

Cake pops with spirulina – physico-chemical aspects

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Abstract

The aim of this study was to evaluate the physico-chemical properties of a raw vegan dessert with high nutritional values. The products used for analyses are called Cake Pops with Spirulina, delicious raw cookies, obtained from cashew, almonds, spirulina, coconut butter, lime for flavor, hemp seeds and acacia honey used as a natural sweetener.

Analyzes were performed on each ingredient and implicit on the finished product in order to find out some physico-chemical characteristics of a functional product made from super ingredients and also to show how this product can improve the performance and quality of the consumer's life.

The analyzes were performed on representative samples using standardized analytical methods, namely: determination of dry matter and water content (moisture%), determination of total mineral substances (ash), and titratable acidity.

The preliminary results show that the Cake pops with spirulina had 85.87% Dry matter, 14.12% moisture (by drying in the oven), 2.49% total minerals and 2.33 °acidity degrees.

Keywords: Cake Pops, raw vegan dessert, acidity, dry matter

1.Introduction

Nowadays, we need not only safe food, but food that can help the consumer maintain a good state of health. Consumers are very careful about food quality, not only in terms of hygiene standards, but also from the nutritional point of view [1].

Food provides the energy and nutrients needed to support all body functions, maintain good health and carry out everyday activities [2].

Obtaining foods with high nutritional value means either restoring the natural concentration of the ingredients or supplementing with nutrients above the natural concentration of the product [3].

Cereals, vegetables and fruits are best represented in the food pyramid as the basis of balanced nutrition, calling them the "basis" for proper nutrition and health, knowing that they can reduce the risk of chronic disease [4].

In this context, the importance of spirulina, almonds, cashew, hemp seeds, lime, coconut butter, acacia honey derives from their complex chemical composition, implicitly from their food value, but

also from the fact that in some countries they are considered basic foods.

From 100% natural ingredients, Cake Pops with Spirulina don't contain colours, preservatives, emulsifiers, stabilisers and sweeteners. These raw cookies have the highest concentration of antioxidants, vitamins, minerals, amino acids, essential oils that strengthen the immune system and keep the body healthy.

Spirulina's concentrated nutritional value makes it an ideal food supplement for people of all ages and lifestyles. Spirulina is about sixty percent complete, highly digestible protein. Spirulina contains every essential amino acid. It contains more beta-carotene than any other whole food; it is the best whole food source of gamma linolenic acid (GLA); it is rich in B vitamins, minerals, trace elements, chlorophyll, and enzymes; and it is abundant in other valuable nutrients about which scientists are learning more each year, such as carotenoids, sulfolipids, glycolipids, phycocyanin, superoxide dismutase [5].

Coconut oil rich in lauric acid has a lesser effect than butter, which is high in palmitic acid, on total and LDL cholesterol in hypercholesterolemic men and women. The findings suggest that, in certain circumstances, coconut oil might be a useful alternative to butter and hydrogenated vegetable fats [6].

Nuts are a rich source of energy because 45 to 75% of their weight is made up of fat, but this fat is mostly unsaturated [7,8]. Nuts also contain high-quality protein, fiber, antioxidant vitamins and minerals such as magnesium, copper, selenium, potassium, and little sodium, except when salted [9,10].

2. Materials and methods

2.1. Materials

Spirulina, almonds, cashew, hemp seeds, lime, coconut butter and acacia honey analyzed in this study have been purchased from hypermarkets and specialized stores from Timisoara.

Cake pops, these delicious raw cookies, were obtained by mixing the nuts (almonds, cashew hydrated and crushed), hemp seeds, lime juice, coconut butter and spirulina, thermally or chemically unprocessed.

2.2. Methods

Moisture, dry matter and total mineral content: For moisture and dry matter content, samples weight was measured by using a digital balance with a sensitivity of 0.001 g. Gravimetric method was used to determine the moisture of samples, using a moisture analyzer Nabertherm model 6/11 with automated programming and electronic display. The level of moisture was tested for all samples by heating a known weight of sample in the hot air oven ($100 \pm 5^\circ\text{C}$) until constant weight [11,12]. Moisture content can be determined from total solid content (TSC) as below [11,12]:

$$\text{Moisture (\%)} = 100 - \text{TSC(\%)},$$

where total solid content (TSC) represent dry matter.

In order to determine the total mineral content (ash), dried samples were calcined in the Nabertherm LE4 oven (Germany), at 505°C . The temperature was gradually raised to 505°C (when the ash became gray-white and the mass of crucible with the burned sample remained constant) [13].

The method for determination of acidity was by titration with NaOH 0,1 N in the presence of phenolphthalein [14].

$$\text{Acidity (\%)} = \frac{V * N}{W} * 100$$

where: V - NaOH used volume (mL); N - NaOH normality (0.1 N); W: sample weight (g) [8].

All analytical determinations were made in triplicate.

3. Results and discussions

The results obtained from the physico-chemical analysis of Spirulin - cake pops and including the ingredients used are shown in fig. 1-3

As seen in the figure above, the highest content of dry matter is in coconut butter (99.66%), also having the lowest moisture (0.34%), and in lime is recorded the lowest content of dry matter (10.99%), respectively the highest moisture (89.01%). In the case of the final product, a dry matter content of 85.87% and moisture of 14.12% are recorded by this method.

From the data presented above, it appears that spirulina has the highest percentage of total mineral substances (13.39%) and the lowest value is observed in acacia honey (0.12%). According to Sharoba et al. [5], spirulina is called the ideal food for mankind and the World Health Organization considered it's "super food" and the best food for the future because of it's nutritional value is very high. Cake pops have a total mineral content of 2.49%.

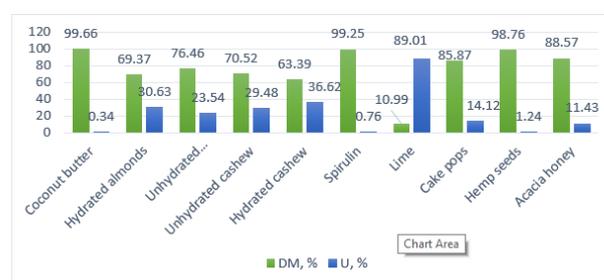


Figure.1. Determination of dry matter and moisture (U%) content using the oven

From the analysis of the experimental data, the highest acidity is observed in lime juice (8.90°) and the lowest acidity is observed in Acacia honey (0.46°).

From these values we can observe that Cake pops have an acidity of 2.33°, and this value it can be attributed to the addition of spirulina and lime juice in their composition.

One of the reasons why lime (*C. Aurantifolia*) was used as an ingredient for our product is that this ingredient is not just a common fruit that is easy to use in daily consumption, but also contains many beneficial substances for human health. According to Nithithev and Wannee [15], lime was studied for its effect against carcinogenesis by mechanisms such as stopping cancer cell mobility in circulatory system; so, inhibiting the metastasis, blocking the angiogenesis, and inducing tumor suppressor gene and apoptosis, this is one of the reasons why it was used as an ingredient for numerous food products.

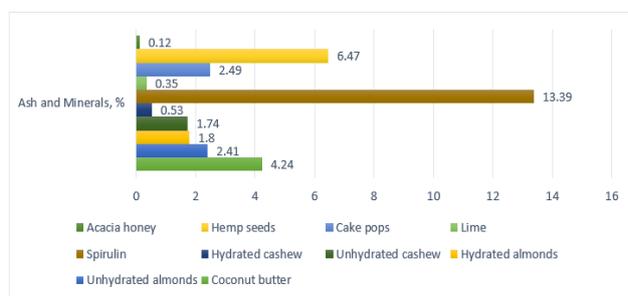


Figure 2. Determination of total mineral substances (ash)

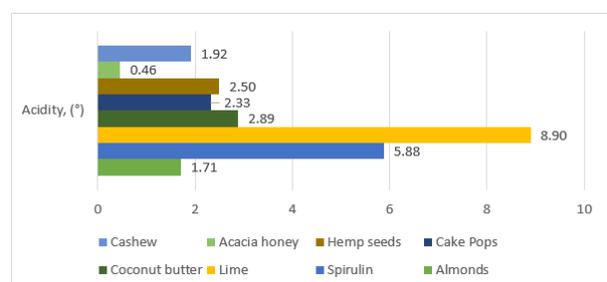


Figure 3. Determination of acidity

4. Conclusion

So-called "raw cakes" on the stick, cake pops with spirulina can be served as occasional and healthy snacks between meals. They contain only raw ingredients, including spirulina and hemp seeds which are considered superfoods. The aim of this study was to evaluate the physico-chemical and proximal composition of a raw vegan dessert with high nutritional values and rich in protein. The main qualities of cake pops:

- is an excellent source of nutrients with high biological value;

- from 100% natural ingredients, it don't contains colours preservatives, emulsifiers, stabilisers and sweeteners;
- gives the body an energy boost.

Cake pops with spirulina are a superfood that should not be missing from the daily diet. This raw vegan dessert can be consumed both by people with a sedentary life, being served as a healthy snack between meals and also by those who have an active lifestyle.

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 / or animal subjects (if exist) respect the specific regulation and standards.

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