Beliefs and Attitudes about and Sensory Perception of Selected Plant-Based Drinks

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Introduction

Interest in sustainably produced food has increased markedly worldwide over the past few decades. Substituting foods of animal origin with alternative plant-based protein sources is one of the main globally debated and implemented strategies to support a sustainable diet.
The present study focused on consumer beliefs and attitudes concerning plant-based alternatives to dairy products, as well as on the sensory perception of plant-based drinks on the Swiss market that are made from almonds, coconuts, oats, rice, soybean and cashew nuts.

Materials and Methods

Online survey

Online survey (Questback EFS software) with the intervista online access panel with the aim of collecting percentage and profile information on consumers and non-consumers of plant-based products (drinks, yoghurts, cream).
A total of 1213 people between the ages of 16 and 74 – 592 males, 612 females, 9 non-binary – took part in the survey.

Sensory evaluation

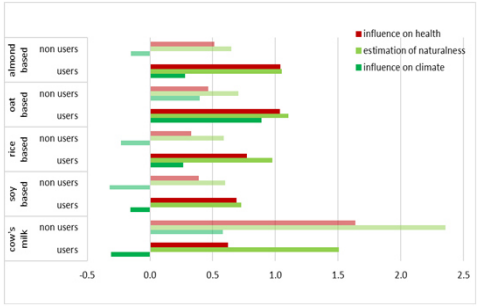
Samples

Plant-based drinks were purchased at retailers in Switzerland.

Test protocol

The sensory profiles of 11 plant-based drinks made from almonds, cashews, coconuts, oats, rice and soybeans were determined by descriptive analysis on a 10-cm unstructured line scale (12 judges, 16 attributes).

Results and Discussion



Users:
Consumers of plant-based products (n= 600)
Non-users:
No consumption of plant-based products (n=613)

Figure 1: Rated impact of selected plant-based drinks and cow's milk on health, naturalness and climate (-3: very negative, +3: very positive; 0: neutral)

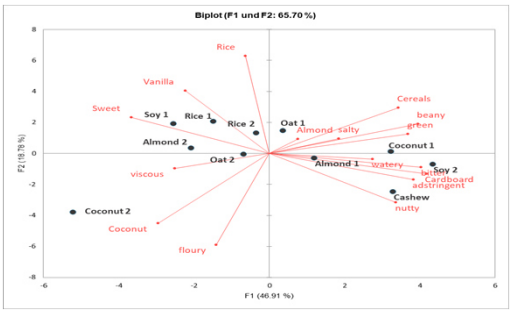


Figure 2: Principal component analysis (PCA) of sensory data evaluated by descriptive analysis of 11 selected plant-based drinks (n=12 judges * 2 reps)

10 main reasons for consumption of plant-based products		10 main reasons against consumption of plant-based products	
like the taste of plant based products	26%	no interest	38%
plant based products are healthy	21%	do no like the taste	25%
lactose intolerance	13%	like dairy products	18%
variety in the diet	12%	do not know any alternative to milk	8%
more digestible than milk	10%	no lactose intolerance	7%
less animal based products in the diet	10%	too expensive	4%
alternative to cow's milk	9%	low consumption of dairy products in general	3%
more climate friendly	9%	plant-based products are not natural	2%
are more animal friendly	7%	plant-based products are bad for the environment	2%
curiosity	6%	plant-based products are not regional	2%

Table 1: Ten main reasons for and against consumption of plant-based alternatives to dairy products (open-ended question)

	fat (g/100 ml)	protein (g/100 ml)	carbohydrates (g/100 ml)	sugar (g/100 ml)	fibers (g/100 ml)	salt (g/100 ml)
Almond 1	4.5	1.5	3.0	2.5	0.5	0.06
Almond 2	1.1	0.0	0.5	0.2	0	0.19
Cashew	2.8	1.0	0.9	<0.5	0.5	0.09
Coconut 1	<0.5	1.7	1.3	1.3	<0.5	0.06
Coconut 2	2.5	<0.5	3.5	3.5	<0.5	0.10
Oat 1	1.5	0.5	7.0	4.0	1.0	0.09
Oat 2	1.5	0.3	6.6	3.2	1.4	0.09
Rice 1	1.5	<0.5	11.0	4.2	<0.5	0.07
Rice 2	1.0	0.5	9.0	7.0	0.5	0.01
Soy 1	1.8	3.0	2.5	2.5	0.5	0.09
Soy 2	2.5	4.0	1.5	0.5	0.5	0.02

Table 2: Chemical composition of 11 plant-based drinks on the Swiss market
B. Walther et. al., 'Frontiers in nutrition' (submitted)

Online survey

One of the main reasons given for consuming or not consuming plant-based replacements for dairy products was the taste of the products. The second most important reason for consumption was the estimated positive impact on health.
Differences between users and non-users of plant-based alternatives to dairy products in terms of their assessment of the impact of these products on climate: users → positive impact, non-users → fairly negative impact; evidence of a positive effect on health cited by both groups.
Both consumers and non-consumers of cow's milk perceived it to be more natural than plant-based products, regardless of the plant on which the alternative product was based

Sensory profile/composition

Some drinks made from the same plant raw material (e.g. coconuts, soy) were perceived as quite different
Most products without added sugar were perceived as 'watery', 'beany', 'green' or 'cardboardy'
The addition of sugar increased perception of the plant raw-material attributes (e.g. almond, coconut, soy)

Conclusions

As expected, users and non-users of plant-based alternatives to dairy products varied in terms of their perception of the naturalness of these products and of their impact on health and climate.
The sensory profile of plant-based alternatives to dairy products is a key factor for users (positive factor) and non users (negative factor). An improvement in the flavour and texture attributes of plant-based alternatives would most likely lead to their increased consumption by today's non-consumers.
More studies are needed in order to acquire solid scientific data on the nutritional, health and climate-impact ramifications of the increased consumption of plant-based processed foods.

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