin of the food, the presence of GMOs and are concerned by purchase organic food (Vermeir and Verbeke, 2006). As a result, one of the major key points for a product to be attractive for potential consumers will be the packaging and the claims. The major work to be done by marketers to sell new unknown products will be advertising.

Moreover, a good approach of plant as an ingredient in a non-dairy yogurt would be to appreciate its taste. Indeed, would consumers expect a certain plant-based yogurt without the taste of the plant? As a result, industries must also find potential candidates with a good taste to be included in a yogurt not only as a way to make it plant-based or only as a matrix, but also to make it as an added value, as a marketing argument.

4.3. *New plant protein source*

Soy is still the most commonly consumed plant protein source. However, trends show that the market will change due to soy unsustainable concerns such as farming, protein content, allergens, and nutrition and that other plants are trending, making the variety of plant proteins growing.

Lupine is a new plant to be explored, showing good qualities due to its high protein, dietary fibre, and antioxidants contents (Fasolin et al., 2019). Lupine shows the same characteristics as soy but without some disadvantages. It is rich in protein, does not contain allergens and has a less strong taste that is often blamed in soy. Concerning environmental points, it is cultivated in Europe. Thus, the carbon footprint is lower compared to soy that is most of the time produced in

South America (FAO). Lupin seems to be a good potential candidate, sensory tests must be done on consumers before thinking about its use as a plant protein.

5. Conclusion

This review aimed to evaluate the potentiality of a new product on the dairy substitutes market. This is a fast-growing topic and the demand does not stop to increase. This review showed that understanding consumers' attitudes and expectations for a new product is the key point to lead to its success. Therefore, it is needed now to work on the consumer's wanting and beliefs about a potential mixed product that may help them to consume more plant proteins and to reduce their animal protein intake but also to work on information effect and claims on their attitudes towards it.

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