

# **Sustainability Innovation**

## **The Optimal Alternative Design For Replacing Disposable Plastic Food Wraps Of Ready- to-eat Food**

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# Summary

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The emerging phenomenon that disposable plastic food wraps of ready-to-eat food is damaging has drawn much attention and an alternative for that material is worth considering. For the current disposable plastic food packaging, many problems such as toxicity to food at certain temperature is difficult to solve. Therefore, in our research, we are to find out a suitable alternative for plastic packaging material.

Firstly, we identify 5 potential challenges that could add difficulty to our project. These challenges include environmental awareness of both consumers and sellers, promotion of new materials, marketing strategies, and safety reassurance. We believe that due to all these challenges, plastic materials have beaten over other materials in the past few decades. Thus, in order to select a feasible alternative solution, the material we choose have to have some advantages over plastic on some of the points and perform not too poor on other aspects. Then, we identify a root cause based on the challenges.

Secondly, we proposed eight solutions that might be effectively in replacing plastic materials. We research on each of the solutions, find out the merits and demerits, and identify the most important criteria. We take aspects such as waterproofness, market prospect, environmental-friendly level in both production and disposal into consideration. We also compare different materials horizontally in order to select the material with the best overall performance.

Thirdly, we began on our action plan. We aim to launch the plan on multiple aspects, including design, marketing and promotion. We have done a lot of research on the material that we are studying, including the production of the packaging and all the machines and crude materials that is needed. With the help of advanced marketing concepts and promotions strategies, we believe we will be able to introduce the new material to the public.

Admittedly, the packaging made of the new kind of material is not perfect. There still exists several deficiencies such as portability. Moreover, we are suggested to design more types of packaging for different instant food. We will attentively listen to the feedbacks from users in order to make large improvements for the product.

# Identify the Challenges

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## 1. Environmental awareness

Both the company and the consumer lack environmental awareness. All they consider are convenience and cost-saving. Even if one day in the future environmental-friendly packaging materials are just the same price as plastics, people might still choose to use plastic packaging as familiarity can lead people's choices. Moreover, some scientists argue that new materials like paper might not have any advantage over plastic on environmental issues due to the pollution created during the process of production, transportation, storage of the new materials.

## 2. Promotion of new materials

It is estimated that a high percentage of the instant food packaging will be used in roadside stalls that sell quick meals or desserts to people. Roadside stalls are numerous and widely distributed. However, they may not keep up with the latest materials like big shopping malls do (or high-end food stores). Maybe they don't even know there's a new environmental-friendly package due to lack of information. Thus, how to popularize the new material to the low-end food stores should be a challenge. If the new material is not widely recognized and understood, they might not be willing to pay for its relatively high price. In other words, clear advertisements as well as other means of promotion are required, enabling the public to know not only about the new material but also aware of its benefits.

## 3. Market

For different shops that sell instant food, they are competing for the market place by presenting the consumers with delicious food while controlling their cost for materials. As we all know, the disposable plastic packages that are prevailing in the market only cost less than 0.5 yuan each. Although new types of packaging materials have been invented by scientists, they have not yet been put into mass production because of their high price. This clearly shows that the gap in price has created a huge barrier to the development of new packages made of environmental-friendly materials since they are usually much more expensive. An overwhelming majority of sellers would prefer to use plastic bags simply because they are much cheaper, and thus, generating large amounts of profit through accumulation. In other words, the market for environmental friendly materials is limited and already occupied by plastic packaging materials. Therefore, we need to discover a new type of packaging material that boosts superior advantages so that consumers are willing to give up the merits of plastic materials to use our product.

#### 4. How to gain the trust of consumers and merchants

##### (1) Price

Price serves to be one of the most critical point in this aspect of challenge. As for the merchants, the price of material is significant in evaluations because selling instant food is business with low capital. And if the price of the material is high, the price of the product would increase as well, and therefore affect the demand. Hence, the price should be relative low and affordable to gain the trust of both consumers and merchants.

##### (2) Quality

Consumers prefer packaging which does not leak when the package is knocked over. Therefore, while using new material, the leakproofness of the new package should also be into consideration.

For some materials like degradable plastic and bioplastic, people can hardly tell them from ordinary plastic. In addition, in our modern society, many customers are always skeptical of the merchant's words. Thus, shops might not have enough evidence to ensure their customers that their new food package deserves its relatively high price (this phenomenon is quite common among low-end food stalls). If the benefits of the new food package cannot get the approval of customers, shops might probably return to use ordinary plastic. In other words, efforts should be made to prevent illicit profiteers from utilizing the chance.

##### (3) Supply

To guarantee a stable supply of particular material, it is necessary to establish a well-functioning industrial chain for it. However, building a complete new industrial chain is quite hard, for new materials like bioplastics, completely new requirements from the collection of raw materials to the final part of selling all need great amount of investment either from government or from private companies. Even for recycled materials like recycled plastic, the process of recollection and retreatment all need great labor and investment as the recycle system is not so complete in our country. The great investment needed during the process of establishing the new industrial chain put emerging industries at a disadvantaged position in the production market.

Besides, some material has limited raw sources, so it would be difficult to expand the production scale.

##### (4) Convenience

Customers prefer to use convenient package while shopping. The plastic package is portable to carry which is one of the reasons why it stands out in its previous competition with glass material packaging. Thus, the new material should be convenient for people to take around.

#### 5. Safety

While many new types of materials are springing up, they might have unsafe hygienic condition due to the lack of pragmatic experiments and the collection of

those data. For example, when water-proving wax materials were first invented for the packaging of liquid, it was said to be completely safe. However, some scientists nowadays claim that those wax materials are somehow related to the cause of cancer.

# Identify a Root Cause

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According to the challenges and the targets, the root cause lies in the nature of market. As consumerism has prevailed since the past few decades, convenience and low pricing have stood out from all of the other considerations that retailers and consumers might have. On seeking for these, disposable plastic packaging materials have become the first choice. The fact that many superiorities of plastic can't be easily substituted and new materials may contain a variety of security risks and price disadvantages serves as the main reason why plastic is so difficult to be replaced. What's more, for producers the great amount of effort and expense needed in the establishment of a new industry and the promotion of the new material might not be so cost-effective as they can't earn lots of profit from a considerably low market price which has already been set by plastic.

# Generate Solutions

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## Solution 1: plant leaf

Admittedly, there is scarcely a material that can perfectly replace the plastic bags for instant servings. But instead of replacing it by full extent, some materials can “proportionally” replace the material, that is, to replace as many plastic bags as possible, and remain those cannot. One of the materials can be absolutely “proportionally replace” the plastic bags for instant snacks is the plant’s leaf. Those seemingly subliminal foliage on left on the ground may be one of the most suitable substitutes of plastic packages, and its advantages are as follows.

Firstly, plant’s leaves are easy to be disposed. Plastic bags either takes long time to be naturally degraded or require relatively large amount of money to be recycled. Also, a few marine tourism companies, which lack considerations of marine environment, dump plastic wastes into the sea, and end up jeopardizing the marine ecosystem in the long-run. On the contrary, plants leaves can be naturally degraded by a rapid speed, which poses fewer threat to the environment and reduces the deposing cost as well. Though producing packages can be cheaper by using plastics, they will be both more costly and risky during the disposal period.

Secondly, plants’ leaves for food packaging have already had some market base, and such market has enormous potential to be enlarged. Phrynium capitatum, a type of plants’ leave grows in the southern part of China, is used for packaging rice dumplings during the Chinese traditional Dragon Boat Festival. According to , this type of plants’ leave have appealing features, including delicate fragrant, antiseptic, and heat-relieving, that are suitable to be served as food packaging. The article also points out that this specific appealing resource lack utilization efficiency. Apart from using it during the annual festival and making a few medicines, most of the leaves are discarded. As a result, Phrynium capitatum, an appealing resource that lacks utilization can be served as a sound choice to “proportionally replace” the plastic bags. Not only does it enhance the utilization efficiency, but also decrease the risks of plastic pollution.

Thirdly, plants’ leaves package has appealing aesthetic values that help encourage the trend of replacing the plastic bags. The delicate fragrant and its unique appearance(the packages may be vary in interesting shapes, including pyramid-like and cube-like) make plants’ leave attraction for consumers. In the public places, people who carries a leaf package of food will leave a pleasant scent to the others and slightly cover up the original smell of the food. Followers will arise as they have seen those attractive benefits.

## Solution 2: Food packaging paper made from peel extract

Introduction: We can make pulp from vascular bundles and pectin from peels, stone cells in nutshells and hemicellulose in the woody tissue of the wood scraps and compare the performance with recycled paper after disinfection. we can adjust the composition ratio and add necessary oil-proof treatment to find the best paper-like products.

1. The paper should undergo special treatment as usual food packaging paper does.
2. The raw material cost little money but the process of production will cost a little money.
3. The material has already have some market base and it has a bright market prospect.
4. The material can degrade quickly in the soil.

## Solution 3: Bio plastics

1. Biome bioplastics uses Eucalyptus as raw material to produce a kind of bioplastic disposable paper cup.
2. Skchemicals is actively seeking to develop PLA, a kind of bioplastics extracted from renewable organisms. PLA usually comes from fermented plant starch, such as corn, cassava, sugarcane or beet pulp.
3. LyondellBasell and Neste jointly announced the first commercial production of bio based polypropylene and bio based low-density polyethylene. The joint project uses Neste's renewable hydrocarbons, which come from biological materials such as waste oil and residual oil. The project has successfully produced thousands of tons of bio-based plastics, which have been approved for use in food packaging products.
4. Bioplastics has found a foothold in the French agricultural field, and it also provides a high-tech marketing market for producers. Bioplastics are made from starch from corn, wheat and potatoes. Like plastics made from petroleum, bioplastics can be made into many forms of products and can be completely biodegraded

These are all successful examples of bio-plastic materials. On the 13th European Bioplastic Conference in 2019, the Managing Director of European bioplastics Association said that in the up-coming 5 years, the market for bioplastic is expected to increase by 25%, providing more opportunity for companies in this area. (More information about our bio-plastic material can be seen in the "Make an action Plan" part and the "Product Design" part.

## Solution 4: Food packaging paper made from rice

We can implement the same technology used in making rice straws to the making of instant food packaging materials. This kind of packaging would be environmental-friendly and even edible. The main ingredient of this material is made of rice, which is widely planted especially in East Asia nations. The production of this material is now a mature technology, ensuring the safety and quality of this material. The material will also dissolve into a form similar to mash potatoes after



being put into hot water for 2 to 3 hours or cold water for over 3 hours. This brings the biggest advantage of this material which is it will not create any left-over that is harmful to the environment. People can even eat the dissolved package if they want since it is not harmful to our health. The production of each package is estimated to be 0.09 yuan.

#### Solution 5: nano-materials

Nano-materials are one of the most advanced new materials that scientists nowadays have been investigating. One benefits of this material is that it has an outstanding performance in its flexibility and water-proof level, which means that the material is very strong and intense. However, without much consideration, the cost of this kind of packaging will be very high as this technology is not mature enough.

#### Solution 6: Bamboo-fiber

Some enterprises have already began to produce bamboo products to replace plastic in some fields. With relatively low cost and sufficient raw material in China, bamboo products are able to replace most disposable tableware already. However, to manufacture a bamboo product to replace plastic package is still yet a problem to solve. Considering the properties of bamboo fiber, it is possible to develop a type of disposable bamboo package. However, whether sufficient raw material could supplied after a great demand is raised is yet hard to determine.

#### Solution 7: Corn bran

Corn bran itself has many advantageous properties: it has great intensity; it is waterproof; and it can absorb oil. A few simple steps could process corn bran into food steamer cloth. Nevertheless, processing corn bran into packages still lack the support of existing production procedure.

Properties: long fibers; strong tension; pliable and tough; preventing damage from worms; relatively strong retention ability; relatively strong oil absorbency; reproducible; fast reproduction cycle (hybrid corn bran dietary fiber is stronger than corn bran insoluble dietary fiber)

Current utilization: industrial processed into knitting(haversack, tea residue, shoes, vessel and container); utilized as food steamer cloth without processed

Market Potential: as a by-product of corn, corn bran could be provided considerably(one of the largest crops in the world; more than 1 billion tons produced annually); normally, corn bran could be divided into 7 to 9 layers, and different layers have different thickness and therefore different use

Technique support: currently no processing procedure could ensure that corn bran could be volume processed into food packages

#### Solution: Mango skin

Current experiments carried out by Mexican scientists have proved that mango skin could be processed into a type of shrink-pack which shares a lot of similar

properties with plastic. However, thinking globally, such raw material could be steadily supported by only a few tropical countries. What's more, since the product is still in its experimental stage, it is not determined how much it would cost to be processed.

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# Identify the Criteria

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1. Whether the material meet safety standards as well as quality standards such as waterproof and oil-proof abilities?
2. Whether the cost of raw materials and the process of production is relatively low and acceptable?
3. Whether the material has already have some market base or whether it has a bright market prospect ?
4. Whether the raw material and the production process are environmental-friendly?
5. Whether the disposition of the waste of the material is environmental-friendly?

# Evaluate the Solutions

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The members in our team carefully voted on the eight general solutions based on both the discussions we had and the documents we wrote. We were not applying the scoring and calculation in a mechanical way. Instead, we clearly knew the meaning of each score given as well as the advantages and disadvantages of each solution. After a well-rounded consideration, although corn bran received the highest score, we still choose to study on bioplastic because more research has been done on this material and it is safer and easier to use due to the advanced study on this material by scientists. However, the technology of making corn bran into plastic is too immature to be implemented in real world practice.

Scores:

1. plant leaf: 16.99
2. peel extract: 21.33
3. rice: 21
4. bamboo: 25.33
5. corn bran: 26.34
6. mango: 25
7. bioplastic: 25.33
8. nano: 21.99

 [Scoring for general solutions](#)

# Make an Action Plan

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## 1. Product introduction

### 1.1 Raw Material

Bioplastics are made from starch from corn, wheat and potatoes. The raw materials we use come from unsold grains in big markets. We collect them to produce our bio-plastic instant food packaging. This will create a win-win situation for both sides: the market owner can still get money while not wasting food and we are able to get our raw material at relatively low prices.

### 2.2 Producing Process

The thermoplastic starch was prepared with starch as raw material and glycerin as plasticizer, and the processing technology was discussed. The mixed coating containing graphite powder is applied on the inner wall of the airtight equipment. After the UV light is irradiated and solidified, the mixed powder of starch and starch modifier is added into the container. The neutron flow is generated by the high-energy spallation neutron generator. The neutron reflects through the graphite layer on the inner wall of the container many times, repeatedly bombards the starch particles, and destroys the hydrogen bond within and between the starch molecules. In this method, the hydrogen bond of starch is destroyed by high energy neutron current bombardment, and the neutron flow is reflected repeatedly by the graphite layer on the inner wall of the container, which improves the efficiency of radiation bombardment, improves the processability of plastic starch, and the whole process has good environmental friendliness.

### 1.3 Physical property

The material is easily degradable in soil and can even be used as fertilizer since the main raw material is starch. Despite starch, other chemical materials ( $\beta$  - hydroxybutyrate) have not been proven to be toxic to the soil due to the scruple amount.

The thermo-gravimetry, scanning electron microscopy, X-ray diffraction and mechanical properties of the material were tested. The thermal stability, morphology, crystallization and mechanical properties of the blends were investigated. The results show that the tensile strength and elongation at break of some blends can reach more than 20 MPa and more than 100%. In addition, a small amount of hydrophobic poly ( $\beta$  - hydroxybutyrate) is added to the system, which improves the water resistance of the blends. The blend has the advantages of simple processing technology, easy industrialization, complete degradation of components and so on, and has broad application prospects.

## 2. Marketing

## 2.1 SWOT analysis

Strengths: High availability of raw material, 100% environmental-friendly and has a large number of targeted users

Weaknesses: Relatively high production cost (expected to be 1 yuan each)

Opportunities: Growing market demand of eco-friendly items; supported by the government

Threats: The competition with environmental-friendly materials; people's awareness of environment protection

## 2.2 Marketing strategy

2.2.1 Since food packaging bags are very commonly used items, its huge potential market is beyond doubt. With the growing public awareness on environmental protection, environmental-friendly packaging bags are widely supported and welcomed. Through effective publicity, further development of the industrial chain and the settling of reasonable price, wide range of popularization could be achieved. Thus, it's fair to say that project shares a bright future.

2.2.2 Since the cost of biodegradable packaging bags is higher than that of ordinary plastic bags, the primary target should be those chain stores like fast food restaurants, cafes and bakeries who have a certain user base. As relatively large stores, they are more willing to pay more in order to improve their companies' images (such as Care For the Environment, etc.). In addition, they have some loyal customers already, meaning that a slight increase in price level will not make them experience massive consumer losses. Via more research, once the cost of this new material is acceptable to the majority, it can be further popularized among roadside stands and food stores since those street vendors are the top users of plastic food bags of ready-to-eat food.

## 3. Promotion

### 3.1 Online Advertising

3.1.1 Using social media like WeChat, Weibo, Twitter, Facebook to deliver our product's poster. Uploading videos on platforms such as Tiktok and Bilibili can also raise our brand awareness.

3.1.2 Cooperating with other Apps such as Meituan. Offer a selection of our material when packaging the take-away food.

3.1.3 We will negotiate with some environmental protecting NGOs (e.g. GoZeroWaste) and utilize the popularity to propagandize our product on their social media account.

### 3.2 Off-line Advertising

3.2.1 There will be our information on the packaging so anyone interested in it can contact us.

3.2.2 We plan to launch on campaigns in public places such as plazas as well as in street communities in the city.

# Prototype and Test

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## | Prototype Design

### 1. Size

We will provide three sizes for the company to choose, small, medium, and large.

The small size is 8cm×10cm×3.5cm, which is suitable for a tart.

The medium size is 14cm×17.5cm×6cm, which is suitable for a regular-sized steamed bread or a croissant.

The large size is 21cm×26cm×9cm, which is suitable for a loaf of sliced bread or two fried breadsticks.

### 2. Material

The packaging is all made up of bio-plastic, including the buckle. The purpose of such a design lies in our consideration of the disposal process. In some other environmental-friendly food packaging, although the main part is environmental protection materials, some small parts still need conventional materials to fill up. This adds a lot of trouble to the garbage disposal personnel. For example, when Starbucks' eco-friendly bags are sealed, the staffs often use glass glue, which cannot be treated in the same way as other eco-friendly materials. Therefore, the garbage disposal personnel sometimes can only tear off the glass glue by hand, or dispose the environmental protection materials together with ordinary materials, making the invention of the new material meaningless. However, for our design, it does not have such a problem. The whole packaging can be easily disposed in the same way without taking up much public resources.

### 3. Design concepts:

#### 3.1 Collapsible clapboards

The bio-plastic packaging will be collapsible so that it will not take too much space when it is not in use. When using it, people can open it up so that the package to stand firmly on the table.

#### 3.2 Buckle design

We design a flip cover on the top of the package, on which our logo will be printed. The shape of the buckle will also change according to the upcoming festival. With such a design, the package will appear to be more qualitative and textured. Moreover, the buckle is also made of bio-plastic so it can be disposed together with the bag without creating other wastes.

#### 3.3 More creative Designs

- 1) The slogan of our product will be printed on the flip cover.
- 2) The front part of the package will be left for designs according to the shop' s need.
- 3) The information of our company will be on the side of the package, including QR code, so people can contact us for customized packaging designs.

 [Design of the packaging](#)

## | **Feedbacks learnt from users**

161 people have been involved in our survey about the optimal alternative for instant plastic packaging. The respondents of this survey are from different ages, ranging from under 18 to over 61. Over 40% of them are within the age of 41~50, the ones who have collected enough property in the past few years and are now the strongest purchasing power in the market.

### 1. Quantitative feedback

#### 1.1 Safety

As we asked the respondents what they regard as the most important factor of a new packaging material, over 61% respondents consider safety as the top priority. Not only should we testify over and over again that bioplastic is safe and even safer than conventional plastic, but also we need to gain the trust from the users, to prove to them that we are safety-conscious and the quality of our product is trustworthy.

#### 1.2 Environmental-friendliness

Over 30% of the respondents consider environmental-friendly as the most important element. Undoubtedly, bio-plastic will be more likely to meet the standard of environmental-friendly than conventional plastic due to the special material it is made from.

#### 1.3 Trending

About 65% of the respondents expect that the environmental-friendly product will be created as a new trend. As more and more people are aware of the fact that our planet Earth cannot be overburdened by garbages, the emergence of such a product will probably become common among people in the future.

#### 1.4 Changes in eating habits

When changing from using a food package to another, people will probably adjust their eating habits. Over 80% of our respondents believe that changing a food package won' t create new restrictions on enjoying the food. And 75% of our respondents are willing to adjust a few eating habits if they need to. Therefore, changing a food package, as they expect, will not massively affect their eating habits and lifestyle.

#### 1.5



Eco-friendliness and cost are trade-off. Therefore, we take prices into concern because change in price will result change in quantity demanded of a product. 4% of our respondent believe that price should be taken into consider firstly, and almost nobody will turn a blind eye on price change. Approximately 70% of our respondents show negative attitude towards price changing due better packages. They feel reluctant to decide whether to buy the same food with a more expensive package. But at the same time, over 80% of our respondents are willing to find out the reason why the package become more expensive, and 60% of them believe their decision may change after they know the reason.

## 2. Qualitative feedback

We also show our respondents our design of the package. Most of them find it intentional and some leave us with priceless comments.

### 2.1 Whether the packaging is well-sealed

One of the main problems that the respondents raised was whether the packaging is well-sealed so that the food inside will not come out easily.

### 2.2 Portability

There exists a common suggestion that the package should include handles so it will be much easier to be carried along. Though this packaging is for instant food, some people can still not finish it within a short period of time and they have to take it with them sometimes. So according to their feedbacks, handles seem to be still needed for the packaging in consideration of people's convenience.

### 2.3 EO logo and plastic grade

The EO logo and plastic grade is definitely a necessity for our product. The EO logo will tell the users that this packaging is environmental-friendly while the plastic grade is a requirement of any plastic product. With such signs, people will understand that this product is qualified by the NDRC and using the product is safe.

In all, whether this food package design be suitable to substitute conventional plastic bags shall be further verified by time and reality.

 [Feedback from users](#)

# | Improvement for next iteration

Improvement for next iteration:

## 1.1

We have done relatively sufficient survey among consumers. However, survey among merchants is also essential to predict the potential of the package in the market. Due to the obstacles of COVID, the survey is delayed by us because we planned to make that in-person in order to get more accurate results.

## 1.2

According to the respondents' choices, the negative effects on eating habits are

concerned by some. Therefore, comparison between bioplastic and traditional plastic packages should be furthered and potential adjustments to eliminate those effects should be made. For instance, the touch of the packaging should be made similar to ordinary plastic.

### 1.3

The present design of the package still has great space for improvement. Firstly, the oriented object of one certain type of package (more styles of design might be made so classification is necessary) should be specified. Further adjustments should be made based on the orientation. For example, if the oriented object is cooked food, the structure should be improved to make carrying easier, probably by adding a handle; if the oriented object is snacks, the structure should be adjusted to improve airtightness, probably by removing the movable "open mouth" design.

### 1.4

According to the respondents' choices, many of them are already aware of the trend of environmentally-friendly packages. However, they are still lack of the will to accept a higher price for them. But the majority of them hold the open attitude to see the exact reason behind the higher price. Therefore, more propaganda, especially on the positive impacts on the environment, works are require to win the acceptance of consumers.

### 1.5

We are aware that though people seem to accept the pricing of such a new material, efforts are still needed in making the price lower. With the advancement of our production machines and number of packages being mass-produced, the price of each bio-plastic bag is going to decrease from 1 yuan each to about 0.8 yuan each.

# Team Credits

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Zhixi Huang, as the leader of the team, is responsible for organizing the team's discussions as well as making sure that the team is on the right track to form a comprehensive solution to the issue that the team endeavors to solve. She has actively involved in every discussion and has integrated the ideas that each team member has to come up with the essays.

Liangze Ke has been working very hard on every part of his work. He designed the questionnaire accordingly to our need in order to obtain valuable feedbacks from users so that we will be able to improve our product for the next iteration. He also researched for abundant data for the 8 general solutions and provided various suggestions in the group discussions.

Tianle Chen, team member, is responsible for the selection of criteria, data analysis of the evaluation questionnaire of all possible solutions and further reference searching and reading after screening out the most promising material. She has completed her part responsibly and has used the background information she learnt to assist other team members.

Yiting Bu actively enrolled in the project Envirothon. In the beginning, she gave some great advice on the "challenge identifying" part. Also, she focused on the market evaluation of the new material proposed in the project. In the evaluation she gave detailed analysis on the market strategies from different perspectives after lots of research. Through the project Yiting Bu recognized the challenges of making changes and she was willing to further the project after the competition.

Yichen Tu, member of the team, actively engaged in the discovery of the alternative for instant plastic packaging. Being in charge of launching promotion strategies, she tried her best to seek for any opportunity to raise the brand awareness.

Guan Yuan, team member, is able to finish every task assigned to him both efficiently and with high quality. He has done lots of research on finding multiple alternatives. He also analyzed the feedback from the questionnaire and wrote down the most important improvements that were expected to be made by the first users of the product.

# Judge Comments

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" The team did a good job and turned in a well researched and thoughtfully presented project. It shows a good understanding of the price and social sensitivities of this complex issue. The effort to undertake a SWOT analysis is also appreciated.

A further elaboration of the need for alternate packaging material including the harm caused by current plastic packaging to the environment (terrestrial and marine) would have added some more context to the study. Given the strong regulation surrounding food and food-close products, some more discussion around the regulatory landscape regarding food-grade plastic and the challenges associated with that will also add additional depth to the work.

While some of the solutions presented are still purely academic and lack any immediate scalability in the market, it is good to see the range of solutions that the team has researched and brought forward. In future reports and presentations, highly recommend the inclusion of references to source information.

The finding that "75% of our respondents are willing to adjust a few eating habits if they need to" is most likely an over-estimate. Studies show that most people are unwilling to change their behaviors simply for a diffuse environmental benefit. They are shown to be willing to change their behavior if they have an incentive to do so – rewards, reduced prices etc. Even at 0.8 yuan per package, you are still looking at a price that is roughly 60% more than the price of a comparable plastic package. Situations in other parts of the world suggest that the willing market that can absorb this price differential is usually a higher end market and that the volumes they can move do not significantly affect the overall amount of plastic packaging being used in the food industry.

Good luck taking this important work forward!

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