

## Preservative effect of the banana peel on the shelf life of creamy cupcakes

التأثير الحافظ لقشر الموز على مدة صلاحية الكعك الكريمي

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## مجلة البحوث في مجالات التربية النوعية

معرف البحث الرقمي DOI: 10.21608/jedu.2023.191274.1829

المجلد التاسع العدد 45 - مارس 2023

الترقيم الدولي

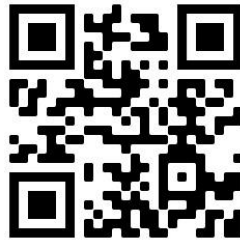
P-ISSN: 1687-3424

E- ISSN: 2735-3346

موقع المجلة عبر بنك المعرفة المصري <https://jedu.journals.ekb.eg/>

موقع المجلة <http://jrfse.minia.edu.eg/Hom>

العنوان: كلية التربية النوعية - جامعة المنيا - جمهورية مصر العربية





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### Abstract

Bananas lags a lot of peel, which is discarded as waste despite being a rich source of nutritional and natural bioactive compounds. Therefore, the main objective of this study was to test the preservative effect of a banana peel on creamy cupcakes while also using banana peel nutrients. It was replaced with different levels of flour and milk in the creamy cupcake (0–5–15 and 25%). The sensory properties were judged by trained arbitrators, also studied the microbiological properties. The results of the sensory evaluation showed a high degree of general acceptance, especially with regard to the taste of the cupcake fortified with 25% banana peel. In terms of the presence of total count and spore-formers bacteria, the findings revealed that increasing the amount of banana peel resulted in a longer shelf life on creamy cupcakes and that it worked to eliminate these types of bacteria. The best results were obtained for the cupcake, which contains 25% banana peel in compared with the control sample. As for the detection of coliform bacteria, the results proved that all samples were free of it. Finally, a creamy cupcake containing 25% banana peels destroyed all mold and yeast after 12 days of storage. In conclusion, increase the nutrient content of the cupcakes, such as banana peel, which is important for the antimicrobial properties that extend the product's shelf life. This study recommended that banana peel be used to

strengthen and increase the shelf life of creamy cupcakes because it has many nutritional benefits.

**Keywords:** Banana peel substitution, creamy cupcake, aerobic bacteria, spore bacteria.

## Introduction

In recent years, because of their high concentrations of polyphenols, carotenoids, and other bioactive compounds, by-products of fruits and vegetables have become popular as natural food additives (**Ayalazavala et al., 2011 and O'shea et al., 2012**). Additionally, they have been considered a source of effective antibacterial agents against a variety of microorganisms (**Sajjad et al., 2015**). All kinds of foods that contain bioactive ingredients are considered functional foods because they contain physiological health benefits and have an additional association with the prevention and management of numerous chronic diseases (**Alkhatib et al., 2017**). Notably, fruit is made up of around 15-20% of the peel. Nevertheless, it is discarded as waste and becomes a source of contamination (**Kim et al., 2010**).

Bananas are considered a widely cultivated and consumed fruit crop. It is consumed on average by 12 kg per individual, making it the world's leading food crop after rice, wheat, and maize (**Zaini et al., 2022**). Despite the fact that bananas are an important crop worldwide, they produce tonnes of residue, with the banana peel accounting for 35%–50% of the total mass of the fruit (**Gomes et al., 2020**). Banana peel has lots of phytochemicals and phytonutrient compounds, which are mainly antioxidants. It also has many types of compounds like anthocyanins, delphinidin, cyaniding, and catecholamines. In this regard, carotenoids, beta-carotene, and alpha-carotene have also been identified by different methods (**Krishna, 1999; Wolf et al., 2003; and Randy et al., 2007**). In this regard, banana pulp and peel contain some catecholamines, carotenoid compounds, and phenolics in addition to pyridoxine (vitamin B6) (**Pérez et al., 1997; Kanazawa and Sakakibara,**

2000; Van den *et al.*, 2000; and Verde-Mendez *et al.*, 2003). With regard to phenolic compounds in banana peels were not underutilized. It can be used to treat illnesses as a safe natural source of antioxidants and enzymes (Adetuyi *et al.*, 2022).

Notably, adding banana peel powder to the flour increased the cake's chemical, physical, and microbial properties (Ahmed *et al.*, 2021). Incorporating 5–10% banana peel flour into some foods can increase their nutritional value without affecting their acceptability. It could be possible to increase the levels of added banana peel flour in some products like biscuits, bread, and pasta (Segura *et al.*, 2022).

The goal of this study is to see if banana peel can be used to make food products with acceptable sensory properties, as well as to look into the preservative effect of the banana peel on creamy cupcakes using microbiological studies.

## MATERIALS AND METHODS

### Materials:

- Banana peels were sourced from a local vegetable store, in Damietta, Egypt.
- Raw materials (Wheat flour 72%) Whole Milk- Egg- Ghee- Sugar- Baking powder- vanilla) were sourced from a local store, in Damietta, Egypt.
- All chemicals and microbiological used in this study were purchased from El-Gomhoriya Company, Egypt.

### Methods:

#### Preparing of creamy cupcake:

Creamy cupcakes were prepared according to Saba (1995).

**Table 1.** Amount and percentage of ingredients used in the processing of creamy cupcake samples at different replacement levels of banana peels (BP).

Ingredient	0% gm	5% gm	15% gm	25% gm
Wheat flour (72%)	110	102	86	70
Whole Milk	90	78	54	30
BP	0	20	60	100
Egg	50	50	50	50
Ghee	60	60	60	60
Sugar	90	90	90	90
Baking powder	5	5	5	5
vanilla	2	2	2	2
<b>Total Ingredients</b>	<b>400</b>	<b>400</b>	<b>400</b>	<b>400</b>

BP: Banana peels

gm:gram

### Preparation of Creamy Cupcake Blends:

Creamy cupcakes were prepared according to the formulas listed in Table 1. Wheat flour and milk were substituted with a banana peel at ratios of 0, 5, 15, and 25%. In the Moulinette machine, the butter and sugar were combined for 5 minutes before adding the eggs. Next, add the dry ingredients and mix. The dough was transferred to a baking pan, then baked in an oven at 180 °C for 40 min **Saba (1995)**.

### Sensory evaluation:

Evaluation of the sensory characteristics of creamy cupcakes was conducted with 10 staff members from the Home Economics Department, Faculty of Specific Education, Damietta University, Egypt, who included professors and postgraduate students. Prior to testing, the products were coded with a number. The samples included a control sample (without banana peel) and three types of samples (with 5, 15, and 25% banana peel). All panelists were evaluating the taste, aroma, texture, color, and overall acceptance of the products (**Mohamed et al., 2023**).

**Chemical composition:**

Data in table 2 according to (Hassan, *et al.*, 2018 and Ahmed *et al.*, 2021).

**Table 2.** Chemical composition of banana peels (BP).

<b>Nutrients</b>	<b>Banana peel (bP)</b> (%)	
<b>Moisture Content</b>	<b>62.33 ± 0.14</b>	
<b>carbohydrate</b>	<b>11.82 ± 2.17</b>	
<b>Fat</b>	<b>5.93 ± 0.13</b>	
<b>Protein</b>	<b>1.95 ± 0.14</b>	
<b>Ash</b>	<b>9.60 ± 0.02</b>	
<b>fiber</b>	<b>8.37 ± 0.18</b>	
<b>MINERAL ELEMENTS</b>	<b>(BP) %</b>	<b>RDA</b> (mg/ 100g)
<b>Fe</b>	<b>47.00 ± 1.26</b>	<b>35</b>
<b>Ca</b>	<b>59.10 ± 0.85</b>	<b>260</b>
<b>Mg</b>	<b>44.50 ± 0.08</b>	<b>170</b>
<b>Zn</b>	<b>0.033± 0.04</b>	<b>3</b>
<b>P</b>	<b>211.30± 1.24</b>	<b>270</b>
<b>K</b>	<b>4.39 ± 0.15</b>	<b>220</b>
<b>Natural antioxidants content</b>		
<b>Total Flavonoids</b> (mg/100g)	<b>1783.32</b>	
<b>Total Carotenoids</b> (mg/100g)	<b>846.58</b>	

Bp: Banana peel

**Microbiological analyses:**

Molds, yeast, complete bacteria and coli bacteria were counted in creamy cupcake samples after 0, 4, 8, and 12 days of storage at 20 °C. All experiments were performed in triplicate.

A) Bacterial numbers (total count) were counted using a nutrient agar medium and incubated at 35 °C for 48 h (González *et al.*, 2017).

B) Spore formers bacteria were counted using nutrient agar medium after treating the sample at 80°C for 10 minutes and then cooled at 37 °C for 72 hours (**González et al., 2017**).

C) For fungi and yeast, the plates were incubated at 25 °C using potato agar and dextrose for 5 days (**González et al., 2017**).

D) Finally, coli bacteria were determined by using Mac-Conkey agar and incubating at 37 °C for 48 hours (**Manual, 1984 and Murray et al., 2007**).

### **Statistical analysis**

The data was analyzed using SPSS statistical software by analysis of variance (ANOVA) by SPSS (version 16) according to (**Ahmed et al., 2021**).

## **RESULTS AND DISCUSSION**

### **Sensory evaluation**

It is clear from the table (3) the sensory evaluation of the creamy cupcake was supplemented with different levels of banana peel (0, 5, 15, and 25%). All the samples were evaluated for colour, aroma, texture, taste, and overall acceptability.

The present result indicated a high degree of acceptance in the mean values for colour, texture, aroma, taste, general acceptability, and total evaluation for the samples. Further, the mean values for colour and aroma have a bit of a difference between the control and supplemented. Notably, texture and overall acceptability data revealed significant means ( $p < 0.05$ ) differences between the control and supplements of 15% and 25%, respectively. Regarding taste, the mean values between groups show a high degree of acceptance, especially between the control and supplemented with (25%). The creamy cupcakes made with BP dough were brownish in color. This colour could be due to the phenolic compounds, carotenoids, and xanthophylls that are associated with the colour characteristics of the fruit.



These findings were similar to those reported by **Ahmed *et al.* (2021)** who reported that cakes substituted with banana peel powder (BPP) at levels of 3, 6, 9, 12, and 15% were evaluated and had no substantial difference in overall acceptability between samples, as well as excellent properties when compared to the control sample.

The present study coincides with that of **El-Kholie *et al.* (2021)**, who reported that in cakes made from banana peel powder (BPP), parameters (flavor and taste, crust color, general appearance, crumb texture, crumb color, and overall acceptability) were substituted at levels of 10, 20, 30, and 40% for BPP. It recorded the highest score for the control cake (100% wheat flour), and it also recorded a decrease in all tested sensory properties at different rates. The lowest sensory properties were for cake, with 40% replacement levels.

**Table 3.** Sensory evaluation of creamy cake supplemented with different levels of banana peels (BP).

Groups		Colour	aroma	Texture	Taste	Over all acceptability	Total
Creamy cupcake (C)		19.6±0.52 <sup>a</sup>	19.5±0.53 <sup>a</sup>	19.7±0.48 <sup>a</sup>	19.7±0.48 <sup>a</sup>	19.7±0.48 <sup>a</sup>	98.2± 2.3 <sup>a</sup>
Creamy cupcake with BP	5%	18.0±0.00 <sup>b</sup>	19.0±0.00 <sup>a</sup>	19.0±0.00 <sup>b</sup>	19.3±0.48 <sup>b</sup>	19.0±0.00 <sup>b</sup>	95.0±0.82 <sup>b</sup>
	15%	18.0±0.00 <sup>b</sup>	17.7±0.95 <sup>b</sup>	17.0±0.516 <sup>c</sup>	19.0±0.00 <sup>b</sup>	18.3±0.48 <sup>c</sup>	91.1±1.45 <sup>c</sup>
	25%	17.8±0.42 <sup>b</sup>	18.6±0.99 <sup>b</sup>	16.0±0.52 <sup>d</sup>	19.7±0.48 <sup>a</sup>	17.0±0.00 <sup>d</sup>	90.2±1.03 <sup>c</sup>

(C): Control

BP: Banana peels

(M±S.D) = Mean ± Std. Deviation. Values with different small letters in the same column are significantly different (p<0.05).

The aerobic bacterial count of the creamy cake prepared with different levels of banana peel was evaluated after every four days (0, 4, 8 and 12 days

)of storage at ( $20\pm 1^\circ\text{C}$ ). The obtained results were shown in table (4).

The current results showed that an increase in the number of aerobic bacteria appeared in the control sample after 12 days of storage, whereas nubers in the creamy cake prepared with different levels of banana peel decreased significantly, particularly in the case of the creamy cake prepared with 25% banana peel, which had eliminated all aerobic bacteria after 8 and 12 days of storage, and the creamy cake prepared with 15% banana peel, which had also eliminated all aerobic bacteria after 12 days of storage.

This study is consistent with that of **Ahmed *et al.* (2021)**, who demonstrated that the microbiological statuses of ten cakes were evaluated during storage ( $25\pm 1^\circ\text{C}$ ) for 12 days after every three days. They discovered that cake samples with 12 and 15% banana peel powder were free of aerobic bacteria until 3 days of storage, whereas aerobic bacteria grew in lower-substituted banana peel powder (BPP) cakes (3, 6, and 9%) and the control sample after 3–12 days of storage.

**Table 4.** Total bacterial count of creamy cake supplemented with different levels of banana peels (BP) during the storage period.

Storage period (days) $25\pm 1^\circ\text{C}$		Zero day	Four days	Eight days	Twelve days
		Numbers $\times 10$			
Treatments	0%	$15\pm 2.54$	$21\pm 0.84$	$66\pm 1.22$	$92\pm 1.55$
	5%	$11\pm 1.58$	$19\pm 1.84$	$23\pm 1.6$	$11\pm 0.9$
	15%	$8\pm 0.83$	$12\pm 0.71$	$7\pm 0.8$	ND
	25%	$7\pm 0.55$	$5\pm 0.7$	ND	ND

(C): Control (BP): banana peels

(M $\pm$ S.D) = Mean  $\pm$  Std. Deviation. Values with different small letters in the same column are significantly different ( $p < 0.05$ ).

Table (5) evaluated the count of spores formers bacteria in a formulated creamy cake made with various types of a banana peel every four-day period of storage at (20±1°C) for 12 days.

The current results showed that the number of spore-forming bacteria increased, particularly in the control sample after 12 days of storage, but the count of spore-forming bacteria decreased significantly in the creamy cake with different levels of banana peel, particularly in the creamy cake prepared with 15% and 25% banana peel, which had eliminated all spore-forming bacteria after 8 and 12 days of storage, respectively.

It's noteworthy that, spore formers bacteria in table 5 were harmonized with the total bacterial count in table 4. These findings could be attributed to the high temperatures used in cooking, as the majority of the remaining bacteria were spore formers .

**Table 5.** Spore formers bacteria count of creamy cake supplemented with different levels of banana peels (BP) during the storage period.

Storage period (days) 25±1°C		Numbers × 10			
		Zero day	Four days	Eight days	Twelve days
Creamy cupcake with (BP)	0%	9±0.84	22±0.71	32±0.84	36±0.71
	5%	8±0.71	13±1.22	12±0.71	11±0.71
	15%	6±1.58	4±0.84	ND	ND
	25%	4±0.84	3±0.71	ND	ND

(C): Control (BP): banana peels

(M±S.D) = Mean ± Std. Deviation. Values with different small letters in the same column are significantly different (p<0.05).

Data tabulated in Table (6) show the coliform bacterial count of creamy cake supplemented with different levels of banana peels (BP) during a four-day period of storage at (20±1°C) for 12 days.

It could be observed that the control creamy cupcake and the supplemented with different levels of banana peels (BP) were free from Coliform bacteria; this is strong

evidence that all samples were for cooking creamy cupcakes to destroy all Coliform bacteria.

In this respect, the absence of coliform bacteria is thought to indicate faecal non-contamination (Brackett and Splittstoesser, 1992).

**Table 6.** Coliform bacterial count of creamy cake supplemented with different levels of banana peels (BP) during the storage period.

Storage period (days) 25±1 °C		Zero day	Four days	Eight days	Twelve days
		Numbers × 10			
Treatments Creamy cupcake with (BP)	0%	ND	ND	ND	ND
	5%	ND	ND	ND	ND
	15%	ND	ND	ND	ND
	25%	ND	ND	ND	ND

(C): Control (BP): banana peels

(M±S.D) = Mean ± Std. Deviation. Values with different small letters in the same column are significantly different (p<0.05).

Table 7 shows that a creamy cupcake containing 25% banana peels disappeared any mold or yeast after 12 days at storage at room temperature, a creamy cupcake containing 15% banana peels remained mold and yeast free at first 8 days, but a creamy cupcake containing 5% banana peels remained mold and yeast free for only 4 days, all of samples stored at (20±1 °C). Moreover, it could be observed that the mold and yeast content of the creamy cupcakes increased. Despite the fact that the control sample showed an increase in mold and yeast during all storage periods.

These findings were similar to those reported by Ahmed *et al.*, (2021), who discovered that cake containing 9–15% banana peel powder (BPP) was mold and yeast free until 6 days of storage, whereas mold and yeast growth appeared in samples containing 3, 6, and 6% banana peel powder and control cake samples after 6–12 days of storage.

In this respect Emara *et al.* (2010) reported that the effectiveness of banana peel powder (BPP) in inhibiting the growth of some groups of microorganisms was related to the relatively high natural antioxidant content and antioxidant activity in BPP.

**Table 7.** Mold and yeast count of creamy cake supplemented with different levels of banana peels (BP) during the storage period.

Storage period (days) 25±1 °C		Zero day	Four days	Eight days	Twelve days
		Numbers × 10			
Creamy cupcake with (BP)	0%	5± 0.71	12± 1.58	13±0.85	21±0.71
	5%	ND	ND	1±0.71	3±0.85
	15%	ND	ND	ND	2±0.71
	25%	ND	ND	ND	ND

(C): Control (BP): banana peels

(M±S.D) = Mean ± Std. Deviation. Values with different small letters in the same column are significantly different (p&lt;0.05).

## Conclusion

According to the current study, banana peel could be used to extend the shelf life of creamy cupcakes. According to the sensory evaluation of the creamy cupcake, the results showed a high degree of general acceptance, especially with regard to the taste of the cupcake fortified with 25% banana peel. Also, increasing the amount of banana peel resulted in a longer shelf life for the creamy cupcakes, and it worked to eliminate aerobic and spore bacteria.

## References

- Adetuyi, B. O., Ogundipe, A. E., Ogunlana, O. O., Egbuna, C., Estella, O. U., Mishra, A. P., & Achar, R. R. (2022); Banana peel as a source of nutraceuticals. In Food and agricultural byproducts as important source of valuable nutraceuticals (pp. 243-250). Springer, Cham.
- Ahmed, Z., Al-Sharnoby, G. A., & El-Waseif, M. A. (2021); Use of Banana peel as a by-product to increase the nutritive value of the cake. Food Dairy Sci, 12(4), 87-97.

- Alkhatib, A., Tsang, C., Tiss, A., Bahorun, T., Arefanian, H., Barake, R. and Tuomilehto, J. (2017);** Functional foods and lifestyle approaches for diabetes prevention and management. *Nutrients*, 9(12), 10-17.
- Ayalazavala, F., Vega, V., Rosasdomínguez, C., Palafox, H., Villarodriguez, A., Wasim, D., Dávila, E. and González, A. (2011);** Agro-industrial potential of exotic fruit byproducts as a source of food additives. *Food Research International*, 44(7), 1866- 1874.
- Brackett, R. E., and Splittstoesser (1992);** Shelf stability and safety of fresh produce as influenced by sanitation and disinfection. *Journal of food protection*, 55(10), 808-814.
- El-Kholie, E. M., Khader, S. A., & Ali, H. M. (2021);** Utilization of Mango and Banana Peels to Produce Cake, *Journal of Home Economics Menoufia University*, 31(3): pp 87-100.
- Emara, F., El-Karamany, M., Nemat, I., Atwa, A., Manal, A. and Soliman, A. (2010);** A study on the use of some natural extracts as anti-fungi to prolong the conservation of wheat and its products. *Journal of Food and Dairy Sciences*, 1(2), 85-100.
- Gomes, S., Vieira, B., Barbosa, C., & Pinheiro, R. (2020);** Evaluation of mature banana peel flour on physical, chemical, and texture properties of a gluten free Rissol. *Journal of Food Processing and preservation*, 46(8), e14441.
- González, M. G. M., Romero, S. M., Arjona, M., Larumbe, A. G., & Vaamonde, G. (2017);** Microbiological quality of Argentinian paprika. *Revista Argentina de microbiologia*, 49(4), 339-346.
- Hassan, H. F., Hassan, U. F., Usher, O. A., Ibrahim, A. B., & Tabe, N. N. (2018);** Exploring the potentials of Banana (*Musa Sapientum*) peels in feed formulation. *International Journal of Advanced Research in Chemical Science*, 5(5), 10-14.
- Kanazawa K, and Sakakibara H (2000);** High content of dopamine, a strong antioxidant, in Cavendish banana. *J Agric Food Chem* 48:844–848.

- Kim, H.J.Y.; Moon, H.; Kim, D.; Lee, M.; Cho, H and Choi, Y.S. (2010);** Antioxidant and antiproliferative activities of mango (*Mangifera indica* L.) flesh and peel. *Food Chem.*, 121, 429-436.
- Krishna, C. (1999);** Production of bacterial cellulose by solid state bioprocessing of banana waste. *Bio Resour Technol* 69:231–239.
- Manual, D. (1984);** Dehydrated culture media and reagents for microbiology. Laboratories incorporated Detroit. Michigan, 48(2), 1027-1059.
- Murray, D., Karas, J., Sato, S., Tabata, S., Amyot, L. and Szczyglowski, K. (2007);** A cytokinin perception mutant colonized by *Rhizobium* in the absence of nodule organogenesis. *Science*, 315(5808), 101- 104.
- Mohamed El-Gazaly, F., Ahmed Sadeek, R., & Mohamed Makram, M. (2023);** Technological and sensory studies on gluten-free food products: applications on Cupcakes and Sable biscuits. *Journal of research in the fields Specific Education*, 9(44), 2303-2326.
- O'shea, N., Arendt, K., and Gallagher, E. (2012);** Dietary fiber and phytochemical characteristics of fruit and vegetable by-products and their recent applications as novel ingredients in food products. *Innovative Food Science and Emerging Technologies*, 16(8), 1-10.
- Pérez AG, Cert A, Rios JJ, and Olias JM (1997);** Free and glycosidically bound volatile compounds from two banana cultivars: Valery and Pequena Enana. *J Agric Food Chem* 45:4393–4397
- Randy CP, Angela KK, Jeff D, and Scot CN (2007);** Banana and plantain—an overview with emphasis on Pacific island cultivars. *Species Profiles for Pacific Island Agroforestry*, 1, pp 2–27.
- Saba, Nargis, H .(1995);** *Cooking , Science and Art.* Dar EL-Maaref, Cairo, p 613,774, 766.
- Sajjad, W., Sohail, M., Ali, B., Haq, A., Din, G., Hayat, M Imran, K , Ahmad, M and Khan, S. (2015);** Antibacterial activity of *Punica granatum* peel extract. *Mycopath*, 13(2), 105-111.

**Segura-Badilla, O., Kammar-García, A., Mosso-Vázquez, J., Sánchez, R. Á. S., Ochoa-Velasco, C., Hernández-Carranza, P., & Navarro-Cruz, A. R. (2022);** Potential use of banana peel (*Musa cavendish*) as ingredient for pasta and bakery products. *Heliyon*, 8(10), e11044.

**Van den Berg H, Faulks R, Granado HF, Hirschberg J, Olmedilla B, Sandmann G, Southon S, and Stahl W (2000);** The potential for the improvement of carotenoid levels in foods and the likely systemic effects. *J Sci Food Agric* 80:880–912

**Verde-Mendez CDM, Forster MP, Rodríguez-Delgado MA, Rodríguez-Rodríguez EM, and Romer CD (2003);** Contento f free phenolic compounds in bananas from Tenerife (Canary Island) and Ecuador. *Eur Food Res Technol* 217:287–290

**Wolfe K, Xianzhong WU, and Liu RH (2003);** Antioxidant activity of apple peels. *J Agric Food Chem* 51:609–614

**Zaini, H. M., Roslan, J., Saallah, S., Munsu, E., Sulaiman, N. S., & Pindi, W. (2022);** Banana peels as a bioactive ingredient and its potential application in the food industry. *Journal of Functional Foods*, 92, 105054.



## التأثير الحافظ لقشر الموز على مدة صلاحية الكب كيك الدسم

### الملخص

يتخلف عن الموز الكثير من القشر ، والذي يتم التخلص منه كنفایات على الرغم من كونه مصدرًا غنيًا بالمواد الغذائية والمركبات الطبيعية النشطة بيولوجيًا. لذلك، كان الهدف الرئيسي من هذه الدراسة هو اختبار التأثير الحافظ والوقائي لقشر الموز على مدة صلاحية الكب كيك الدسم بجانب الاستفادة من المغذيات الموجودة به. وقد أجريت هذه الدراسة باستبدال كلا من الدقيق واللبن بمستويات مختلفة من قشر الموز (0- 5- 15- 25 %) في الكب كيك الدسم، وتم تحكيم الخواص الحسية له من خلال محكمين مدربين، وأيضا دراسة الخواص الميكروبيولوجية. وأظهرت نتائج التقييم الحسي درجة كبيرة من التقبل العام وخصوصا بالنسبة للطعم للكب كيك المدعم ب25% استبدال. وبالنسبة لأعداد البكتريا سواء الخضرية أو المتجرثمة فقد أظهرت النتائج أنه مع زيادة محتوى المنتج من قشر الموز تتناقص هذه الانواع من البكتريا فكانت أفضل النتائج التي تم الحصول عليها للكب كيك الذي يحتوي على 25% قشر موز فقد لوحظ أنه مع زيادة مدة التخزين تختفي كلا من بكتريا العد الكلي والمتجرثمة على الرغم من زيادتها في العينة الكنترول. أما بالنسبة للكشف عن بكتريا القولون فقد أثبتت النتائج خلو جميع العينات منها بما فيها الكنترول. وأخيرا اثبتت النتائج خلو الكب كيك المدعم ب 25% قشر موز طوال فترة التخزين حتى 12 يوم من الفطريات والخمائر في حين تواجد الفطريات والخمائر في العينة الكنترول طوال فترة التخزين على درجة حرارة الغرفة. وفي الخلاصة، اتضح انه يمكن الاستفادة من العناصر الغذائية الموجودة في قشر الموز في تدعيم محتوى الكب كيك من العناصر الغذائية، كما أن المواد الفعالة الموجودة في قشر الموز أدت لاطالة العمر الافتراضي للمنتج. و توصي هذه الدراسة باستخدام قشر الموز لتعزيز وتدعيم وزيادة مدة صلاحية الكب كيك لما لها من فوائد عديده بجانب قيمتها الغذائية.

**الكلمات المفتاحية:** التدعيم بقشر الموز، الكب كيك الدسم، البكتريا الهوائية، البكتريا المتجرثمة.