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Researches into antioxidant rich cocktail banana

Maria Cristiana Garnai, Camelia Vizireanu, Felicia Dima, Daniela Istrati, Gabriela Iordachescu

"Dunărea de Jos" University of Galati, Faculty of Food Science and Engineering, Domnească Street, 47, RO-800008, Galati, Romania

Abstract

This paper presents the results of analyzes performed on different types of alcoholic and non-alcoholic cocktails flavored with infusions made from berries, goji berries and green tea. Raw and auxiliary materials used to make the cocktails (ripe bananas, banana liqueur, sweet milk, yogurt) were characterized in terms of physicochemical and sensory.

Variants yogurt layered cocktails were sweet, beautiful appearance and kept in well-defined layers. Sweet milk variants have characteristic taste and appearance of raw materials, although these layers are less poor. Ice variants were pleasant and appreciated because they are smoother and more refreshing than the other two variants. Fluid variants were highly appreciated due limpidity, pleasant taste and appearance.

Keywords: bananas, cocktail, banana liqueur, green tea, goji berries, berries.

1. Introduction

Combinations of drinks were consumed since the dawn of civilization. Remains discovered on the banks of the Tigris led to the conclusion that the first cocktail we have any evidence was prepared in Mesopotamia, some 5,000 years ago, and contained wine, beer, apple juice and honey. Romans too were heavy drinking starter drink made from wine with addition of various herbs. The word "cocktail" first appeared printed in 1803, in *The Farmer's Cabinet...*"I drank a cocktail glass – excellent for the head...". The origin of the noun comes from the semantics of the two components, "cock" and "tail", which means rooster tail. A prosaic variant to this etymology is that most cocktails are vividly and diversely colored, like the feathers in the tail of a rooster [8,9, 20].

Cocktails can be consumed at any time of year, and consumption of bananas is healthy because it contains potassium, vitamins and minerals. [2,4 10,19].

Components cocktails made in the study (berries, goji berries, green tea) are rich in antioxidants (polyphenols, flavonoids, vitamin C) [18]. Cocktails are drinks that have to look good to attract consumers through composition, and the issue [7]. In this work were carried out, under this aspect, two types of cocktails, some stratified and some fluids.

These drinks, besides satisfaction on taste and appearance, should also bring a plus in terms of energy and nutritional value. Of forest fruits, ripe blackthorn, red variety is rich in polyphenols (105.7 mg gallic acid equivalent/100 g fresh fruit) and has a low energy (35.5 g / 100 g) [15].

Green tea is aleading beverage in the Far East for thousands of years; it is regarded for along time as a health product. Green tea is important source of polyphenol antioxidants, if properly prepared [17]. It can be successfully used green tea for health heart [21,22]. Green tea is known for its antiviral properties which are based on the polyphenols ability to act as antioxidants, inhibit enzymes that damage cellular membranes and prevent binding and penetration of viruses to cells.

Corresponding author: *e-mail:* maria.garnai@ugal.ro

Those properties are extremely important since green tea may encounter various viruses which are found the in oral cavity [5,6]. Green, white and black teas were assayed for inhibition of pancreatic lipase activity in vitro. White tea proved to be more effective than green tea with black tea showing little inhibition even at 200 lg GAE/ml. The EC50 values for inhibition were 22 lg/ml for white tea and 35 lg/ml for green tea; both easily achievable from normal infusions of tea [13].

Lycium barbarum (goji) has been used as a traditional Chinese medicine (TCM) to nourish liver and kidney, and brighten the eye. The fruits are dried or freshly squeezed for their juice and concentrated for beverages. Among various constituents, a group of polysaccharides (LBP) with a Glycan-O-Ser glycopeptide structure has been most researched and considered to be important for the efficacy of *L. barbarum*. Studies indicate effects of *L. barbarum* on aging, neuroprotection, general well-being, fatigue/endurance, metabolism/energy expenditure, glucose control in diabetics, glaucoma, anti-oxidant properties, immunomodulation, anti-tumor activity and cytoprotection. In addition to TCM, L. barbarum can be sold as a dietary supplement or classified as a food based upon the long and safe traditional usage [1-3].

2. Materials and Methods

Materials: All raw materials were bought from Galati supermarkets and Galati Market, as follows:

-   overripe bananas were used to obtain banana liqueur (containing 40% sugar and 21% alcohol). The banana liqueur obtained represented the alcoholic part of alcoholic cocktails, its alcoholic contribution being of 6% (volume) alcohol.
-   fresh bananas - used as a basis for obtaining alcoholic and non-alcoholic cocktails;
-   milk with 3.5% fat;
-   yogurt with 2.6% fat;
-   supplements with antioxidant properties obtained by infusing green tea, goji fruits and berries.

Methods:

-   physico-chemical analysis of ripe bananas, banana liqueur, sweet milk, yogurt;
-   sensory analysis of ripe bananas, banana liqueur, sweet milk, yogurt;
-   sensory analysis of cocktails used method score (rating scale from 0 to 5 points, where 0 - absent to 5 - very good). Samples were tasted by a panel of coaches Panelists Sensory Analysis Laboratory of the Faculty of Food Science and Engineering in Galati, Romania.

3. Results and discussion

Using Raw materials and auxiliary materials (infusion of green tea/berries/goji fruit) and cocktails realized in this study were characterized fizico-chimical.

Bananas were commercially available. The three types of bananas marketed of Galati ("Dole", "Chiquita", "Ecuador") are type of banana dessert and were analyzed for physico-chemical. Further variety was chosen "Dole" because it has the highest content of total sugars (table 1).

Table 1. The chemical composition of banana the variety "Dole"

The chemical composition	Banana the variety "Dole"	
	% F.P.	% D.M.
Water	76,74	-
Dry substance	23,26	-
Proteins	1,78	7,66
Carbohydrates	13,14	56,49
Lipids	0,38	1,64
Ash content	0,90	3,88

F.P. – fresh product; D.M. – dry matter.

Bananas used in the study were ripe, being 7-8 ripening stage [14-16].

1	2	3	4
enterely green	only green	more green than yellow	more yellow than green
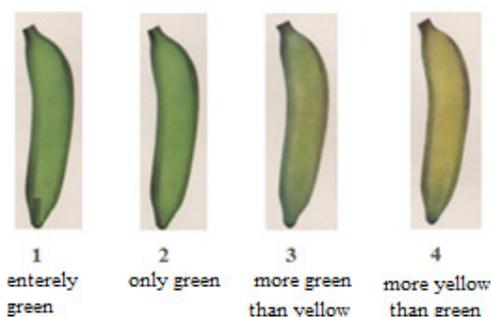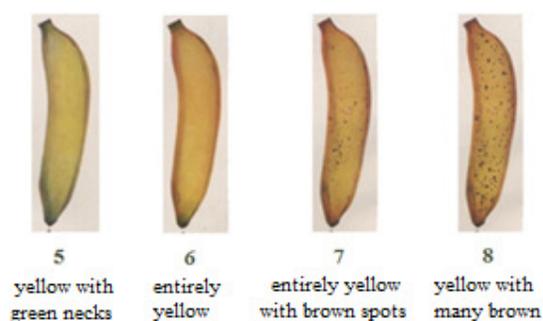
Figure 1. Stages ripening to bananas (1 - very green banana, 8 - ripe banana)

The research followed to establish optimum stage of ripening of bananas in order to accumulate a maximum content of fermentable sugars. Variety "Dole" was analyzed in terms of the total carbohydrate content in different stages of maturation (table 2).

Liquor used as a basis for alcoholic cocktail was obtained by mixing bananas with alcohol 96 ° double refined and sugar, in the proportions established by receipt. After a maceration period of 7 days, the mixture was filtered and pasteurized at 75 °C, then it was stored under refrigeration. [11, 12].

Banana liqueur has 21% alcohol and 40% sugar.

Milk and yogurt have been analyzed in terms of fat content (acid-butirometric method), when they obtained the following values: milk with 3.46% fat; yogurt with 2.56% fat.

Cocktails were obtained by diagrams shown in figures 1 and 2 and were coded as in tables 1 and 2

a. **Obtaining cocktails**

Technological process for cocktails analyzed is presented in figures 1 and 2.

Samples realized were codified as shown in tables 1 and 2.

Cocktails made were tested for taste, after which we obtained full analysis bulletins of the tasting team.

In figure 4 was analyzed **appearance**, studied visual evidence. It can be seen that:

- samples with yogurt followed by milk are the most popular in terms of color; alcoholic variants had a pleasant color than nonalcoholic;
- samples with milk and yogurt, both enriched with berries, the alcoholic and non alcoholic versions recorded the highest values in terms of color intensity. Variants fluid and the layered ice recorded the highest values in samples with the green tea and goji fruit.
- both alcoholic and non-alcoholic variants, samples with milk and yogurt had very clearly defined layers;
- cocktails with milk and the yogurt (control) were registrated highest scores in terms of uniformity and consistency, in fact all the evidence points recorded medium or strong (3 or 4 out of 5).

In figure 5 were analyzed **3 types of floral aromas** (rose hips, jasmine, green tea). In non-alcoholic versions, the more intense flavor was detected in the samples of green tea with milk and with yogurt. Jasmine was detected in samples with ice.In alcoholic versions, probably due to the pronounced flavor of banana liqueur, other flavors were poorly reported, except variant fluids and green tea ice when he was notified medium flavored green tea and jasmine.

In figure 6 were analyzed **5 different fruity flavors** (banana, berries, goji berries, raspberries, and pomegranate). The more intense flavor was banana flavor, detected in alcoholic variants, and in the non-alcoholic. In the iced version, enriched with berries (4.4.a) was detected slightly flavored of berries.

From figure 7 it can be seen that **taste sweet** (made from banana) is noticeably intense in nonalcoholic version, in blank and alcoholic versions of samples with milk, followed by the controls with yogurt and ice.

From figure 7 it can be seen that *mouth feels* attribute in cocktails was appreciated with high scores and *after taste* of cocktails was obtained medium scores in almost all variants. Except does the ice variants, which were very poorly appreciated.

Table 2. The chemical composition of banana the variety "Dole". Stages of ripening

Determinations	Stages ripening to bananas							
	4		6		7		8	
	F.P.	D.M.	F.P.	D.M.	F.P.	D.M.	F.P.	D.M.
Dry substance, %	23,08		23,14		23,14		23,26	
Proteins (Kjeldhal), %	1,92	8,33	1,973	8,528	2,20	9,50	1,78	7,66
Carbohydrates (Schoorl), %	11,593	50,23	11,65	50,34	13,135	56,76	13,1408	56,49
Total lipids (Soxhlet), %	0,434	1,88	0,459	1,98	0,25	1,08	0,383	1,647
Ash content, %	1,034	4,48	0,87	3,78	0,98	4,27	0,903	3,883

F.P. – fresh product; D.M. – dry matter.
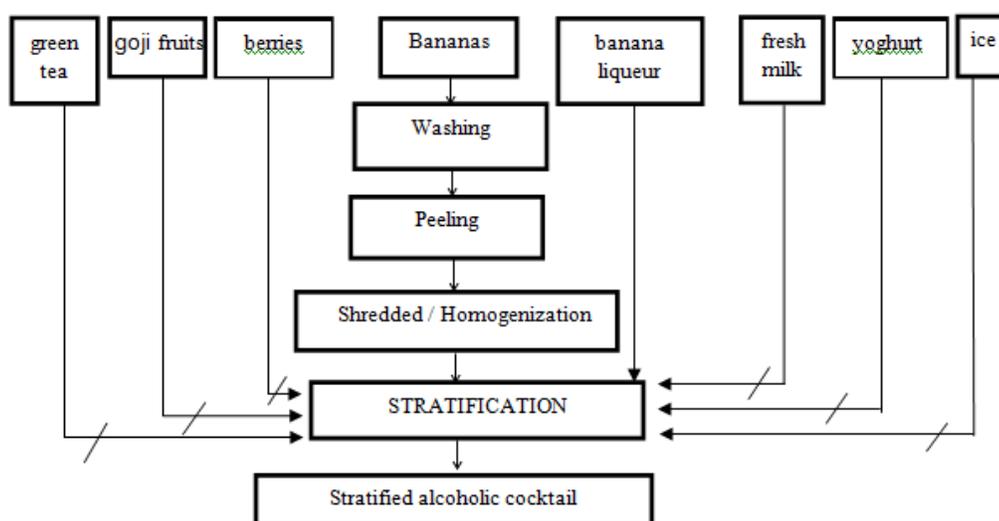

Figure 2. Technological process for alcoholic cocktails analyzed
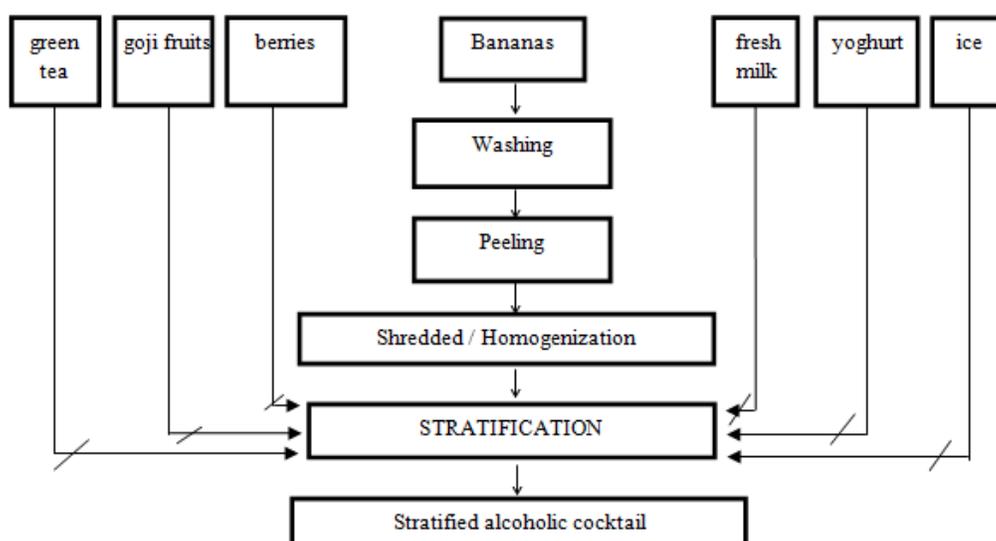

Figure 3. Technological process for non-alcoholic cocktails analyzed

Table 3. Composition and coding samples for non-alcoholic cocktails

Variants with milk	Variants with yogurt	Variants with ice
[1.1.na] **control milk** banana milk	**[2.1.na]** **control yogurt** banana yogurt	**[3.1.na]** **control ice** banana ice
[1.2.na] **M, Ba, Gt** banana milk green tea	**[2.2.na]** **Y, Ba, Gt** banana yogurt green tea	**[3.2.na]** **I, Ba, Gt** banana ice green tea
[1.3.na] **M, Ba, Be** banana milk berries	**[2.3.na]** **Y, Ba, Be** banana yogurt berries	**[3.3.na]** **I, Ba, Be** banana ice berries
[1.4.na] **M, Ba, Gf** banana milk goji fruits	**[2.4.na]** **Y, Ba, Gf** banana yogurt goji fruits	**[3.4.na]** **I, Ba, Gf** banana ice goji fruits

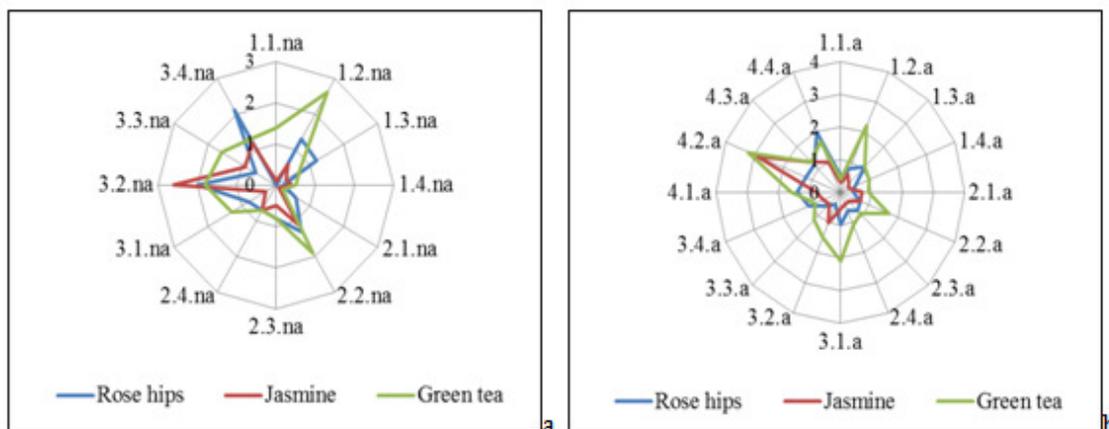*Table 4.* Composition and coding samples for alcoholic cocktails

Variants stratified with milk	Variants stratified with yogurt	Variations stratified with ice	Variations fluids with ice
[1.1.a] **control milk alcohol** banana banana liqueur milk	**[2.1.a]** **control yogurt alcohol** banana banana liqueur yogurt	**[3.1.a]** **control ice alcohol** banana banana liqueur ice	**[4.1.a]** **control ice alcohol** banana liqueur ice
[1.2.a] **M, Ba, BL, Gt** banana banana liqueur milk green tea	**[2.2.a]** **Y, Ba, BL, Gt** banana banana liqueur yogurt green tea	**[3.2.a]** **I, Ba, BL, Gt** banana banana liqueur ice green tea	**[4.2.a]** **I, BL, Gt** banana liqueur ice green tea
[1.3.a] **M, Ba, BL, Be** banana banana liqueur milk berries	**[2.3.a]** **Y, Ba, BL, Be** banana banana liqueur yogurt berries	**[3.3.a]** **I, Ba, BL, Be** banana banana liqueur ice berries	**[4.3.a]** **I, BL, Be** banana liqueur ice berries
[1.4.a] **M, Ba, BL, Gf** banana banana liqueur milk goji fruits	**[2.4.a]** **Y, Ba, BL, Gf** banana banana liqueur yogurt goji fruits	**[3.4.a]** **I, Ba, BL, Gf** banana banana liqueur ice goji fruits	**[4.4.a]** **I, BL, Gf** banana liqueur ice goji fruits
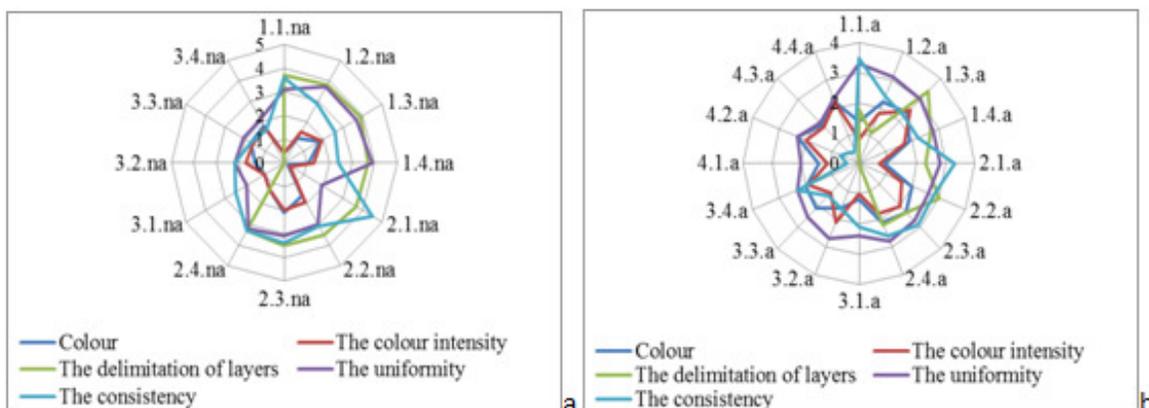
Figure 4. Appearance
a – samples to non-alcoholic cocktail; b – samples to alcoholic cocktail

1.1.na – sample to control with milk; 1.2.na – sample with banana, milk, green tea; 1.3.na – sample with banana, milk, berries; 1.4.na – sample with banana, milk, goji fruits; 2.1.na – sample to control with yogurt; 2.2.na – sample with banana, yogurt, green tea; 2.3.na – sample with banana, yogurt, berries; 2.4.na – sample with banana, yogurt goji fruits; 3.1.na – sample to control with ice; 3.2.na – sample with banana, ice, green tea; 3.3.na – sample with banana, ice, berries; 3.4.na – sample with banana, ice. goji fruits.

1.1.a – sample to control with milk alcohol ; 1.2.a – sample with banana, banana liqueur, milk, green tea; 1.3.a – sample with banana, banana liqueur, milk, berries; 1.4.a – sample with banana, banana liqueur, milk, goji fruits; 2.1.a – sample to control with yogurt alcohol; 2.2.a – sample with banana, banana liqueur, yogurt, green tea; 2.3.a – sample with banana, banana liqueur, yogurt, berries; 2.4.a – sample with banana, banana liqueur, yogurt , goji fruits; 3.1.a – sample to control with ice alcohol; 3.2.a – sample with banana, banana liqueur, ice, green tea; 3.3.a – sample with banana, banana liqueur, ice, berries; 3.4.a – sample with banana, banana liqueur, ice, goji fruit, 4.1.a – sample to control with ice alcohol; 4.2.a – sample with banana liqueur, ice, green tea; 4.3.a – sample with banana liqueur, ice, berries; 4.4.a – sample with banana liqueur. ice. goji fruits.

Figure 5. Flowery taste
a – samples to non-alcoholic cocktail; b – samples to alcoholic cocktail

1.1.na – sample to control with milk; 1.2.na – sample with banana, milk, green tea; 1.3.na – sample with banana, milk, berries; 1.4.na – sample with banana, milk, goji fruits; 2.1.na – sample to control with yogurt; 2.2.na – sample with banana, yogurt, green tea; 2.3.na – sample with banana, yogurt, berries; 2.4.na – sample with banana, yogurt goji fruits; 3.1.na – sample to control with ice; 3.2.na – sample with banana, ice, green tea; 3.3.na – sample with banana, ice, berries; 3.4.na – sample with banana, ice, goji fruits.

1.1.a – sample to control with milk alcohol ; 1.2.a – sample with banana, banana liqueur, milk, green tea; 1.3.a – sample with banana, banana liqueur, milk, berries; 1.4.a – sample with banana, banana liqueur, milk, goji fruits; 2.1.a – sample to control with yogurt alcohol; 2.2.a – sample with banana, banana liqueur, yogurt, green tea; 2.3.a – sample with banana, banana liqueur, yogurt, berries; 2.4.a – sample with banana, banana liqueur, yogurt , goji fruits; 3.1.a – sample to control with ice alcohol; 3.2.a – sample with banana, banana liqueur, ice, green tea; 3.3.a – sample with banana, banana liqueur, ice, berries; 3.4.a – sample with banana, banana liqueur, ice, goji fruit, 4.1.a – sample to control with ice alcohol; 4.2.a – sample with banana liqueur, ice, green tea; 4.3.a – sample with banana liqueur, ice, berries; 4.4.a – sample with banana liqueur, ice, goji fruits.
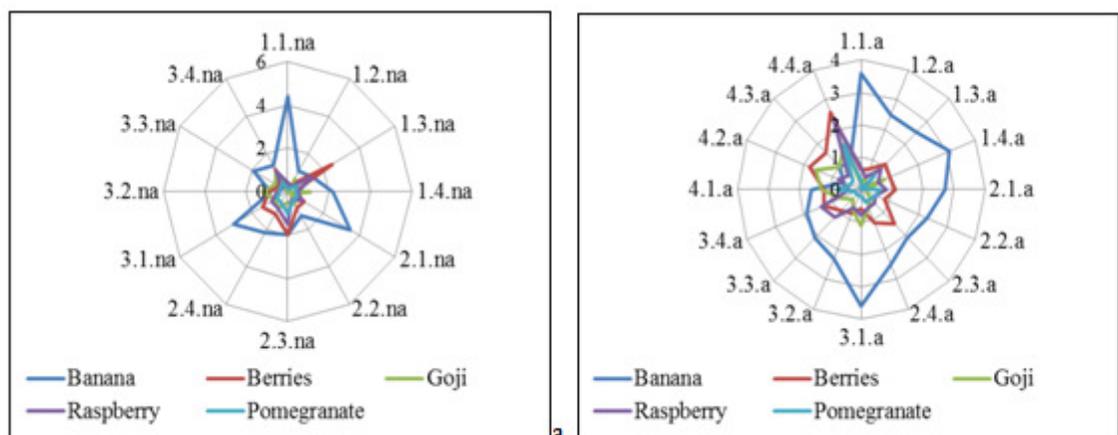

Figure 6. Fruity taste
a – samples to non-alcoholic cocktail; b – samples to alcoholic cocktail

1.1.na – sample to control with milk; 1.2.na – sample with banana, milk, green tea; 1.3.na – sample with banana, milk, berries; 1.4.na – sample with banana, milk, goji fruits; 2.1.na – sample to control with yogurt; 2.2.na – sample with banana, yogurt, green tea; 2.3.na – sample with banana, yogurt, berries; 2.4.na – sample with banana, yogurt goji fruits; 3.1.na – sample to control with ice; 3.2.na – sample with banana, ice, green tea; 3.3.na – sample with banana, ice, berries; 3.4.na – sample with banana, ice, goji fruits.

1.1.a – sample to control with milk alcohol ; 1.2.a – sample with banana, banana liqueur, milk, green tea; 1.3.a – sample with banana, banana liqueur, milk, berries; 1.4.a – sample with banana, banana liqueur, milk, goji fruits; 2.1.a – sample to control with yogurt alcohol; 2.2.a – sample with banana, banana liqueur, yogurt, green tea; 2.3.a – sample with banana, banana liqueur, yogurt, berries; 2.4.a – sample with banana, banana liqueur, yogurt , goji fruits; 3.1.a – sample to control with ice alcohol; 3.2.a – sample with banana, banana liqueur, ice, green tea; 3.3.a – sample with banana, banana liqueur, ice, berries; 3.4.a – sample with banana, banana liqueur, ice, goji fruit, 4.1.a – sample to control with ice alcohol; 4.2.a – sample with banana liqueur, ice, green tea; 4.3.a – sample with banana liqueur, ice, berries; 4.4.a – sample with banana liqueur, ice, goji fruits.
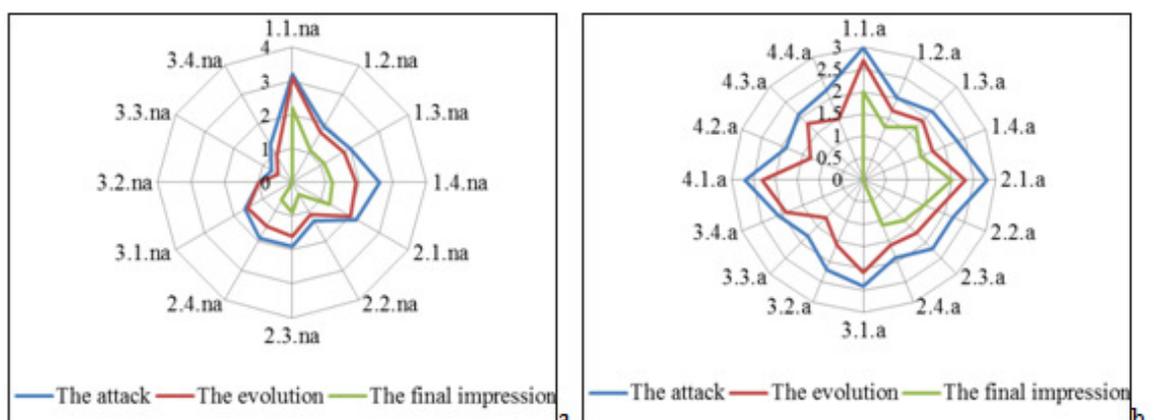
Figure 7. The sweet taste
a – variantele de cocktail-uri non-alcoolice; b – variantele de cocktail-uri alcoolice

1.1.na – sample to control with milk; 1.2.na – sample with banana, milk, green tea; 1.3.na – sample with banana, milk, berries; 1.4.na – sample with banana, milk, goji fruits; 2.1.na – sample to control with yogurt; 2.2.na – sample with banana, yogurt, green tea; 2.3.na – sample with banana, yogurt, berries; 2.4.na – sample with banana, yogurt goji fruits; 3.1.na – sample to control with ice; 3.2.na – sample with banana, ice, green tea; 3.3.na – sample with banana, ice, berries; 3.4.na – sample with banana, ice, goji fruits.

1.1.a – sample to control with milk alcohol ; 1.2.a – sample with banana, banana liqueur, milk, green tea; 1.3.a – sample with banana, banana liqueur, milk, berries; 1.4.a – sample with banana, banana liqueur, milk, goji fruits; 2.1.a – sample to control with yogurt alcohol; 2.2.a – sample with banana, banana liqueur, yogurt, green tea; 2.3.a – sample with banana, banana liqueur, yogurt, berries; 2.4.a – sample with banana, banana liqueur, yogurt , goji fruits; 3.1.a – sample to control with ice alcohol; 3.2.a – sample with banana, banana liqueur, ice, green tea; 3.3.a – sample with banana, banana liqueur, ice, berries; 3.4.a – sample with banana, banana liqueur, ice, goji fruit, 4.1.a – sample to control with ice alcohol; 4.2.a – sample with banana liqueur, ice, green tea; 4.3.a – sample with banana liqueur, ice, berries; 4.4.a – sample with banana liqueur, ice, goji fruits.
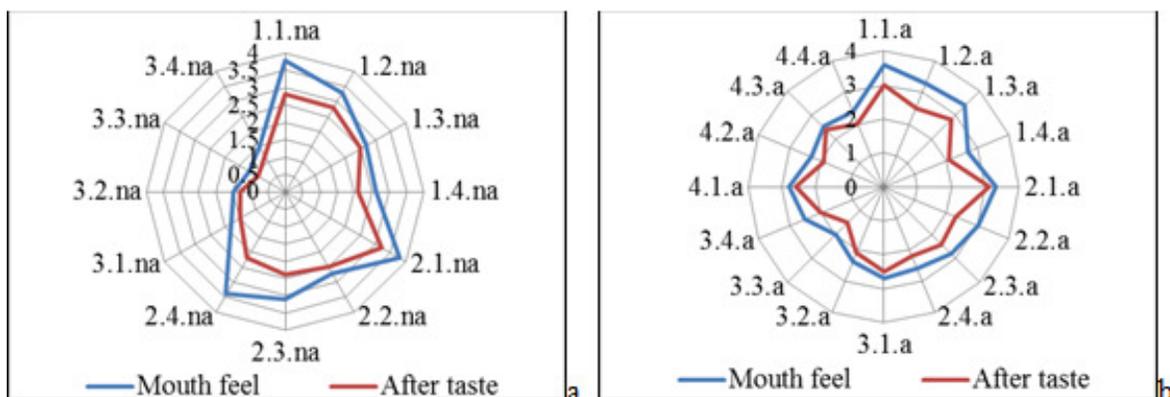

Figure 8. Mouth feel – aftertaste
a – variantele de cocktail-uri non-alcoolice; b – variantele de cocktail-uri alcoolice

1.1.na – sample to control with milk; 1.2.na – sample with banana, milk, green tea; 1.3.na – sample with banana, milk, berries; 1.4.na – sample with banana, milk, goji fruits; 2.1.na – sample to control with yogurt; 2.2.na – sample with banana, yogurt, green tea; 2.3.na – sample with banana, yogurt, berries; 2.4.na – sample with banana, yogurt goji fruits; 3.1.na – sample to control with ice; 3.2.na – sample with banana, ice, green tea; 3.3.na – sample with banana, ice, berries; 3.4.na – sample with banana, ice, goji fruits.

1.1.a – sample to control with milk alcohol ; 1.2.a – sample with banana, banana liqueur, milk, green tea; 1.3.a – sample with banana, banana liqueur, milk, berries; 1.4.a – sample with banana, banana liqueur, milk, goji fruits; 2.1.a – sample to control with yogurt alcohol; 2.2.a – sample with banana, banana liqueur, yogurt, green tea; 2.3.a – sample with banana, banana liqueur, yogurt, berries; 2.4.a – sample with banana, banana liqueur, yogurt , goji fruits; 3.1.a – sample to control with ice alcohol; 3.2.a – sample with banana, banana liqueur, ice, green tea; 3.3.a – sample with banana, banana liqueur, ice, berries; 3.4.a – sample with banana, banana liqueur, ice, goji fruit, 4.1.a – sample to control with ice alcohol; 4.2.a – sample with banana liqueur, ice, green tea; 4.3.a – sample with banana liqueur, ice, berries; 4.4.a – sample with banana liqueur, ice, goji fruits.

4. Conclusion

- **Cocktails with yogurt** variants were pronounced slightly sweet taste, they look pretty good keeping the layers delimited.
- Variants **with sweet milk** has a pleasant, beautiful appearance, although these layers are less poor.
- **Ice variants** were also pleasant and appreciated because they are smoother and more refreshing than the other two previous versions.
- In all **variants of stratified cocktails** after mixing of layers they have a less pleasant.
- Variants without banana pulp (**variants fluid**) were very popular due to their limpidity, pleasant taste and appearance throughout the cocktail consumption.

Compliance with Ethics Requirements

Authors declare that they respect the journal's ethics requirements. Authors declare that they have no conflict of interest and all procedures involving human and/or animal subjects (if exists) respect the specific regulations and standards.

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