Omega-Mallow Treats

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NFSC 320-06, Science of Food

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01 December 2023

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Abstract

The product market is an ever changing, highly competitive market that companies continually have to generate new ideas for in order to survive. The creation of a new product or the improvement of an existing product which was whole-grain, grab & go, marketed for college students and follows the top food trends was the goal. Concepts for the development of this product were brainstormed by the entire lab group. Once a viable potential product list was attained, research was conducted to eliminate similar products already marketed. The creation of protocepts were used to test the product for taste, visual appeal, texture, aroma, and overall likability. After experimenting with flavoring, texture, ingredient measurement, and overall recipe tweaking a final prototype was produced. The high fiber, grab & go bars are quinoa based, gluten-free, vegan, and exclude almost all allergens with the exception of soy. These bars then were used for consumer testing on California State University, Chico's campus, which included a panel of students and staff. Information gathered on the responses of this panel found that overall people enjoyed this product and slightly preferred chocolate flavoring over vanilla. Further testing could be a goal to verify the results. However, replicating overall approval would be the logical next step.

Introduction & Background

The category for our team is whole-grains. Whole-grain products contain all three original grain kernel parts, the bran, germ, and endosperm. They are considered to contain more nutrients, fiber, and phytochemicals, which provide health benefits. Upon brainstorming to find a viable product, the concept of a "Rice Krispy" type bar that uses whole grains was determined to be appealing. Research did not find any similar marketed product. Quinoa, which is the base for our product, is the whole-grain component which we utilized. Initially the gluten-free aspect of quinoa was the determining factor in our choice. The gluten-free market is increasingly appealing to consumers. When interviews about this product were conducted we received positive feedback regarding our product concept. Due to the desire from the group to create a vegan product elicited the only "negative" response on the part of the individuals who were interviewed. The concern focused on a vegan product not tasting as good. In response to this feedback the group produced quinoa bars that had vegan chocolate and vanilla bars. Taste tests in lab resulted in both bars being liked and revealed that the product being vegan had no effect on taste. After ruling out taste as an issue in the vegan aspect of the quinoa bars and due to positive feedback for our product, we created our final product concept. "OmegaMallow Bars" were ultimately born.

Current food trends influence product choices by consumers. OmegaMallow Bars meet the criteria of various top food trends. The first trend that our product meets is "Morphing Meal Patterns", under this trend it states that snack sales are increasing. Due to OmegaMallow bars being considered a grab & go and the serving size being 40g, they are considered a snack. The next trend that our product follows is "Sustainable Superstars", this includes Gen Z avoiding gluten and consuming more foods that are considered "superfoods" because it incorporates a

proactive approach to health and wellness.. Quinoa is both gluten-free and a “superfood” making our product a “Sustainable Superstar”. Another trend being followed by our product is “Everyday Self-Care” which states that popular diet items are being bought into more. Vegan and gluten-free diets are increasing in popularity due to this trend. “Urgent Care” is a trend that highlights the health benefits foods provide. The Urgent Care trend enhances, stabilizes weight, improves digestive health, sleep and also immune function. Omega Mallow Bars are a great choice for overall health. Finally, the “Parent Trap” trend targets those with teenagers and households with small children. Prepared food, such as grab & go bars, make Omega Mallows a good choice for these top food spending households. In conclusion the number of trends that Omega Mallows satisfy and because the food market size is so vast for a product such as this we predict continued enthusiasm and acceptance for those seeking a grab & go, whole-grain snack. An obstacle, which cannot be discounted, would be market penetration. Due to new products being introduced daily and large corporations ruling this market, penetrating the market would be the largest challenge.

Product Concept

Discover a healthy way to snack with our Omega Mallow Bars! Taste the gooey goodness of our vegan marshmallows combined with a nutritious quinoa crunch. Enjoy your favorite childhood treat with a boost of omega fatty acids. Perfect for an on-the-go guilt-free snack.

Prototype

Prototype Development & Results

Our recipe and procedures for making the Omega-Mallow treats was inspired by a recipe we found online for vegan Rice Krispies using regular puffed white rice where we adjusted the recipe and swapped out the white rice with other puffed whole grains. The procedures were as

follows: After weighing out all the ingredients, we added butter (35 grams per batch) to a pot and allowed it to melt completely. Next, we added in the marshmallows (141.5 grams per batch or half a bag), constantly stirring until they were also completely melted. While still in the pot, we added a small amount of water (1 tablespoon or 15 grams per batch), salt (¼ a teaspoon or 1.5 grams), and vanilla extract (¼ a teaspoon or 1 gram) to the marshmallow butter mixture. In a separate bowl, we mixed the puffed grain and chocolate chips. We added the marshmallow butter mixture to the dry ingredients and mixed using our hands covered with gloves. Lastly, we distributed the entire mixture into square pans, filling them up to the top. To prevent the mixture from sticking to the mixing bowls and square pans, we sprayed them with non-stick cooking spray.

The goal of the first prototypes of the Omega-Mallow Treats was to decide on which puffed grain we wanted to use, either puffed brown rice or the Nuts.com puffed quinoa to see which grain would have a better texture and flavor. Due to the Nuts.com quinoa being very dense, we were unable to make a weight-for-weight substitution and instead, substituted using similar volumes. One cup of puffed brown rice was ~16 grams while one cup of puffed Nuts.com quinoa was 60 grams. Hence, we used 2.5 cups of puffed brown rice in one batch and 2 cups of puffed Nuts.com quinoa. In these prototypes, we also used large vegan marshmallows, vegan butter, chocolate (for both batches), water, vanilla extract, and salt.

The results from the in-class feedback showed a strong preference for the Nuts.com quinoa bar over the puffed brown rice. The Nuts.com quinoa bar had a nice crunch and the texture was highly acceptable while the puffed brown rice bar had a bit of a soggy and chewy texture to it. Hence, we decided to use puffed quinoa as our grain due to the favorable texture and flavor that it adds.

In the second prototypes, our group decided to buy a cheaper puffed quinoa online from the Olive Nation brand to try to keep the cost of the bar lower. The Olive Nation puffed quinoa was also very dense, but not as dense as the Nuts.com puffed quinoa, and we made a weight-for-weight substitution to the previous prototype with the Nuts.com quinoa. We used 120 grams of this Olive Nation quinoa per batch. We also made the addition of 20 grams of chia seeds and 20 grams of flaxseeds to each batch to add extra nutrition, flavor, and color. Additionally, we decided to test out a vanilla flavor versus a chocolate flavor to see which one would be preferred. All other ingredients and procedures stayed about the same.

The results from the in-class feedback showed mixed results for the preference between chocolate and vanilla. Adding in the chia and flax seeds added a bit of a nutty flavor that was more present in the vanilla bars compared to the chocolate bars. Using the Olive Nation puffed quinoa gave us a similar chewy and soggy texture as the puffed brown rice bars. The flavor was acceptable, however, the texture still needed to be adjusted. We also received some feedback expressing a lack of marshmallow and vanilla flavor in the bars.

In the third prototype, we decided to roast the Olive Nation quinoa to try to make the texture of the bars more favorable while adding a pleasant roasted flavor. Our goal here was that roasting this puffed quinoa would make the bars more crunchy and add a pleasant roasted flavor. We roasted the Olive Nation puffed quinoa for around 15 minutes and let it cool down a bit before mixing in the rest of the ingredients. We also decreased the amount of puffed quinoa and only used 80 grams per batch compared to 120 grams in the second iteration. This was to give the bars a stronger marshmallow and vanilla flavor. All other ingredients and procedures stayed the same. We also used mini marshmallows here instead of large marshmallows to help decrease the time spent melting the marshmallows as the mini marshmallows melted faster.

While decreasing the amount of puffed quinoa positively improved the marshmallow and vanilla flavor, the results of the texture were still negative. Roasting the puffed quinoa added some extra flavor, however, the texture did not improve much. The bars were still a bit soggy and chewy and did not have a favorable texture.

In the fourth prototype, we decided to go back to the Nuts.com quinoa, even though it cost a bit extra. In the very first iteration, we used 120 grams of the Nuts.com quinoa but we did not have any seeds in these prototypes. In this fourth prototype, we decreased the amount of the Nuts.com quinoa to 100 grams to take into account the extra chia seeds and flax seeds that were not included in the first prototype. All other ingredients and procedures remained the same.

The results of this prototype iteration were very positive. The texture had improved immensely using the Nuts.com quinoa compared to the Olive Nation quinoa. These bars were much more crispier and did not become soggy. Both the chocolate and the vanilla bars were highly acceptable and there was still the question of which one is preferred. We decided to use the fourth prototype's recipe for the consumer testing.

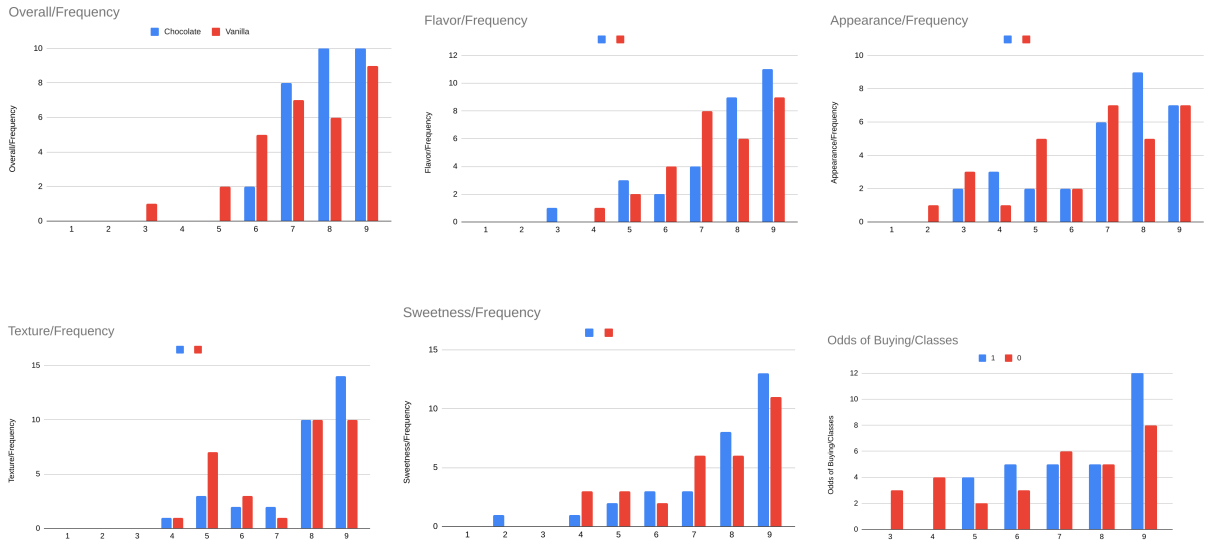
Consumer Testing

Statistics

In our consumer testing data, we gathered feedback on chocolate and vanilla products, focusing on attributes such as overall liking, flavor, appearance, texture, sweetness, and the odds of consumers buying the product. Participants rated chocolate with a mean overall liking score of 7.93 and a standard deviation of 0.94, while vanilla received a mean score of 7.37 with a standard deviation of 1.52. The statistical analysis revealed a significant difference in overall liking between the two, as denoted by a p-value of 0.014. When it comes to flavor, chocolate scored a mean of 7.63 with a standard deviation of 1.56, and vanilla received a mean of 7.433 with a standard deviation of 1.41, with no statistically significant difference (p-value = 0.52). In terms of appearance, chocolate earned a mean score of 7 with a standard deviation of 1.88, while vanilla scored 6.58 with a standard deviation of 2.09, with a non-significant p-value of 0.1867. However, significant differences were observed in texture, sweetness, and the odds of buying. For texture, chocolate scored a mean of 7.84 (SD = 1.46) compared to vanilla's 7.31 (SD = 1.674) with a p-value of 0.013. Sweetness did not show significant differences (p-value = 0.348), while the odds of buying were significantly higher for chocolate (mean = 7.34, SD = 1.75) than vanilla (mean = 6.5, SD = 2.27) with a p-value of 0.0176. Our data indicates noteworthy variations between chocolate and vanilla products, particularly in overall liking, texture, and purchase likelihood.

Table and Graph

<u>Frequency Tables:</u>



Score Table:

		Mean	Std. Dev.	P-Value
Overall Liking	Chocolate	7.93	0.94	0.015
	Vanilla	7.37	1.52	
Flavor	Chocolate	7.63	1.56	0.052
	Vanilla	7.43	1.41	
Appearance	Chocolate	7	1.88	0.019
	Vanilla	6.58	2.09	
Texture	Chocolate	7.84	1.46	0.013
	Vanilla	7.31	1.67	
Sweetness	Chocolate	7.61	1.76	0.38
	Vanilla	7.35	1.70	
Odds of Buying	Chocolate	7.34	1.75	0.018
	Vanilla	6.5	2.27	

Consumer Testing Summary

Consumer comments on chocolate highlighted positive aspects such as a KitKat-like crunch and overall goodness, despite occasional reservations about an odd opening flavor and dryness. Participants expressed a strong inclination to purchase the chocolate product if budget constraints weren't a factor. For vanilla, feedback mentioned a softer texture, with some participants noting the need for more effort in chewing. Similar to chocolate, non-vegan considerations impacted purchase decisions, but positive remarks on texture, crunch level, and appropriate sweetness indicated a favorable reception. In summary, qualitative feedback aligns with quantitative findings, emphasizing distinct variations between chocolate and vanilla, particularly in texture and purchase likelihood.

Discussion

Product Label

Chocolate Label

Nutrition Facts

servings per container
Serving size **(40g)**

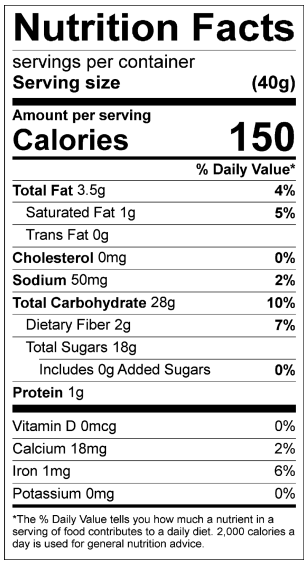
Amount per serving
Calories **150**

	% Daily Value*
Total Fat 3.5g	**4%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 50mg	**2%**
Total Carbohydrate 28g	**10%**
Dietary Fiber 2g	**7%**
Total Sugars 18g	
Includes 0g Added Sugars	**0%**
Protein 1g	
Vitamin D 0mcg	0%
Calcium 18mg	2%
Iron 1mg	6%
Potassium 0mg	0%

*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

INGREDIENTS: VEGAN MARSHMALLOW (TAPIOCA SYRUP, CANE SUGAR, FILTERED WATER, TAPIOCA STARCH, CARRAGEENAN, SOY PROTEIN, NATURAL VANILLA FLAVOR), ORGANIC QUINOA PUFFS, VEGAN BUTTER (VEGETABLE OIL BLEND [PALM OIL, CANOLA OIL, SOYBEAN OIL, FLAXSEED OIL], WATER, SALT, LESS THAN 2% OF: NATURAL FLAVORS, SOY PROTEIN ISOLATE, OLIVE OIL, ORGANIC SOY LECITHIN, LACTIC ACID, ANNATTO EXTRACT [COLOR]), VEGAN CHOCOLATE (CANE SUGAR, UNSWEETENED CHOCOLATE, COCOA BUTTER), ORGANIC FLAX SEED, ORGANIC CHIA SEEDS, WATER, SALT, VANILLA EXTRACT (VANILLA BEAN EXTRACTIVES IN WATER AND ALCOHOL).
CONTAINS: SOY. GLUTEN FREE. VEGAN.
Note: Packaged in the same facility as peanuts, tree nuts, wheat, soy, sesame, and milk products.

Vanilla Label



Nutrition Facts

servings per container
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Amount per serving
Calories **150**

	% Daily Value*
Total Fat 3.5g	**4%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 50mg	**2%**
Total Carbohydrate 28g	**10%**
Dietary Fiber 2g	**7%**
Total Sugars 18g	
Includes 0g Added Sugars	**0%**
Protein 1g	
Vitamin D 0mcg	0%
Calcium 18mg	2%
Iron 1mg	6%
Potassium 0mg	0%

*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

INGREDIENTS: VEGAN MARSHMALLOW (TAPIOCA SYRUP, CANE SUGAR, FILTERED WATER, TAPIOCA STARCH, CARRAGEENAN, SOY PROTEIN, NATURAL VANILLA FLAVOR), ORGANIC QUINOA PUFFS, VEGAN BUTTER (VEGETABLE OIL BLEND[PALM OIL, CANOLA OIL, SOYBEAN OIL, FLAXSEED OIL], WATER, SALT, LESS THAN 2% OF:NATURAL FLAVORS, SOY PROTEIN ISOLATE, OLIVE OIL, ORGANIC SOY LECITHIN, LACTIC ACID, ANNATTO EXTRACT [COLOR]), ORGANIC FLAX SEED, ORGANIC CHIA SEEDS, WATER, SALT, VANILLA EXTRACT (VANILLA BEAN EXTRACTIVES IN WATER AND ALCOHOL). CONTAINS: SOY. GLUTEN FREE. VEGAN.
Note: Packaged in the same facility as peanuts, tree nuts, wheat, soy, sesame, and milk products.

Package and Distribution

The Omega-Mallows treats would be packaged and sold individually. Simple, sleek, flexible, heat sealable cellophane bags would wrap each serving of 40 grams. The cellophane is clear and allows the consumer to view the size, texture, and perceived flavor of the treat. The chosen package is moisture resistant to preserve freshness. The desired supplier of the packaging would be Uline. Their cellophane bags are FDA compliant, compostable under industrial conditions, and tested to ASTM D6400 standards. The bag chosen would not be resealable due to the compact, single serving intended to be consumed “on-the-go” and in its entirety. A sticker label would be placed on the top of the bag with the required six elements: product identity, net quantity of contents, manufacturer name and address, ingredients in descending order of amount, nutrition facts, and allergen declaration.

Results

Conclusions

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Recommendations

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Appendices

PT Iteration Table

	Weight Percentage of Main Ingredients				
	Puffed Quinoa/Rice	**Vegan Marshmallows**	**Chocolate Chips**	**Chia & Flax Seeds**	**Other**
Prototype 1: Puffed Quinoa (Nuts.com)	33%	39%	21%	0%	8%
Prototype 1: Puffed Rice	14%	49%	19%	0%	17%
Prototype 2: Chocolate Puffed Quinoa (Olive Nation)	30%	35%	15%	10%	11%
Prototype 2: Vanilla Puffed Quinoa (Olive Nation)	35%	41%	0%	12%	13%
Prototype 3: Chocolate Roasted Puffed Quinoa (Olive Nation)	22%	39%	16%	11%	12%
Prototype 3: Vanilla Roasted Puffed Quinoa (Olive Nation)	26%	46%	0%	13%	15%
Prototype 4: Chocolate Puffed Quinoa (Nuts.com)	26%	37%	16%	11%	10%
Prototype 4: Vanilla Puffed Quinoa (Nuts.com)	31%	45%	0%	13%	11%

Other

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