ARTICLE

SENSORY CHARACTERISTICS OF YOGHURT FORTIFIED WITH KIWANO FRUIT

Mihaela MEȘTER, Anca Mihaela DICU, Daniela DIACONESCU, Monica ZDREMȚAN, Dumitru CONDRAT

Faculty of Food Engineering, Tourism and Environmental Protection, "Aurel Vlaicu" University, Romania, 2 Elena Dragoi, Arad 310330, Romania
Corresponding author email: mihaelamester@yahoo.com

Abstract: *Nowadays, the target of food industries is to produce low-calorie products safe for human health. We all know that yoghurt is a popular, flavorful, and healthy dairy product. Due to its high nutritive value, its production and consumption are growing continuously because of its therapeutic properties. To increase attractiveness, we added kiwano pulp in yoghurt, which is rich in antioxidants and vitamins. The nutritional composition of yoghurt and delicious kiwano fruits will lead to a product that will have health benefits and can be consumed by everybody, even by people who suffer from hypercholesterolemia. The sensory evaluation of kiwano yoghurt was performed using the 5-point method. Yoghurt was mixed with 15% fresh fruit pulp. We studied some characteristics: visual (appearance, colour, and consistency), flavour/aroma, and taste. The most appreciated characteristic was the taste. Over 80% of tasters accepted all the sensory characteristics of the analyzed product.*

Keywords: yoghurt, kiwano, sensory analysis.

INTRODUCTION

Yoghurt is a dairy product that has been around for centuries because is easily digested and also is a rich source of proteins, fat, calcium, vitamins, carbohydrates, iron, and phosphorous (Vahedi et al., 2008) and has a special flavor. Over time it has been modified for nutritional benefits, and pleasing flavor, appearance, texture, and aroma.

Lactic acid bacteria in yoghurt include protection against gastrointestinal upsets, enhancing digestion of lactose by maldigestion, decreasing the risk of cancer, lowering blood cholesterol. Also, yoghurt helps the body to assimilate protein, calcium, and iron and improves immune response (Fernandez et all, 2017).

People are interested in functional food obtained by fortification with vegetables and fruits that have healthy and nutritive benefits (Khoulod et al., 2020). As a result, the final product, yoghurt with different vegetables or fruits, is a special food that has functional properties, high nutritional value, and therapeutic effects (McKinley, 2005).

Different fruits are used in yoghurt production (Abdeldaiem, 2019) for making functional fruit yoghurt. In the body's defense system against free radicals, some fruits have important effects (Manisha et al, 2017).

Kiwano (*Cucumis metuliferus*) is rich in antioxidants and vitamins. This exotic fruit is known as African horned cucumber; also goes by horned melon and it tastes like banana and kiwi or passion fruit combined. This fruit boasts an array of vitamins and minerals, many of which play a role in its ability to positively impact health. WHO recognizes the kiwano as an essential fruit that can fight against illness and malnutrition, due to the presence of some valuable nutrients (Bina Rani et al., 2019).

A single kiwano melon (average 200 grams) provides the following nutrients: calories, carbs, protein, fat, vitamin C, vitamin A, vitamin B6, magnesium, iron, phosphorus, zinc, potassium, calcium, copper, and sodium. The African horned cucumber contains high amounts of water (about 88%) and is relatively low in calories, carbs, and fat. About 16% of its calories come from protein - which is relatively high compared to other fruits. The seeds of this fruit contain several antioxidants, including lutein, zinc, and vitamins A, C, and E. The horned melon is low-glycemic and additionally, it's a rich source of magnesium; also is a good source of iron and vitamin C

(Cazanevscaia Busuioc et all, 2020; Šeregelj et all, 2022).

Our aim research is to find out how is been taken by the consumers a new product like this yogurt which has a high nutrition value by adding kiwano pulp.

MATERIALS AND METHODS

We used the skimmed home-made yoghurt (0.1% fat) with 15% freshly shredded kiwano pulp which was added after fermentation. Kiwano was washed, peeled, and cut into pieces, and seeds were removed. The samples were analyzed immediately after preparation.

The sensory analysis method was the 5-point scaling system. The taster team was formed by 15 members, each one of them accorded from 0 to 5 points for the following three categories: visual (appearance, colour, and consistency), flavour/aroma, and taste.

The steps in the 5 point system: very good – 5 points; good – 4 points; satisfactorily – 3 points; unsatisfactorily – 2 points; bad – 1 point; very bad – 0 points. (Abdalla et al., 2019; Croitoru, 2013; Banu et al., 2002; Dicu, Perța-Crișan, 2012).

RESULTS AND DISCUSSIONS

The sensory evaluation (Karagul-Yuceer et al, 2007) of kiwano yoghurt was performed using the 5-point method. Yoghurt was mixed with 15% fresh fruit pulp.

In the Table 1 there are the average score points accorded by the tasters to the analyzed characteristics. The average unweighted score was obtained considering the point accorded by each taster for every characteristic and the number of tasters. The average weighted score was calculated in accord with the importance of each sensory characteristic in the global evaluation of the product (for visual - 1.5 factor, for flavour/aroma – 0.5 factor, and taste – 2.0 factor).

Table 1. Centralized results obtained from sensory analysis

Characteristic /Score	Visual	Flavour/ aroma	Taste
Average unweighted score	4.06	4.6	4.73
Average weighted score	6.09	2.3	9.46
Total average weighted score		**17.85**	

The total average weighted score is 17.85.

Regarding the taste, the tasters had given a high score. For smell the percentage was small and for aspect and consistency, it was higher, as can be seen in Figure 1. In this figure, it can be seen that the most appreciated characteristic was taste.

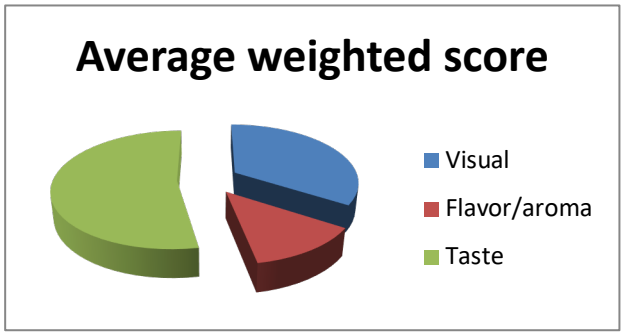

Figure 1. The average weighted score for kiwano yoghurt

CONCLUSIONS

The product has positive and specific sensory characteristics and it was widely accepted by the tasters. The most appreciated characteristic was the taste, followed by flavour/aroma and visual.

On an industrial level, there are no changes, because the process flow is the same as in any other fruit yogurt process.

The shredded kiwano pulp can be used as an ingredient to improve yoghurt sensory, nutritional and physiological qualities.

REFERENCES

Abdalla, A. K., Ahmed, Z. F. R., 2019. Physicochemical and sensory properties of yoghurt supplemented with green banana flour. Egyptian Journal of Dairy Science 47 (1), 1-9.

Abdeldaiem, A., M., Blassy, Kh., I., 2019. Effect of replacing skim milk powder by sweet lupine powder on characteristics of zebda-

mango 2020 yoghurt drink. Ismailia Journal of Dairy Science and Technology, 6: 9-17.

Banu, C., et all, 2002. Calitatea și controlul calității produselor alimentare, Editura AGIR, București.

Bina, R., Upma, S., Lakha, R., Ravi, S., Harsukh, C., Anju, S. and Raaz, K., Maheshwari, 2019. Incredible Benefits of Exotic Kiwano (Horned Melon) for Wellness, Vigour and Vitality. International Journal of Biological Innovations, 1 (2), 56-59.

Cazanevscaia Busuioc, A., Dediu Botezatu, A.,V., Furdui, B., Vinatoru, C., Maggi, F., Caprioli, G., and Rodica-Mihaela Dinica, R., M. Comparative study of the chemical compositions and antioxidant activities of fresh juices from Romanian Cucurbitaceae varieties, Molecules, 2020, 25(22): 5468.

Croitoru, C., 2013. Analiza sensorială a produselor agroalimentare. Vol. 1, Elemente metrologice, metodologice și statistice, Editura AGIR, București.

Dicu, A., M., Perţa-Crişan, S., 2012, Calitatea şi analiza senzorială a alimentelor. Editura Universităţii „Aurel Vlaicu" Arad, Romania, ISBN 978-973-752-612-0.

Fernandez, M. A., Panahi, S., Daniel, N., Tremblay, A., and Marette, A. Yogurt and Cardiometabolic Diseases: A Critical Review of Potential Mechanisms, Adv. Nutr. 2017 Nov; 8(6): 812–829.

Karagül-Yüceer, Y., Drake, M. A., 2007. Sensory analysis of yogurt. Manufacturing Yogurt and Fermented Milks, 265 - 278.

Khoulod, B., Magdy, O., Amin, G., Mervat H., 2020. Functional Properties of Yoghurt Fortified with Fruits Pulp. Ismailia Journal of Dairy Science & Technology.

Manisha, W. H., Rajak R., Jat D., 2017. Oxidative stress and antioxidants: an overview. International Journal of Advanced Research and Review, 2: 110-119.

McKinley, M. C., 2005. The nutrition and health benefits of yoghurt. International Journal Dairy Technology, 58: 1-12.

Šeregelj, V.; Šovljanski, O.; Tumbas Šaponjac, V.; Vulic, J.; Cetkovic, G.; Markov, S.; Canadanovic-Brunet, J. Horned Melon (Cucumis metuliferus E. Meyer Ex. Naudin) — Current Knowledge on Its Phytochemicals, Biological Benefits, and Potential Applications. Processes 2022, 10, 94.

Vahedi, N., Tehrani, M., M., Shahidi, F., 2008. Optimizing of fruit yoghurt formulation and evaluating its quality during storage. American-Eurasian Journal Agriculture and Environmental Science, 3: 922-927.