

Understanding consumers' perceptions, behavior and attitudes towards homemade non- and low-alcoholic fermented beverages in on-line comments: A content analysis

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Abstract

Introduction: This study examined the information on websites, blogs and forums in on-line comments about homemade non- and low-alcoholic fermented beverages (NAFB and LAFB), and evaluated the main concerns and motivations of people interested in these beverages.

Material and methods: This descriptive study assessed the information from 2,349 on-line comments of 20 websites, blogs and forums related to homemade NAFB and LAFB using a content analysis design.

Results: From the analysis of the on-line comments, 11 themes of concern of the visitors emerged. The systematic evaluation of the on-line comments as theme categories presented four prominent threads, which are (i) health and preventive nutrition, (ii) ethical and cultural concerns, (iii) homemade food, (iv) web as a promotion tool.

Conclusions: Web provides a digital space for exchanging information and educating people in home fermentation of NAFB and LAFB. Home fermenters interested in the preparation and consumption of NAFB and LAFB is a particular group of people with similar themes of concern and motivations.

Keywords: homemade, fermented, beverages low-alcoholic, non-alcoholic, internet, websites

1. Introduction

Although convenience food and beverages, constitute a large part of the food market globally, a growing interest in the preparation and consumption of homemade foods and beverages is currently being observed among people in urban centers ^[1, 2]. Homemade foods and beverages have a special role in the construction of family identities, mainly through their importance in contemporary consumption and their antagonism to the market's attempts to commodify the homemade food category ^[3]. In contrast to industrially processed foods, such as chilled and frozen ready-made meals and sugar-sweetened beverages, homemade foods are more often prepared from wholesome ingredients; they require a limited use of additives and are usually prepared and consumed within a short period of time. Also, they give consumers the opportunity to experiment with new cooking methods and a variety of ingredients ^[4]. Consumption of commercial complementary food during infancy and childhood in particular, such as readymade milled vegetables/fruits, pasteurized flavoured milk, milk pudding, fruit juice etc., has been associated with increased sugar intake, while offering the homemade version was shown to reduce sugar intake ^[5].

Food fermentation has a long tradition in practically every society around the world and fermented foods and beverages constitute an important part of cultural evolution and human nutrition with important contributions to food sustainability, security and transformation and preservation ^[6-8]. The diversity of fermented beverages produced, such as wine, beer and fermented milks, is the result of different raw materials, starter cultures and fermentation conditions and the variety of the beverages traditionally and industrially produced is remarkable.

^[9-11] in western societies, beverages made with alcohol-producing yeasts, such as beers and wines, are the dominant ones. But fermentation need not result in an alcoholic beverage. Non-alcoholic fermented beverages (NAFB) and low-alcoholic fermented beverages (LAFB) refer to beverages produced via fermentation process and contain no alcohol (<0.5% alcoholic strength by volume, which is the number of liters of ethanol contained in 100 liters of beverage both volumes being measured at a temperature of 20 °C) or small amounts of alcohol (<1.2% alcoholic strength by volume), respectively. These beverages constitute important part of culinary traditions and are important in achieving safety in traditional settings ^[8, 12]. In addition, a number of health benefits have been attributed to NAFB and LAFB, albeit the fact that most of those have not been proven yet in an unequivocal manner ^[13]. Many of these beverages contain a special category of starter or adjunct cultures, the so-called probiotic cultures, which are generally considered to be health promoting ingredients, since they have been shown to help in the treatment of gastrointestinal tract diseases, such as the prevention of antibiotic- and infectious-associated diarrhea, the alleviation of the symptoms of irritable bowel syndrome and lactose intolerance, the maintenance of the remission of ulcerative colitis and prevention of the relapse of Crohn's disease ^[14-16].

NAFB and LAFB differ in many ways from massively produced non- and low- alcoholic beverages currently consumed in modern societies, such as the sugar sweetened beverages. Due to the fermentation process, NAFB and LAFB have unique sensorial properties and enhanced nutritional value ^[13, 17-19]. Depending on the raw materials used, they are good sources of proteins, lipids or carbohydrates, as well as, of various vitamins,

minerals and/or antioxidants. Milk-based fermented beverages in particular, apart from being a good source of milk -deprived of its lactose content, they also contain bioactive compounds, mainly immunoglobulins, bioactive peptides, hormones, cytokines, growth factors and probiotics [13]. With respect to homemade NAFB and LAFB, these are deemed to be even better, as they can be prepared using less sugar or salt compared to their commercial versions.

The Web has emerged as a social and cultural phenomenon with a very substantial impact on communication [20]. It enables people to seek information, publish their thoughts and participate in a global dialogue. Healthy eating and healthy food choices are a theme on which many online media have recently focused [21]. In terms of the impact of diet on health, it has been estimated that an increasing number of people search the Web in order to obtain information regarding the prevention, treatment or alleviation of symptoms of certain medical conditions. Furthermore, online social networking websites provide an alternative source of knowledge and support via the formation of communities of people with the same concerns [20, 22-26]

The purpose of the content analysis study was to document for the first time the exchanged information and ideas available on the Web among a special group of people interested in a kind of food which is not industrially produced, the homemade NAFB and LAFB. Thus, an in-depth examination of information on websites, blogs and forums presented in on-line comments by visitors about this topic, was conducted. We applied an extensive first- and second-generation sampling methodology and a detailed coding manual. The available information was processed and evaluated and theme categories of the visitors' on-line comments as well as, threads of their concerns were comprehensively summarized.

systematic content analysis, we first established a population of websites, blogs and forums in the English language dealing with homemade NAFB and LAFB information, topics, discussion, and features, using Yahoo and Google search engines (Figure 1). Five terms were included in our search, as follows: "homemade", "non-alcoholic", "fermented", "beverages", "fermentation". The first 5 pages of search results for each term from each search machine were used to generate a list of relevant websites, blogs and forums ("first" generation). Subsequently, viable links offered on these sites were included in the sample ("second generation"). This resulted in a total of 86 pertinent unique URL addresses. All websites, blogs and forums characterized by a primary focus on or promotion of homemade NAFB and LAFB were included in this level of our search. Medical journals, video links, directories, repeated sites, sites with restricted access and sites containing web layouts only, were excluded. A total of 52 active websites, blogs and forums met the first level of criteria for our analysis. Next, from this list we selected the top twenty (20) websites, blogs and forums with the highest PageRank of Google PageRank (Google PR), which is one of the methods used to determine a page's relevance or importance (second level of inclusion criteria) for a given topic. The duration of the study was between 1st April 2014 and 31st March 2015. Selected websites and blogs were visited by the authors of this paper on a regular basis (every three months) during a 12-month period and their content with regard to types of homemade NAFB and LAFB, preparation methods, cultural aspects, ways of promotion, and messages regarding their health effects, were recorded and evaluated. Almost all the websites, blogs and forums examined were available in the public domain and only 20% (n=4) required approval from a maintainer for the exclusive entry to certain pages. In these cases, we collected data from the publicly available portions only.

2. Material and methods

2.1 Study material and data collection

In order to obtain a valid and representative sample for a

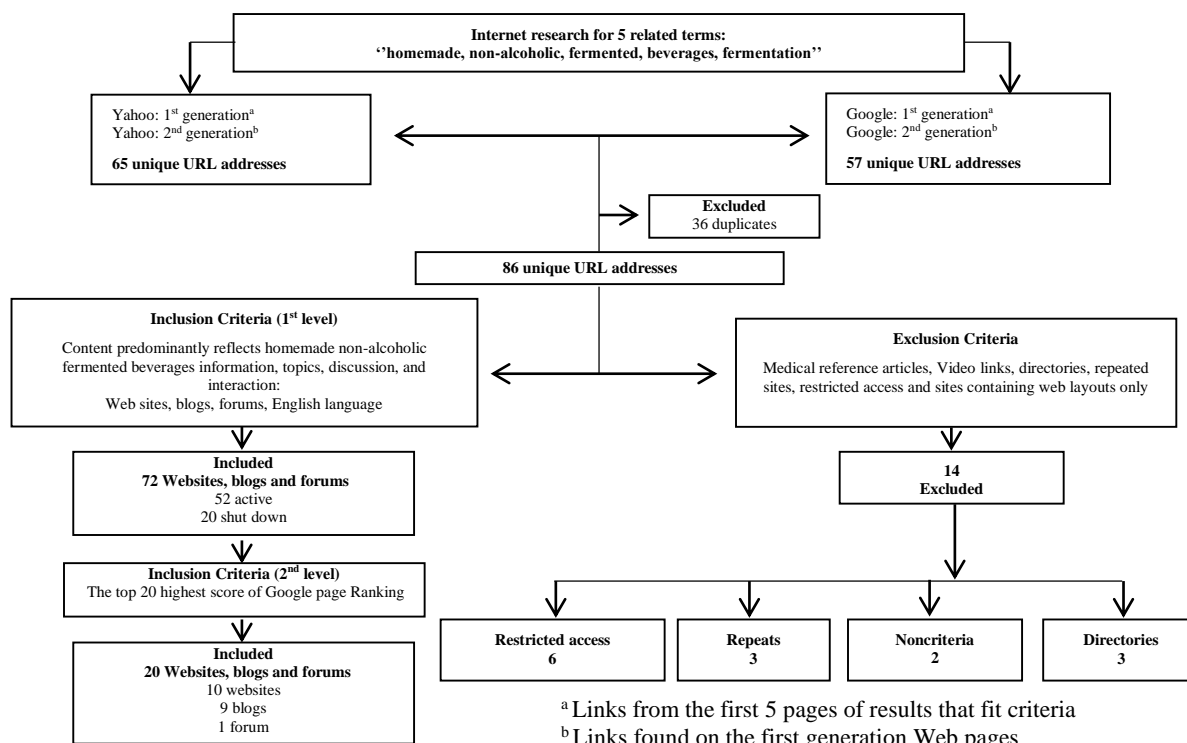


Fig 1: Establishment of the study sample of homemade NAFB and LAFB websites: 2014.

Our research focused on identifying ‘wall comments’ and ‘discussion topic comments’ related to NAFB and LAFB and collecting visitors’ comments regarding these beverages. ‘Wall comments’ include comments made by visitors of a webpage and serve as a way of expressing their opinions and concerns about a given topic or to communicate with other visitors. ‘Discussion topic comments’ refer to comments made by a Web based discussion group which sets a certain topic for discussion, in order to share thoughts, ideas and opinions. For simplicity reasons we would refer to wall comments and discussion topic comments as ‘on-line comments’. During 12 months we identified 157 webpages in these twenty sites, blogs and forums providing information regarding various traditional homemade NAFB and LAFB originating from different parts of the world. In these 157 webpages, 2,319 wall comments and 30 discussion topic comments were included. Sixty six (66) webpages did not contain any comment (9 webpages, 13.6%) or did not give the opportunity to the visitor to post a comment/response (49 webpages, 74.3%) or the visitor could have access to the comments only after subscription/registration (9, 12.1%). To monitor and track visitors’ concerns about these beverages, we gathered information from the comments which were written by the webpages’ visitors.

2.2 Data processing

Two evaluators assessed the on-line comments. They read all the selected on-line comments carefully, developed descriptive codes and applied them to the data. After the assessment of approximately 25% of the data, new descriptive codes did not occur. A high degree of agreement was achieved between the two evaluators upon assigning the codes to the data. All discrepancies between the evaluators were discussed thoroughly until a consensus was reached. Unique visitors were identified by only one researcher, in order to avoid the coding of multiple occurrences of a statement by the same visitor more than once. After the closure of the research the data were cleaned using Microsoft Excel. For the conduction of the analysis codes were entered into a database of SPSS 13.0 software for Windows (SPSS Inc, Chicago, IL, US). Analysis was both quantitative and qualitative and all the variables were categorical. Results on the profile of the related sites, blogs and forums as well as, on on-line comments are reported as frequencies and relative frequencies. Regarding on-line comments, frequencies and relative frequencies refer to comment content and how often a user posts a comment.

3. Results

The study material was abstracted from twenty sites, blogs and forums related to various homemade NAFB and LAFB and

included 2,349 individual comments on comment walls and discussion boards written by 1,607 unique visitors (range 1-102 in each post). We analyzed all the on-line comments written in our database and we found that the duration of communication in those comment walls and discussion boards ranged from less than 1 day to over three years (1,188 days). During the 12 months period of the study, the majority of the visitors (1,350, 84%) only wrote one comment/response, while a smaller number of the visitors (257, 16%) posted more than once. The maximum number of posting from the same visitor was 41 times. Among the visitors, 611 (38%) reported producing homemade NAFB and LAFB, 691 (43%) were interested in making these beverages, 209 (13%) were promoting products while 96 (6%) had irrelevant concerns.

3.1 Themes of the on-line comments

All the comments on comment walls and discussion boards were assigned to at least one theme category. Based on the issues, visitors commented about, 11 theme-categories were identified (Table 1) ^[1]. Health, in which a comment/response shared the user’s own experience and advice regarding health benefits, digestive issues and side effects ^[2]. organoleptic characteristics of the beverages, in which the visitor stated his/her opinion or experience or asked for information regarding the taste, flavor, color and texture of the ingredients of the beverages ^[3]. Methodology, in which the visitor asked for advice or gave information regarding the preparation and preservation process of a beverage ^[4] nutritional features, such as the nutrient, alcoholic and caffeine content of the beverages ^[5]. modes of preparation and consumption of different beverages and their variants ^[6]. Compatibility with religious and other dietary guidelines (prohibitions) ^[7]. Eco-gastronomy, in which visitors ask for or give information regarding food waste, the cost and variations of use in different cultures ^[8]. recommendations, in which visitors required/provided or commented on information regarding the safety of these beverages or on their suitability for children, pregnant women, athletes and lacto-vegetarians ^[9]. Novel versions, in which different versions of these beverages, their use as substitutions of ingredients in recipes, for example fermented milk instead of raw milk and other possible culinary uses were discussed ^[10]. procurement, in which visitors require or provide information on ways to purchase cultures, starters or ready to drink NAFB and LAFB, such as specific stores, sites/blogs and on line groups ^[11]. Marketing information, in which visitors could find information regarding specific brand names or characteristics of these products. Figure 2 represents the relative frequencies of these theme categories as a percent of all on-line comments.

Table 1: Theme categories of the on-line comments on comment walls and discussion boards.

1	Health
	<i>Benefits</i>
	<i>Digestive issues</i>
	<i>Side effects</i>
2	Organoleptic Characteristics
	<i>Taste</i>
	<i>Flavor</i>
	<i>Color</i>
	<i>Texture</i>
3	Methodology
	<i>Preparation</i>

	<i>Preservation</i>
4	Nutritional Features
	<i>Nutritional content</i>
	<i>Alcoholic content</i>
	<i>Caffeine content</i>
5	Modes Of Preparation And Consumption
	<i>In different countries</i>
	<i>Variants of specific beverages</i>
6	Prohibitions
	<i>Alcohol content</i>
	<i>Tea content</i>
7	Eco-Gastronomy
	<i>Food waste</i>
	<i>Cost</i>
	<i>Variations of use in different cultures</i>
8	Recommendations
	<i>Safety</i>
	<i>Suitability for special groups</i>
9	Nover Versions
	<i>Different versions</i>
	<i>Substitutions of ingredients in recipes</i>
	<i>Culinary uses</i>
10	Procurement
	<i>Stores</i>
	<i>Sites/blogs</i>
	<i>Online groups</i>
11	Marketing Information
	<i>Brand names</i>
	<i>Special characteristics</i>

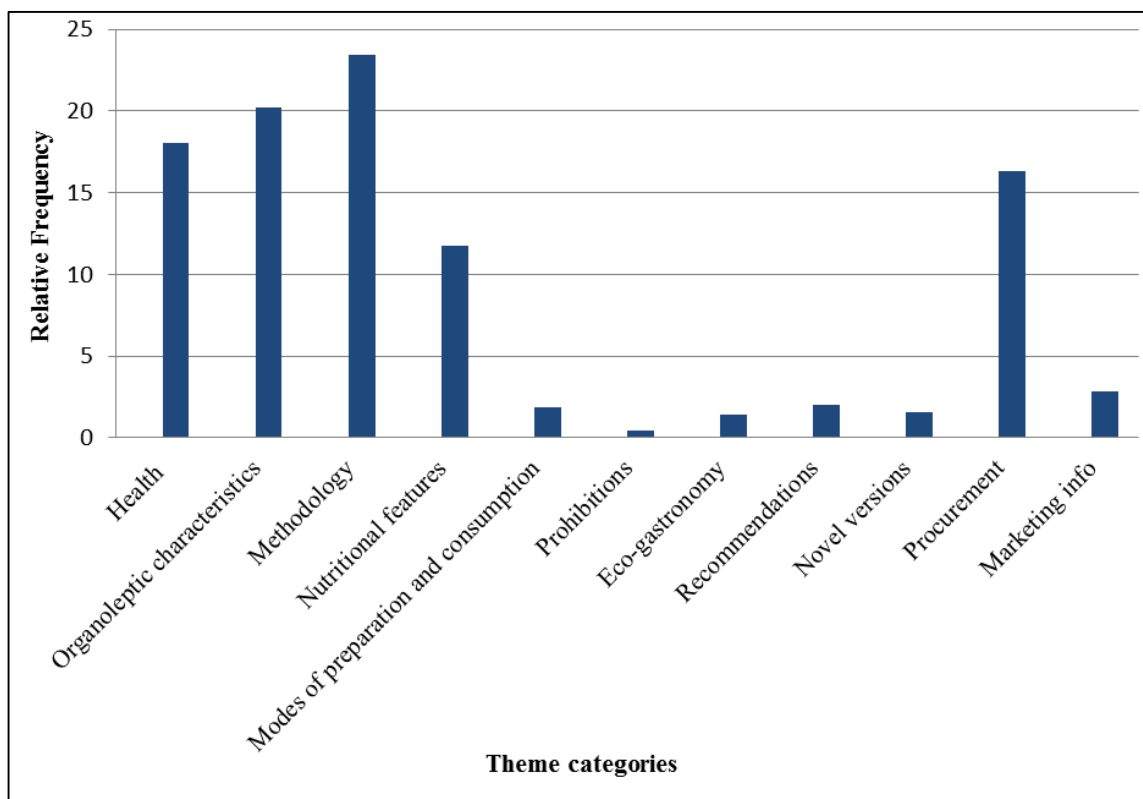


Fig 2: Relative frequencies of theme categories in the on-line comments coded. (n=2,349)

3.2 Concerns of the visitors in regard to NAFB and LAFB

A further examination of the themes we identified revealed four prominent threads (Figure 3): (i) health and preventive nutrition,

(ii) homemade food, (iii) ethical and cultural concerns, (iv) web as a promotion tool; these are presented in detail below.

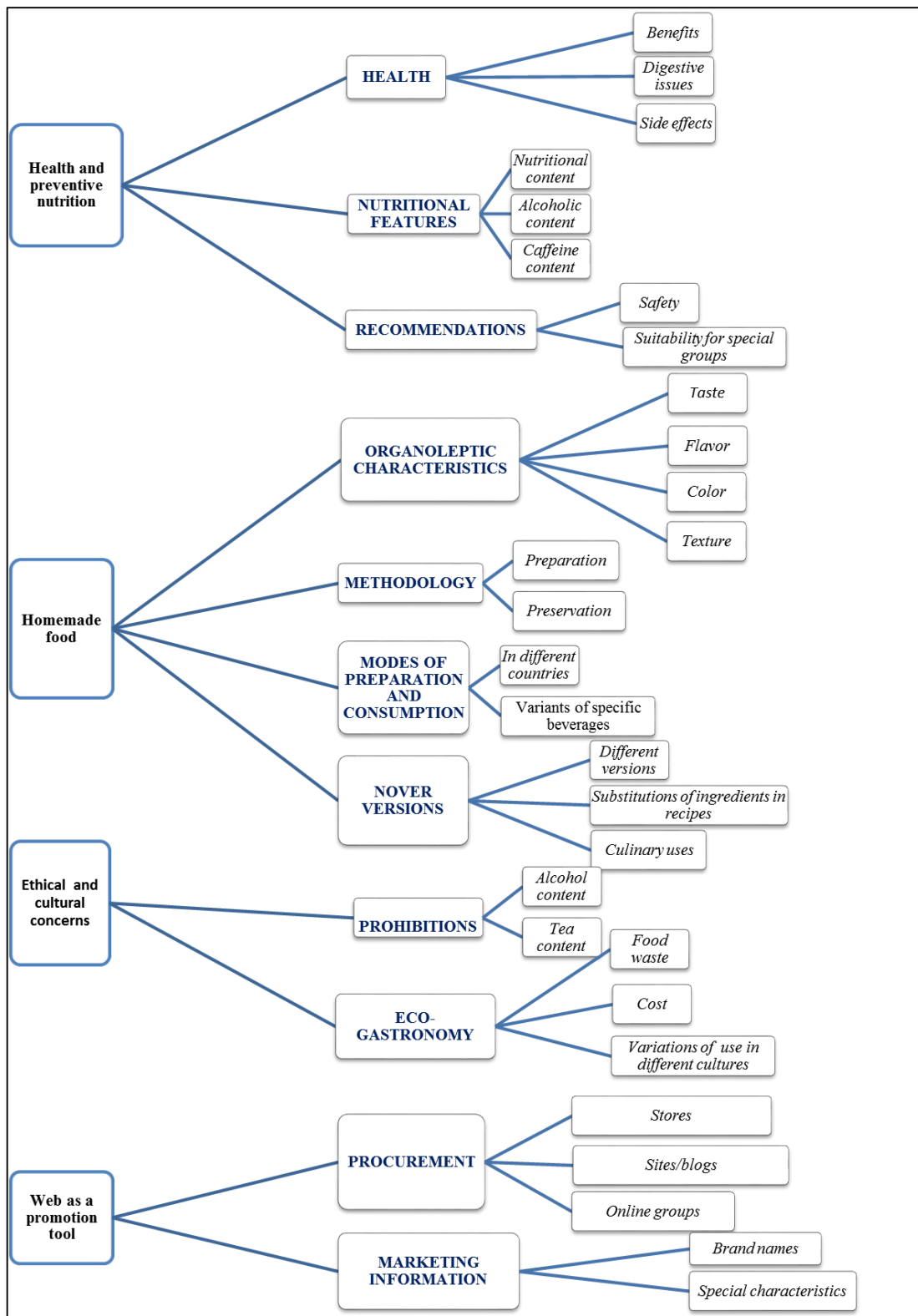


Fig 3: Schematic presentation of the threads, the theme categories and subcategories of the visitors' on-line comments.

3.2.1 Health and preventive nutrition

Almost one third (30%) of the on-line comments shared information, personal experience and advice on the role of NAFB and LAFB in treating or curing specific health problems and disorders. For instance, visitors provided or requested information about possible health benefits of NAFB and LAFB in liver function and liver cleansing properties, the stomach and the gut, diabetes and blood sugar regulation etc. Other on-line

comments highlighted the importance of NAFB and LAFB in digestion and in particular, their efficacy in promoting healthy digestion by repopulating the digestive tract with good bacteria, such as probiotics and preventing candida overgrowth. As an example, a new member requested information from the owner of a blog about the properties of milk kefir:

‘‘I wondered how long it takes after drinking Kefir for the body to start to ‘heal’? Or in the case of intestinal problems, how

much should you consume daily and for how long before you will feel a difference?.....

And the owner of the blog answered:

“Everyone is a little different. So I always suggest you try anything that might help you feel better and if it doesn’t work for you in about 3-4 weeks then just mark it off of the list. I’ve heard of kefir helping candida and not helping it.....

A number of visitors reported adverse effects after NAFB and LAFB consumption, trying to find out if their own experiences are matching with that of others. The following comment regarding the consumption of kombucha, a NAFB traditionally prepared from black tea and white sugar, triggered the post of many responses claiming adverse events:

“Also has anyone heard of a reaction of kombucha after months of drinking it, like a rash only on the neck which is itchy, dry, peels?”

Also, many visitors reaffirmed the statement of previous on-line comments by presenting their own experiences and history of preparing and consuming a NAFB and LAFB and the following adverse effect:

“I made my own kombucha, but drinking it gave me the kind of headache I get from cheap red wine. Has anyone else had this problem?”

Our examination showed that the synthesis of the NAFB and LAFB, and especially their alcoholic and caffeine content, is of concern for some visitors, for instance in the case of ginger beer: *“Well this (ginger beer) looks very good! So with the yeast I am assuming it creates alcohol???”*

Caffeine content is also an issue that concerns many visitors, especially mothers who wish to provide a healthy and balanced diet for their children and patients who are advised to limit its consumption. For example:

“I have a problem here with Kombucha. I’m allowed nothing with even a hint of caffeine in it. Any suggestions what I could use as a base?”

Posters usually confronted questions of nutrient profile and caloric content of NAFB and LAFB. A great number of discussion threads were initiated by visitors, who presented themselves as enthusiasts of healthy and preventive nutrition. Most of the on-line comments focused on sugar and carbohydrate content, probiotics, recommended daily intake and alterations in nutrient content after fermentation.

“Very interesting. I hadn’t heard of matsoni or blaand before. Cultured raw dairy is a healthy food if you don’t add any sweetener....If you just have to make it sweeter, adding a little fresh fruit is the healthiest way. Most commercial cultured milk is loaded with sugar or artificial sweeteners and should be avoided.

“A couple of questions: the sucrose is converted to fructose. While this doesn’t impact blood sugar, isn’t fructose worse for you overall?.....

Questions and recommendations regarding safety of consumption and suitability for special groups of people, such as athletes, pregnant women and children, lacto-vegetarian etc. are reported in many discussion threads.

“Fermented milks are so much easier to digest, even babies can eat cultured milk products like yogurt and cottage cheese (from about 7 months)

“Is there a risk for botulism through using honey to ferment tea?”

Many of these discussions also resulted in arguments, as some of the posters are trying to persuade others about the safety of

particular beverages. This is obvious in the following on-line comments below:

“Kombucha is a medicinal tonic, not a replacement for water – small frequent amounts, coupled with an equal amount of water is optimal....”

“Is it okay to drink kombucha while nursing?”

And another visitor replied:

“I’ve read some sources that say no, but most agree that as long as you start with small amounts like 4-6 ounces when you are first drinking it.....”

3.2.2 Homemade food

Visitors’ comments on the methodology of preparation and preservation of homemade NAFB and LAFB and their organoleptic/sensorial characteristics represented almost one fourth of total on-line comments examined (23.4%). Most of them were concerned about the preparation process (80.2% versus 19.8% for the preservation process). On-line comments in this category refer to details of the process of fermentation, time-length of fermentation, the proper temperature while fermenting homemade NAFB and LAFB, different recipes (especially for children) and sharing family recipes with other visitors and eliminations or substitutions of ingredients as a healthier option, such as substituting sugar with agave nectar. For example:

“You want your brew to optimally be at aprox 75 F. If you need to heat, it is best not to heat from the bottom as this over stimulates yeast which can then take over and starve out the beneficial bacteria.....”

“I made homemade root beer the start time and I used champagne yeast. My question is how do you open the bottle without the root beer shooting out the top of the bottle even after you crack the cap to let the gas to escape?”

The preservation section consists of on-line comments that contain or require information mainly for the storage of the final product, the period of time which is best consumed and the cleansing of the storage equipment. Some examples are presented below:

“Can be frozen and then thawed and used?”

“Do kefir grains ever go bad?”

Visitors seek or gave information regarding the taste, flavor, color and texture of the final product. They had concerns about the sweetness or sourness of their homemade NAFB and LAFB, stated personal opinions about other NAFB and LAFB they had tasted, required information about appealing recipes for kids or the possibility that specific ingredients may alter the taste of the final product, assessed the flavor and taste of their own homemade NAFB and LAFB and shared intimate experiences with these beverages. Selected on-line comments are given below and provide examples of the above:

“If you don’t like the flavor of the kefir, you can use yeast. My brewer recommended champagne yeast. It will taste more like what you are used to buying at the store but the roots will be more flavorful”

“This is a fantastic recipe for ginger beer. It takes me back to my childhood in England”

The analysis of the on-line comments also revealed that the possibility of producing novel versions of homemade NAFB and LAFB was an appealing project for the visitors. Thus, they required or gave information in preparing healthier versions of these beverages, such as low-fat, low-sugar, low-salt, lactose-free, caffeine-free and diabetic versions. They were also seeking

information regarding the possibility of these beverages serving as substitutes for other foods or ingredients and also if these beverages may have other gastronomy uses. These observations are illustrated in the following on-line comments:

"I'm substituting agave nectar for the sugar, it is more diabetic friendly"

"Can it be a substitute for raw milk in order to make a baby formula?"

"Beet kvass can be used not only as a beverage but also as a salad dressing"

A great number of on-line comments contained storytelling threads as a result of a group of responses to the query *"Does anyone have experience of preparation or consumption of kefir or kombucha or any other similar beverage?"*. Visitors presented their experiences of preparation and/or consumption of different NAFB and LAFB or of a certain NAFB and LAFB in different countries. For example:

"While living and traveling with the Bedouin of Egypt our camels' milk was re-cycled through bladder's tied to humps, Kefir is an undying treat from pantry shelf to village hut and outward bound into a sea of culinary possibilities! "

".....I live in the bush in central Canada, where we have a number of root-beer ingredients growing wild. I like to drink the kombuchaMy sister in law is from Kazakhstan and grew up with a jug of kvass on her counter."

3.2.3 Ethical and cultural concerns

A number of on-line comments/responses reveal the sustainability and eco-gastronomy concerns of the visitors regarding NAFB and LAFB. Visitors were providing or requesting information about food waste, cost of these beverages and variations of their use in different cultures. From the analysis of the on-line comments, it was obvious that visitors had raised awareness of preventing and reducing food waste, which in turn strengthen sustainability of the food system.

"Plastic is full of carcinogens, you should use glass. It will have a crisper flavor....."

"How many times can kefir grains be re-used?"

"For the preparation of milk kefir, collect the cheese whey, use it and keep the rest in the fridge for next use"

Furthermore, the low cost of the preparation of NAFB and LAFB is very appealing to the visitors and they usually ask for more details about the costs of their homemade preparation. For example,

"How much does the homemade preparation of beet kvass cost?"

"Milk kefir is my favorite fermented food! It is so easy to make. Because the milk kefir grains are reusable, they are an easy inexpensive way to make kefir forever!?"

In terms of the different ways of use, some visitors describe different ways of consuming or preserving these beverages. The following query is an excellent paradigm.

"I remember my mother fermenting juices and then make popsicles with them. In this way, we could have fermented juices all the seasons"

Visitors also seek information regarding the safety of NAFB, such as water kefir due to alcohol prohibition for religious reasons. As LAFB contain small amounts of alcohol (a result of the fermentation process), a limited number of visitors post comments or responses requesting specific information on

alcoholic content and safety of consumption for these beverages. The post cited below is an example.

"I don't drink alcohol for religious reasons. Is kefir safe for me?"

Some visitors state their wish to abstain from tea, as a result of their religious beliefs. Thus, they ask for alternatives, such as NAFB or LAFB and ways of preparation and preservation, for example:

"I don't drink tea for religious reasons, so I cannot drink kombucha. Is there a way to make water kefir continuously?"

"If you cannot use caffeinated tea because of religious reasons, I recommend you find a different tonic, as kombucha needs to be made with the tea plant."

3.2.4 Web as promotion tool

Product promotion was predominant in 19.1% of on-line comments, while the majority of them contained information about the procurement of NAFB and LAFB from stores, for example from organic groceries or supermarkets and also the supply of starter cultures or ready to drink NAFB and LAFB. Also, some visitors were willing to share or sell starter cultures for the preparation of homemade NAFB and LAFB. For example:

"Info about people willing to share culture "babies" for free"

"Can I get the coconut water kefir at a healthy store locally?"

A smaller group of visitors was requesting information or was suggesting sites/blogs that sell starter cultures or ready to drink NAFB and LAFB.

"I've been searching for a kombucha that I can stand. So glad I've found <http://fabulousferments.com/> in Cincinnati, Ohio....."

"I've been making my own Kombucha for about a year now from a scoby given to me by a woman who was blogging about it."

An even smaller number of on-line comments referred to recommendations/suggestions of online groups or social networking groups that give information about homemade fermentation or share/buy starter cultures. These on-line comments reflect consumer trust in social media-based information in order to promote their products or to buy these products. Representative examples are shown below.

"Very much want to be in a group for brewers to learn more. I am already in the LinkedIn Kombucha group"

"Is there a Facebook group for fermenters?"

"Hi Kim ~ Scobies can be obtained online pretty easily.....Or ask around your local community through your health food store..... there is also an online group that you can get a scoby for free"

Requests and recommendations for certain brand names of these beverages or their starter cultures and first-person testimonials about their special characteristics were presented in a number of on-line comments. Also different names of brands of these beverages in different countries or regions were also referred.

"You can find Ke Vita in certain supermarkets or healthy stores. It is the best coconut water kefir"

"..... Buy a bottle of Kombucha that has some of the slimy goodies in it. K.T. is a great brand or if you are in Austin, TX Buda's Brew is a wonderful local brand."

4. Discussion

Despite the overwhelming trend of consuming ready to eat foods and meals, homemade food and beverages are deemed to confer

many health benefits. Homemade food is also linked to other beneficial habits, as research has shown. Recently it has been found that families who eat more fast-food meals than home-cooked ones, are less likely to eat fruits and vegetables, and have an increase in consumption of salty snacks and soda ^[4]. Preparation and consumption of homemade food may also help people, especially children and teenagers, to adopt healthy eating habits. In addition, it can serve as a way of supporting local farmer/processors *versus* the global market ^[27]. Moreover, people are generally innovative and creative and the new trend of “homemade” beverages reveals the fact that even people who do not have tradition for NAFB and LAFB in their own culture, they have the urge to acquire know-how and also to evolve the whole procedure of preparing and preserving them. One easy way for seeking information for these beverages is searching the Web, posting comments and participating in global digital discussions in websites, blogs and forums which focus on homemade NAFB and LAFB. To the best of our knowledge, our study is unique in analyzing in depth the content of the information which visitors shares regarding homemade NAFB and LAFB, while it also reveals their profile characteristics. Content analyses, such as the one described here, provide systematic data on what is available and likely to be seen by visitors in the comment walls and discussion boards of homemade NAFB and LAFB related websites, blogs and forums. Our study showed that many traditional beverages, such as homemade NAFB and LAFB, originating from different parts of the world have found their way in the everyday life of the visitors.

The analysis of the on-line comments of the visitors of the websites, blogs and forums reveals that the major themes categories were firstly the methodology of preparation and preservation of the beverages, and then their organoleptic characteristics, as well as health and nutritional information. In practically every message wall and discussion board there were questions addressing the preparation and preservation methods and the organoleptic characteristics of the final product. Many of the viewers were beginners in homemade fermented foods/beverages and they wished to be informed about their mistakes or to know all the details regarding every stage of the process. Personal experiences or opinions for the consumption, mainly from viewers living in different countries or regions, were of special value because they provided a different insight into the research by posting different names, recipes or different ingredients for the same beverage.

Visitors also raised many questions about the impact of these beverages on the function of certain organs of the human body, such as the liver, stomach and intestines, on food allergies and on particular age groups (e.g. children, pregnant and lactating women, weight losers, athletes, lactose intolerant people, and so on). The most common questions regarding particular age groups concerned digestive issues, safety and hygiene matters, portions for consumption, and the alcohol, caffeine and nutrient content of the final product. Some visitors also seek information regarding the content of alcohol of NAFB due to alcohol prohibition for religious reasons. They had also the tendency to become innovative and to differentiate the ingredients of the initial recipe in order to produce a final product of their own choice. They were interested in producing homemade versions of NAFB and LAFB, using less sugar or/and salt or low calorie ingredients. They thought that these beverages may be used as alternative choices for children and adolescents as well as for

adults.

A large proportion of the on-line comments addressed financial issues, concerned eco-gastronomy as well as food wasting, the costs of the final product (homemade versus commercial) and practical ways of consuming or preserving these beverages. In addition, a big number of visitors offered information about certain stores e.g. web stores, sites/blogs or online groups, which sell these beverages or their starter cultures or even offer them for free, gave recommendations for special brands and commented on some of their special properties, mainly their organoleptic characteristics.

Our findings allow us to identify some of the major concerns underlying visitors’ choice for producing homemade beverages. A part of the on-line comments focused on nutrition for health promotion and disease prevention. Visitors were concerned about the adoption of a healthy lifestyle, eating fruits and vegetables, reducing fat, sugar, salt and alcohol, preparing food in a safe and hygienic way and maintaining a body weight between the recommended limits. The choice of a healthy lifestyle which is based on preventive nutrition has been a growing trend among people in western societies ^[28]. Moreover, the choice to follow a particular dietary pattern gives the person the opportunity to belong to a group of people in the community with similar interests and values and unique ways of communication ^[29]. Another major concern was sustainable nutrition, referring to the physical and economic access to sufficient, safe and nutritious food and water in order to achieve a healthy lifestyle. Visitors’ comments on sustainable eating and nutrition concerned food production, consumption and security, income, public health and economics.

A very significant concern of the visitors was the purity of the food and the beverages consumed, in terms of their content in preservatives, colorings, additives, chemical fertilizers and inferior ingredients and the impact of the food and beverage impurity on their health. On the other hand, home fermentation is a way of preserving the food and beverage purity and the fact that the majority of NAFB and LAFB are traditional ones contributes to this direction. For this reason, it has been observed that this certain social group has a great interest in these beverages, which are very often presented by them as “organic” beverages.

The present study has certain limitations though, which should be taken into account when interpreting the data. First, it should be kept in mind that websites, blogs and forums are dynamic and sometimes short lived. A revisit to the sampled on-line comments might reveal new data. The period of time for the collection of the data (12-month period) may be limited, and thus we could have gathered more longstanding or repetitive features of information exchange in the case of a longer study. Although we visited these sites, blogs and forums on a regular basis (every three months) during a 12-month period, some data might have been missed, thus more regular monitoring might be needed.

Furthermore the selected 20 sites, blogs and forums related to various traditional homemade NAFB and LAFB might not be the only way of communication of people interested in these beverages. Maybe online social networking, such as Facebook, Twitter and Pinterest could reveal more information regarding their concerns and motivations. A final limitation concerns the subjectivity involved in an analysis such as ours. We did not have multiple researchers consider the data objectively and the selection of the variables, their features, and the content analysis of the on-line comments may thus be biased.

Regardless the limitations, however, our study provides a methodology for a systematic examination of an enormous database with elusive material, i.e. the behavior of sharing and seeking information through the Web by a big number of people interested in homemade NAFB and LAFB. We uncovered the perspective of a community exchanging information and experiences and also educating each other for achieving the optimal result in preparing, preserving or buying these beverages. Beverage industry could benefit from the results and observations of this study and consider them in order to produce their standardized types in accordance to consumers' behavior and attitudes. Furthermore, the involvement of health professionals, such as nutritionists, agriculturists, food technologists etc. in the reply of the on-line comments of the visitors will result in the provision of more scientific and precise information.

Because technology is constantly advancing, these websites, blogs and forums will evolve and change. It is also clear from our analysis that the population under study consists of dynamic communities with ever-changing, user-contributed content. Although we have provided a methodology to evaluate information available on the Web about these beverages, different methodologies must be employed to analyze in depth their content and to determine whether and how exposure to such material and media affects visitors. To better understand how messages with the potential for good or harm are communicated through such media venues, researchers must continue to investigate both the messages to which an individual is exposed and their impact. Furthermore, more research is needed in order to clarify the association between healthy/organic dietary patterns and the psychosocial and psychological well-being of people.

5. Conclusions

Home food and beverage fermentation seems to be a resurgence of interest for a group of people in western world. NAFB and LAFB have a long tradition in many cultures all over the world and have gained peoples' interest and attention, especially for their health benefits and for their positive impact on food sustainability, eco-gastronomy and purity of the food. Web enables the communication and education of people who are interested in preparing and consuming NAFB and LAFB in real time and also in a cheap and convenient way. This Web community has unique characteristics and behavior which have to be better investigated and evaluated in order to explore and understand their concerns.

6. Authors' contributions

AB was responsible for the implementation of the study presented in this paper; collection, analysis, interpretation of the data and drafting of the article. ET, AK and ALM involved in the study concept and design and participated in the coordination of the project, the writing and the reviewing of the manuscript. Each author made significant contributions to the study. All authors read and approved the final manuscript.

7. References

1. Rivera XCS, Orias NE, Azapagic A. Life cycle environmental impacts of convenience food: Comparison of ready and home-made meals. *Journal of Cleaner Production*. 2014; 73:294-309.
2. Key Note. Ready Meals: Market Report Plus 2013.

www.keynote.co.uk/market-intelligence/view/product/10850/ready-meals?medium=download. Assessed February 15, 2017.

3. Moisiso R. Between Mothers and Markets: Constructing Family Identity through Homemade Food. *Journal of Consumer Culture*. 2004; 361(4):4, doi: 10.1177/1469540504046523.
4. Boutelle KN, Fulkerson JA, Neumark-Sztainer D. Fast food for family meals: relationships with parent and adolescent food intake, home food availability and weight status. *Public Health Nutrition*. 2007; 10(1):16-23, doi: <https://doi.org/10.1017/S136898000721794X>.
5. Foterek K, Buyken AE, Bolzenius K. Commercial complementary food consumption is prospectively associated with added sugar intake in childhood. *British Journal of Nutrition*. 2016; 15:1-8.
6. Marshall E, Mejia D. Fermentation and sustainable livelihoods. In: FAO, eds. *Traditional fermented food and beverages for improved livelihoods*, Rome; 2011, 15-27.
7. Farnworth ER. The history of fermented foods. In: G. Mazza, eds. *Handbook of fermented functional foods*. Boca Raton: CRC press. 2008, 1-24.
8. Tamang JP, Samuel D. Dietary cultures and antiquity of fermented foods and beverages. In: JP Tamang and K Kailasapathy, eds. *Fermented foods and beverages of the world*. New York: CRC Press Taylor and Francis Group, 2010, 41-72.
9. Steinkraus KH. Fermentations in world food processing. *Comprehensive Reviews in Food Science and Food Safety*, 2002; 1:23-32.
10. Josephsen J, Jespersen L. Starter Cultures and Fermented Products. In: Hui Y.H, Meunier-Goddik L, Hansen ÅS, Josephsen J, Nip WK, Stanfield PS, *et al.*, eds. *Handbook of food and beverage fermentation technology*. New York, NY: Marcel Dekker, Inc. 2004, 23-49.
11. Tamang J. Diversity of fermented foods. In: JP Tamang and K Kailasapathy, eds. *Fermented foods and beverages of the world*. New York: CRC Press Taylor and Francis Group, 2010, 41-72.
12. Fonden R, Leporanta K, Svensson U. Nordic/Scandinavian Fermented Milk Products. In: A.Y. Tamime, eds. *Fermented Milks*. Oxford: Blackwell Science Ltd; 2006, 156-120.
13. Baschali A, Tsakalidou E, Kyriacou A, Karavasiloglou N, Matalas AL. Traditional low-alcoholic and non-alcoholic fermented beverages consumed in European countries: a neglected food group. *Nutrition Research Reviews*. 2017, 1-24, doi:10.1017/S0954422416000202.
14. Khani SM, Hosseini H, Taheri M. Probiotics as an alternative strategy for prevention and treatment of human diseases: a review. *Inflammation and Allergy Drug Target*. 2012; 11:79-89.
15. Elmadfa I, Klein P, Meyer AL. Immune-stimulating effects of lactic acid bacteria in vivo and in vitro. *The Proceedings of the Nutrition*. 2010; 69:416-420.
16. Takano T. Anti-hypertensive activity of fermented dairy products containing biogenic peptides. *Antonie van Leeuwenhoek*. 2002; 82:333-340.
17. Mrdjenovic G, Levitsky DA. Nutritional and energetic consequences of sweetened drink consumption in 6- to 13-year-old children. *Journal of Pediatrics*. 2003; 142(6):604-10. [PubMed: 12838186].

18. Harnack L, Stang J, Story M. Soft drink consumption among U.S. children and adolescents: nutritional consequences. *Journal of American Dietetic Association*. 1999; 99(4):436-41. [PubMed: 10207395].
19. O'Connor TM, Yang SJ, Nicklas TA. Beverage intake among preschool children and its effect on weight status. *Pediatrics*. 2006; 118(4):e1010-8. [PubMed: 17015497].
20. Beck F. Use of the Internet as a Health Information Resource among French Young Adults: Results from a Nationally Representative Survey. *Journal of Medical Internet Research*. 2014; 16(5):28.
21. Valente TW. Chapter 1. In: *Social Networks and Health. Models, Methods, and Applications*. Oxford University Press: Oxford, 2010.
22. Fox S JS. The social life of health information: Americans' pursuit of health takes place within a widening network of both online and offline sources. <http://www.pewinternet.org/Reports/2009/8-The-Social-Life-of-Health-Information.aspx/>. Accessed June 15, 2016.
23. Farmer AD, Bruckner Holt CE, Cook MJ, Hearing SD. Social networking sites: a novel portal for communication. *Postgraduate Medical Journal*. 2009; 85(1007):455-459. doi: 10.1136/pgmj.2008.074674.
24. Hawn C. Take two aspirin and tweet me in the morning: how Twitter, Facebook, and other social media are reshaping health care. *Health Affairs (Millwood)*. 2009; 28(2):361-368. doi: 10.1377/hlthaff.28.2.361.
25. Greene JA, Choudhry NK, Kilabuk E. Online social networking by patients with diabetes: A qualitative evaluation of communication with Facebook. *Journal of General Internal Medicine*. 2010; 26(3):287-92.
26. Ravert RD, Hancock MD, Ingersoll GM. Online forum messages posted by adolescents with type 1 diabetes. *Diabetes Education*. 2004; 30(5):827-834. doi: 10.1177/014572170403000518.
27. Halweil B. Rebuilding the local foodshed. In: T. Prugh, eds, *Home Grown- The Case for Local Food in a Global Market* Danvers, MA: Worldwatch Institute; 2002, 50-57.
28. Von Essen E, Englander M. Organic food as a healthy lifestyle: A phenomenological psychological analysis. *International Journal of Qualitative Studies on Health Well-being*. 2013; 8: 10.3402/qhw.v8i0.20559. doi: 10.3402/qhw.v8i0.20559.
29. Hunt G, Fazio A, MacKenzie K. Food in the family. Bringing young people back in. *Appetite*. 2011; 56(2):394-402.