

Developing the Concept of 'Skull Shot Sachet': An Innovative Method for Packaging Soft Drink Powder and Developing Sugar-Free Composition

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Abstract: Powdered soft drinks, in their dry, convenient form, have become a popular choice among consumers seeking portable and affordable beverage options. This research paper examines the technology and nutritional value of powdered drinks, explores the market for powdered soft drinks, and delves into their production processes. Powdered soft drinks are created through a blend of flavoring materials, dry acids, gums, artificial colors, and other additives, resulting in a versatile and customizable beverage option. The nutritional content of these drinks varies, allowing for tailored choices, from traditional sugar-sweetened options to low-calorie and low-sugar alternatives. The market for powdered soft drinks is diverse, with a range of products catering to different tastes and preferences, and often emphasizing affordability and convenience. By addressing these aspects, this research paper offers valuable insights into an industry that continues to evolve, driven by changing consumer preferences and technological advancements.

Keywords: Powdered soft drinks

I. INTRODUCTION

In a modern era defined by fast-paced lifestyles and evolving consumer preferences, the search for convenient, cost-effective, and portable beverage options has given rise to powdered soft drinks. This dry, versatile form of non-alcoholic beverages has captured the attention and thirst of consumers worldwide. Powdered soft drinks, often referred to as powdered drink mixes or instant drink powders, are more than just a beverage; they represent a fusion of technology, nutrition, and market dynamics, offering insights into an ever-evolving industry.

Powdered soft drinks are crafted through a fascinating amalgamation of flavoring materials, dry acids, gums, artificial colors, and an array of other additives. These elements unite to create a beverage option that is as adaptable as it is customizable. The outcome is a powdered soft drink that caters to a variety of tastes, preferences, and dietary requirements. These range from conventional sugar-sweetened options to low-calorie and low-sugar alternatives, making them suitable for a diverse consumer base.

The research holds significance due to the convergence of these five objectives that will be discussed at section 2 objectives, which collectively contribute to a holistic comprehension of the powdered soft drink sector. Through an examination of these various facets, our objective is to offer significant perspectives on a sector that not only adapts to changing consumer desires but also thrives on ongoing technical progress. In this exploration of powdered soft drinks, we extend an invitation to readers to accompany us on a scholarly expedition, aimed at revealing the intricate nuances of a deceptively uncomplicated beverage.

11. Objectives

Aim 1: Examine the manufacturing processes and technology involved in producing powdered soft drinks, including the selection and integration of ingredients, blending techniques, and packaging methods.

Aim 2: Evaluate the nutritional value of various powdered soft drink products, with a focus on calorie content, sugar levels, and the presence of added vitamins, minerals, or artificial sweeteners.

Aim 3: Analyze the current market for powdered soft drinks, including market size, growth trends, consumer preferences, and competitive landscape.

Aim 4: Investigate consumer attitudes and behaviors regarding powdered soft drinks, including factors influencing purchase decisions, flavor preferences, and perception of nutritional value.

Aim 5: Assess the environmental impact of producing and consuming powdered soft drinks, and examine any sustainability initiatives within the industry.

1.2 Steps for Preparation

- **Selection and Collection:** The initial stage in the production of powdered soft drinks involves the careful selection and collection of the necessary components. The creation of powdered soft drinks involves the utilization of several components, namely granulated sugar, cocoa powder, skimmed milk powder, malt and barley powder, citric acid, Rebaudioside M, and a variety of other minor constituents.
- **Cutting:** The process of cutting, or the act of dividing or separating, is not considered a necessary procedure in the manufacture of powdered soft drinks.
- **Drying:** Drying is an initial step in sample processing that may be necessary to acquire a representative sample and enhance the dissolution or dispersion of the sample in a more effective manner.
- **Grinding:** The process of grinding is a crucial component in the initial stages of producing powdered soft beverages. The procedure for combining dry materials entails the amalgamation of the constituent components, while the decrease in particle size of energy powder is accomplished by the utilization of a pneumatic conveying and grinding system[1].
- **Sieving:** Sieving is a method of sample processing that can be employed to narrow down the distribution of particle sizes.
- **Mixing:** The process of mixing serves as the last stage in the production of powdered soft drinks. The manufacturing process for instant powdered drink mixes comprises multiple stages, encompassing the storage and transportation of sugar for dissolving in a meticulously measured cast iron tank, the blending of dry ingredients, and the incorporation of ingredients for beverage manufacture.[2]



Figure 1: Steps for preparation

II. LITERATURE REVIEW QUESTIONS

Aim 1: Examine the manufacturing processes and technology involved in producing powdered soft drinks, including the selection and integration of ingredients, blending techniques, and packaging methods.

There are different ways to blend powders, such as using low-intensity, inhomogeneous mills like the ribbon blender and paddle mixer, or high-intensity mills.

- **Blending and segregation (demixing)** are two processes that work against each other. When a transfer step is added to a process, the powder blend can separate[3].
- **Things that affect blending:** Particle segregation depends on a lot of things, like particle size, density, moisture level, and more. Some of the features of particles are their size distribution, shape, density, composition, and internal structure[4].

The goal of good mixing systems is to make the process as efficient and effective as possible so that the final result is homogeneous and of consistent quality.

In the steps used to make things that involve mixing powder, producers make sure that a high level of homogeneity is kept.

Picking the right blender: Picking the right mixing type for each powder and processing need is important to get uniformity within the time requirements.

The right mixer design can help keep powder degradation low while getting a high level of regularity.

Aim 2: Evaluate the nutritional value of various powdered soft drink products, with a focus on calorie content, sugar levels, and the presence of added vitamins, minerals, or artificial sweeteners.

- **Calories:** Powdered soft drinks can have different amounts of calories based on the brand and size of the serving. One dose of chocolate drink powder, for instance, can have 39 calories.
- **Levels of sugar:** Powdered soft drinks may have a lot of sugar, which can make you gain weight and cause other health problems.
- But some powdered soft drinks are being changed to include natural and low-calorie sweets. This means that health-conscious people can drink soft drinks without sacrificing their health.
- **Added minerals and vitamins:** Mineral and vitamin supplements can be added to powdered soft drinks, which can then be sold to customers as a source of energy, vitamins, and minerals[5].
- **Normal soft drinks,** on the other hand, don't usually have a lot of vitamins or minerals in them[5].
- **Artificial sweeteners:** Some powdered soft drinks may have artificial sweeteners in them, which may be bad for your health.

Aim 3: Analyze the current market for powdered soft drinks, including market size, growth trends, consumer preferences, and competitive landscape

- **Size of the market:** The market for powdered soft drinks will be worth US\$ 12.3 billion in 2023 and US\$ 17.3 billion by 2033, growing at a rate of 3.4% per year[6].
- **Trends in growth:** In the past few years, the global powdered soft drinks market has grown a lot. This is because more and more people are looking for easy, portable, and cheap drink choice. In the years to come, the market is likely to keep growing.[7].

People are changing the powdered soft drink they like, and they want more natural and low-calorie sweets. Customers also want new tastes and ways to package their purchases.

The market for powdered soft drinks is very competitive, with many companies trying to get a piece of it. PepsiCo, Coca-Cola, Nestle, and Kraft Foods are some of the biggest companies in the business[8].

Companies are spending money on advanced technologies and eco-friendly packaging options to make their production methods more efficient and last longer.

Powdered soft drinks are attractive to consumers because of the ease with which they may be prepared, which is a key component in the expansion of the market.

Powdered soft drinks are a popular option for consumers who are constantly on the go because they do not require any preparation and can be consumed anywhere.

Changing consumer preferences The preferences of consumers for powdered soft drinks are shifting, and there is an increase in the demand for low-calorie sweeteners and natural sweeteners. Additionally, customers are searching for novel flavor combinations and novel packaging alternatives.

The demand for powdered drink mix can be ascribed to customers' greater awareness of the importance of maintaining a healthy lifestyle, which has led to a growth in the number of people interested in the product[7].

Some powdered soft drinks are being reformulated to contain low-calorie and natural sweeteners. This will allow consumers who are concerned about their health to enjoy soft drinks without compromising their regular health regimens.

Increasing participation in outdoor sports and activities The increasing participation in outdoor sports and activities is driving demand for portable and handy beverage options, like powdered soft drinks. This need is being driven by the growing popularity of outdoor sports and activities[8].

Companies are increasing their investments in environmentally friendly and sustainable packaging solutions as well as cutting-edge technologies in order to increase the efficacy and sustainability of their manufacturing operations.

Aim 4: Investigate consumer attitudes and behaviors regarding powdered soft drinks, including factors influencing purchase decisions, flavor preferences, and perception of nutritional value.

What Flavor of skull shot you want to try?

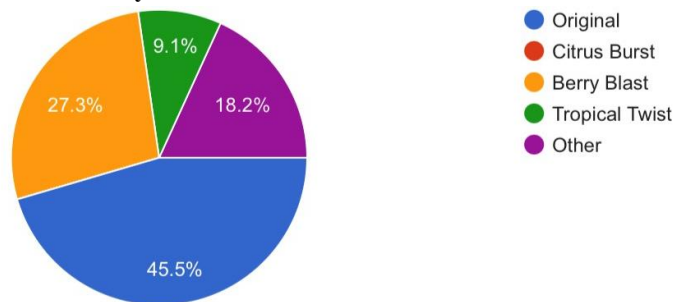


Figure 1: Flavors Demands

An analysis of the skull shot flavor preferences reveals that among both men and women, the majority (45.5%) express a strong interest in trying the classic, original flavor. In addition to the original, (27.3%) of individuals expressed a preference for the exhilarating berry blast option, while (9.1%) leaned towards the enticing tropical twist. Furthermore, (18.2%) of respondents exhibited a more adventurous palate, expressing a desire to explore the array of other captivating flavors available.

Frequency of consumption of soft drink in a week?

Frequency of Consumption	Number of Respondents
Daily	23
2 to 4 times	20
More than 4 times	20
Once in a week	27
Very rare	10
Total	100

Table 1: Frequency of consumption of soft drink

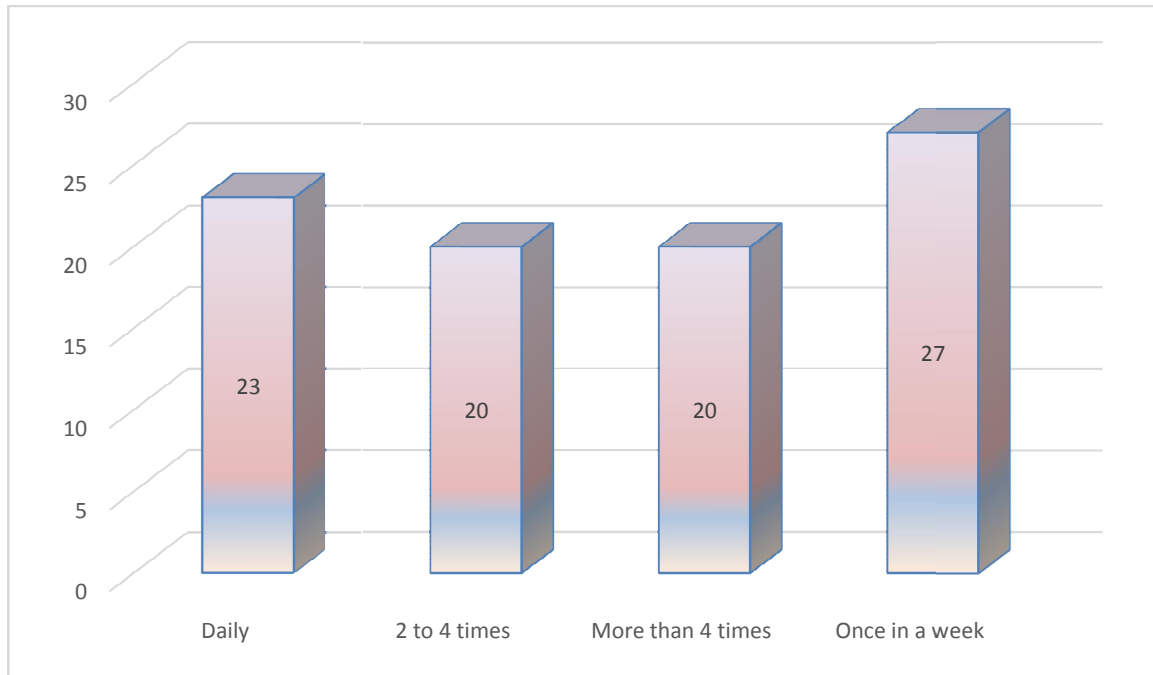


Fig. 2: Frequency of consumption of soft drink

Analysis: The examination of the respondents' consumption patterns reveals a varied range of patterns among themselves. A sizeable fraction, 23%, consumes the item on a regular basis, which points to a significant preference or necessity for daily consumption. In addition, 20% of people consume it two to four times per week, while another 20% consume it more than four times per week, indicating a substantial degree of consistency in their use. In addition, 27% of people say they have it once a week, indicating that it is part of their regular weekly routine, while 10% say they have it extremely infrequently. These findings shed light on the diverse consumption patterns that exist within the population represented by the sample, which may be useful in formulating product or service plans that are in line with the preferences of customers.

What encourages you to buy soft drinks?

Factors Inducing Soft Drink Purchase	Frequencies
Price with Quantity	13
Health Drink	11
Status Symbol	37
Taste	29
Mood Uplift	7
Advertisement	3
Total	100

Table 2: Factors inducing soft drink purchase.

The analysis of factors driving soft drink purchases highlights diverse consumer motivations. Notably, 37% prioritize soft drinks as status symbols, while 29% focus on taste. Price and quantity matter to 13%, health to 11%, and mood uplift to 7%. Advertisement holds the least influence at 3%. These insights underscore the need for tailored marketing and product strategies to cater to these varying consumer preferences.

Do you prefer the Instant Powder Sachet instead of plastic bottles of soft drinks?

Preference of Instant Powder Sachet instead of plastic bottles of soft drinks	Frequencies
Yes	41
No	49
not sure	10
Total	100

Table 3: Preference of Instant Powder Sachet instead of plastic bottles of soft drinks

The data shows that 41% of respondents are open to the idea of using instant powder sachets instead of plastic bottles for soft drinks, indicating a willingness to embrace eco-friendly packaging. However, 49% express a preference for plastic bottles, possibly due to convenience or familiarity, while 10% remain unsure. This underscores the importance of both consumer education and understanding preferences when considering sustainable packaging alternatives.

Aim 5: Assess the environmental impact of producing and consuming powdered soft drinks, and examine any sustainability initiatives within the industry.

There is a considerable impact on the environment caused by soft drinks, notably powdered soft drink mixes. The manufacturing of soft drinks needs a significant quantity of resources, such as water, sugar, and energy, and it also has the potential to contribute to the emission of greenhouse gases. One of the most significant contributors to the environmental impact of soft drinks is their packaging, with glass containers having the most impact on the environment and PET plastic bottles having the least impact on the environment. However, if between 40 and 60 percent of PET bottles were recycled, the potential for soft drinks to contribute to global warming might be cut by between 32 and 48 percent.

The agricultural procedures that are used to cultivate sugar need the use of pesticides and chemical fertilizers, and the cultivation of sugarcane presents a unique set of challenges due to the plant's high water consumption, which can lead to soil erosion and water contamination.

Because cultivating sugarcane requires a significant amount of water, manufacturing 0.5 liters of carbonated beverage might utilize anywhere from 170 to 310 liters of the resource.

The soft drink industry has implemented a few sustainability efforts in an effort to lessen their negative effects on the environment. For instance, Tetra Pak[9] has developed a versatile island solution that can be used for mixing and preparing any type of beverage or syrup. This solution combines minimal energy and water use with minimized product losses.

The primary cause for worry with regard to the effect that consumption of powdered soft drinks has on the environment is the packaging[11]. Powdered soft drinks are generally sold in containers made of plastic, which can add to the accumulation of trash and pollution caused by plastic. On the other hand, the manufacturing of powdered soft drinks uses far less water and energy than the manufacturing of ready-to-drink soft drinks, which may make the former a more environmentally friendly choice.

If you believe that the soft drink contains pesticides, which diseases do you think it could cause?

Pesticides in the soft drink cause	Frequencies
Cancer	13
Paralyses	14
Tooth decaying	29
Pregnancy issues	4
Don't know	40
Others specify	0
Total	100

Table 4: Pesticides in the soft drink cause [10]

The results of the survey presented in table 4 showed that respondents are well aware of the diseases caused by over consumption of soft drinks like cancer, paralysis, tooth decay, pregnancy issues, etc.

III. CONCLUSION

In conclusion, the "Skull Shot Sachet" is a promising concept that aligns with the growing demand for environmentally friendly and health-conscious products. However, its acceptance will likely require time as consumers adapt to the idea of powdered soft drinks as a viable alternative to traditional plastic bottled beverages. The success of this concept will depend on effective marketing, education, and the industry's commitment to sustainability and innovation.

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