

## Research Report

# Seasoned

National University of Science & Technology School of  
Art Design & Architecture, SADA

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# Seasoned

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Submitted in Partial Fulfilment of the Requirement for the  
Degree of Industrial Design

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National University of Science & Technology School of  
Art Design & Architecture, SADA

Gulrukh Shehzad



Approved by the Guidance Committee

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June 2024



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**Seasoned**

A Research Report

**Gulrukh Shehzad**

A research report submitted for evaluation to the School of Art, Design and Architecture on 4th June 2024, in partial fulfilment of the requirement for the degree of B.ID.

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## Abstract

Due to a lacking communication with previous generations, the Pakistani youth is disconnected with their traditional spice knowledge and practices. This leaves them heavily dependent on standardized packaged spices, slowly forgetting the core of spices. This paper explores the factors contributing to this disconnect and the ways in which we can encourage the two to reconnect. The research reveals existing mainstream Pakistani spice practices to include the use of pre-ground spices and blends, both branded and unbranded. Due to this, the new generation has lost touch with the indigenous knowledge of spices: their origin, identification, health benefits, and effect (*taaseer*). While both new and traditional spice grinding products are available in the market, none of them offer the facility of measuring spices. The entailed product design titled “Seasoned” offers a unique spice-measuring feature while showing potential for bridging the gap between Pakistani youth and their traditional spice knowledge and practices.

*Keywords: spices, taste, technology, recognition, identification, measuring*



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## 1. Seasoned Heritage

Have you ever felt lost amongst the variety of jars of coloured powders in the kitchen cabinet, not knowing what their purpose is? Have you ever wanted to replicate the flavour of your grandmother's dishes but always found something missing? You are not alone. Pakistani youth feel an increasing disconnection with their Subcontinental roots and traditional spice-related practices.

This disconnect is caused by the increasingly modern, capitalistic, and machine-induced ease dimensions of the world. Qureshi and Syed explore these dimensions in their research work titled "Branding Agricultural Commodity based Industry: The Case of Spice Industry in Pakistan" (2016). There is a lack of communication between the older and younger generations due to increase in nuclear families and working women. Furthermore, the pace of life and priorities are changing due to rapid urbanization and increasing convenience-seeking attitudes. Moreover, due to introduction and promotion of products and services like packaged spices and food delivery, traditional practices revolving around spices have been diminishing. According to Qureshi and Syed (2016), the above factors have increased consumption of spices. Due to this exponential growth, tastes have become standardized into categories, leading to similar tastes for each household. Consequently, traditional spice practices unique to each household are gently fading away.

Although this trend is in part influenced by consumer preferences and data, it has left younger generations at a disadvantage. In the way that languages become obsolete, we can anticipate the same outcome for spice knowledge. In due time, even the most basic spices will become unrecognizable and unknown to them. It can become an alarming scenario if neglected

since spices are a very important part of the Pakistani culture and have a deep-rooted history in the subcontinent.

Further, each region of Pakistan sources different kinds of spices. The taste of each region also factors upon how close it is to the borders and ports depending on the ease of trading, import, and availability of spices. Other than the difference in regional tastes, food tastes can also differ depending on the way a spice is processed. People have testified that the taste of spices ground manually using pestle and mortars is significantly richer than that processed using machines. Therefore, indigenous spice practices and knowledge play an important part of Pakistani culture and food. However, these practices are fading away.

**Due to a lacking communication with previous generations, the Pakistani youth is disconnected with their traditional spice blends and practices. This leaves them heavily dependent on standardized packaged spices, slowly forgetting the core of spices.**

Having established the problem statement, this paper will continue to the background research, a collection of related case studies, and a prerequisite market research on spices. The market research will include a thematically organised review of existing literature. These findings will inform the research methodologies which propel the research forward. The methodologies will be followed by the design criteria and final proposed design. After the design is introduced, the paper will illustrate the material research, manufacturing process, and product branding elements. Finally, the outcome of the design research will be presented.

## 2. Background Research

### 2.1 Spices and Traditional Blending Practices

Spices last for multiple years, whole spices have a long shelf life, while powdered spices get stale quicker when contacted with air. Powdered spices also lose the strength in their flavour after a few months. Traditionally, spices had been used as source of flavour, as preservatives, and also for health benefits since they contain medicinal properties. Herbs and spices are first sourced and harvested, and then get sent for drying/ cleaning. After which they get ground/ crushed in mills. They are then stored for consumers to buy and then measured by the user to be used in dishes (this is for loose spices). Users consider Availability, Taste, and Preference of family members, convenience in preparation, nutrition and health value while buying processed spices (Rajan Babu. R and Ganesan. S, 2015).

Factors Considered for Using  
Table 5: Factors Considered for Using Processed Spices Products

Sl. No.	Factors	Processed Spices Products						Overall
		Pure spice powders	Masala powders (veg.)	Masala powders (non-veg.)	Instant mixes	Cooking paste	Rice paste	
1	Ready available	50 (41.67)	105 (87.50)	108 (90.00)	19 (15.83)	7 (5.83)	5 (4.17)	294 (10.86)
2	Taste	44 (36.67)	103 (85.83)	102 (85.00)	15 (12.50)	7 (5.83)	5 (4.17)	276 (10.20)
3	Liked by the family members	47 (39.17)	100 (83.33)	97 (80.80)	13 (10.83)	7 (5.83)	3 (2.50)	267 (9.86)
4	Influence of friends or relatives	39 (32.50)	87 (72.50)	85 (70.80)	22 (18.33)	9 (7.50)	5 (4.17)	247 (9.12)
5	Easily available in the shops	55 (45.83)	93 (77.50)	92 (76.67)	41 (34.17)	25 (20.83)	13 (10.83)	319 (11.78)
6	Convenient to use for preparation	29 (24.17)	72 (60.00)	81 (67.50)	18 (15.00)	8 (6.67)	5 (4.17)	213 (7.87)
7	Satisfaction	45 (37.50)	102 (85.00)	104 (86.67)	31 (25.83)	10 (8.33)	4 (3.33)	296 (10.93)
8	Save time of preparation	58 (48.33)	105 (87.50)	107 (89.20)	36 (30.00)	23 (19.20)	14 (11.70)	343 (12.67)
9	Nutritive & Health value	31 (25.83)	83 (69.17)	83 (69.20)	7 (5.83)	4 (3.33)	3 (2.50)	211 (7.80)
10	High price of domestic cooking fuels	40 (33.33)	73 (60.83)	72 (60.00)	27 (22.50)	18 (15.00)	11 (9.17)	241 (8.90)

Source: Compiled from primary data.

Note: Figures in parentheses indicate percentages to the number of users

**Figure 1. (Rajan Babu. R and Ganesan. S, 2015)**

## **2.2 Problem in Identification and Recognition of Spices**

### **2.2.1 Types of Tastes**

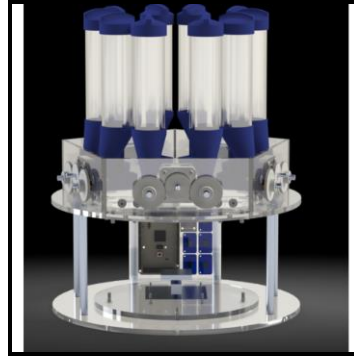
There are six types of tastes when recognizing flavour: sour, bitter, sweet, salty, spice, savoury (umami). The youth is unable to identify using what spices result what flavour.

## **3. Related Works**

Despite the existence of spice grinding products in the market, new and traditional, none offer the facility of measuring within them. Separate scales are available for weight and volume measurement. There were some case studies, however, that catered to the measurement and grinding simultaneously which are listed below.

### **3.1 Jeffrey Wang - Automatic Spice Dispenser**

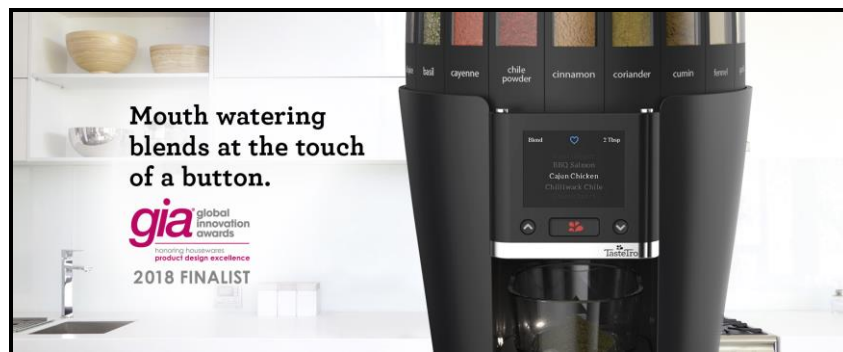
This was a student work where they had combined the grinding and movement/transportation of spices. A total of six cylindrical compartments were set up with an elbow joint at the bottom edge. Those elbow joints contained blades and were connected with horizontal cylinders containing augers to move the ground spices. This setup had a very crude user interface since that was not the objective of this project, however it was an effective demonstration of moving spices from the grinder to an output container.



*Figure 2. Jeffrey Wang - Automatic Spice Dispenser*

### 3.2 Tastetro

An award winner in 2018, this product aids in the storage, measurement and moving of spices. Although it offers most of the features thinkable, it does not grind fresh spices, rather uses pre-ground spices and mixes them together. It poses a challenge to the already established industry of boxed mix spices.



*Figure 3. Tastetro*

### 3.3 E-tongue

Referenced in 3.4.3 in literature review: existing technologies

### 3.3 EZspice

This student work has a similar concept to Tastetro, however it aims to cater to restaurants and an audience that requires larger quantities of spice mixes at a time.



*Figure 4. EZspice*

### 3.4 Literature review

Currently, the spice industry is dominated by the unbranded and unpacked/loose spice. More than half of the market share is enjoyed by the unbranded spice sector whereas the rest 42% of shares is taken up by the branded spice sector. (Qureshi & Syed, 2016) Loose spices available at utility stores have economical rates, providing them with a solid market base. However, it is interesting to note that most of the loose spices have unconfirmed sources. Where they are milled, as well as how they get transported remain a mystery to the locals. This leads to ambiguity in questions regarding sanitation and health of not only of loose spices but also of pre-packaged spices.

Lead contamination is a serious spice-related hazard. Both types of spices, branded and loose, are prone to it. This is addressed by B.H. (2005) in their research “Lead in spice mixes caused poisonings”. According to the research,

*“Contaminated spices purchased from poorly regulated sources can explain some cases of lead poisoning”.*

Although, most of the lead contamination research was published a decade ago, and mostly in countries foreign to Pakistan. Moreover, with rapid advancements in food quality department, lead contamination might not be as serious a problem in spice mixes as it used to be. Therefore, it is an aspect consciously outside the jurisdiction of this research.

### **3.4.1 Subcontinent, spice and trade**

Hazard or not, spices have had a happening history in the South Asian subcontinent, where they became the bane of colonization in that region. (Narsimhan, 2009) Further, the trade of spices along the Silk Road had allowed for spices to be available in different geographical locations. (Buell et al, 2020) In the age of hyper globalization, Buell et al. (2020) claims that today, the concept of Silk Road has expanded to apply to the world. They sketch the current scenario as such:

*“...with a Uighur restaurant in Sydney, a Mongolian one in San Francisco, and an Uzbek one in Los Angeles.... Central Asian food has thereby become part of a wider story of human enterprise, change, adaptation, and conflict.”*

### **3.4.2 Major spice sources and influence of box mixes on traditional spice practices**

Locally in Urban spaces, there are four different sources of spices: packaged, branded spices, unpackaged spices, whole spices which can be crushed at demand and whole spices which can be crushed at home. Packaged spices host two major stakeholders, Shan and National masala. Users trust these brands due to their brand identity, the ease these already crushed spices

provide, and because of how affordable they are. Owing to the ease with which they can be bought at any supermarket, unlike whole spices, users prefer packaged spices.

### 3.4.3 Existing technologies

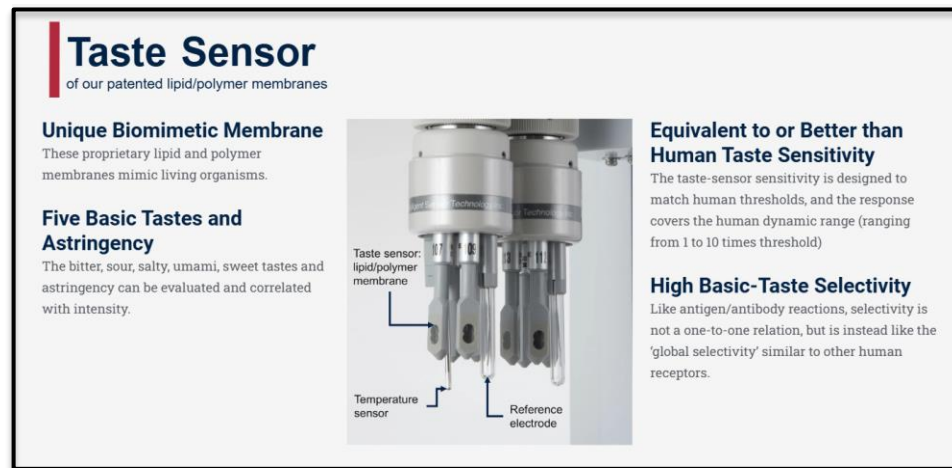
Replicating specific tastes by replicating the chemicals involved in producing it is not impossible. But because taste is subjective, determining whether the replicated taste is better than the original one is impossible. (Savage, 2012) In his article, Neil Savage (2012) puts forth a prospective scenario: that of a British coffee consumer linked through technology and data to a Brazilian coffee grower. The goal is replicating tastes. Savage presents an interesting scenario which seems exhilarating at first, however gets deemed unachievable on second or third thought. To some extent though, this was achieved years after Savage's (2012) research. Like many other companies, INSENT's (Intelligent Sensor Technology, Inc.) of Japanese origin has designed an Electronic Tongue (E-Tongue). (Podražka et al., 2017) INSENT's E-Tongue understands sensitivities of food flavors, helping it to identify exact chemical composition. Among the many applications of E-Tongue, one is the quality testing of food (Podražka et al., 2017). Savage (2012) supports the existence of such a method. In Savage's words:

*“With a large enough library of reference samples, food producers could test a sample and predict how consumers would react to it.”*

Bruker BioSpin of Cologne, a German company, sells juice screeners using NMR spectroscopy coupled with a library of over 3,000 reference samples. These samples belong to 30 different kinds of fruit hailing from 50 separate countries (Savage, 2012). As Savage highlights, the problem lies in lack of the required data flow, from say, the grower to the consumer. The problem is not technological advancement. Another drawback of E-Tongues or any other similar



existing technology is that a large portion of what humans identify as taste is smell. This somewhat limits the capability to replicate tastes and identify nuances of the flavour.



*Figure 5. (Insent / Intelligent Sensor Technology, Inc. (insentjp.com))*

#### 3.4.4 Social connection and community building concerning spices

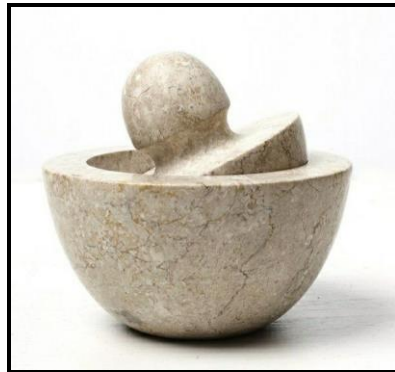
The Dutch appear to be a classic example of utilising mealtime to build social connection. They have numerous meals each day and the recipes consulted are usually referred to by a family member, friend, cookbooks, the Internet or Television cooking programs. An increasing number of the Dutch population are learning to cook either for enjoyment or to learn the necessary skill preparing food. (mil, 2004) Therefore, the culture of cooking does not restrict itself to the kitchen space. Multiple branching aspects of cooking include sharing food with neighbours, watching Television cooking shows, joining cooking clubs, and exploring cooking utensils and recipes from various other cultures. This depicts the multi-faceted nature of taste and food. Although this excerpt was taken from a western source, similar habits and activities can be seen at the eastern edge, where grandmothers, and mothers are entrusted with the duty of transferring cooking secrets that have been coming down since generations. Each household has

a unique flavour to its dishes due to the specific methods and ingredients passed down within each family.

## **4. Market Research**

### **4.1 Mortar and Pestle**

Stone has been one of the traditional methods to grind spices. The stone gets seasoned and prepared before grinding spices in it. It is a long-term product with a resilient surface that can last decades.



*Figure 6. Mortar and Pestle*

### **4.2 Hand mills**

A similar design and mechanism can be found in manual coffee bean grinders and have been found in Turkish households, often made of metal, and holding an exquisite design of reliefs.



*Figure 7. Hand Mill*

### **4.3 Blenders**

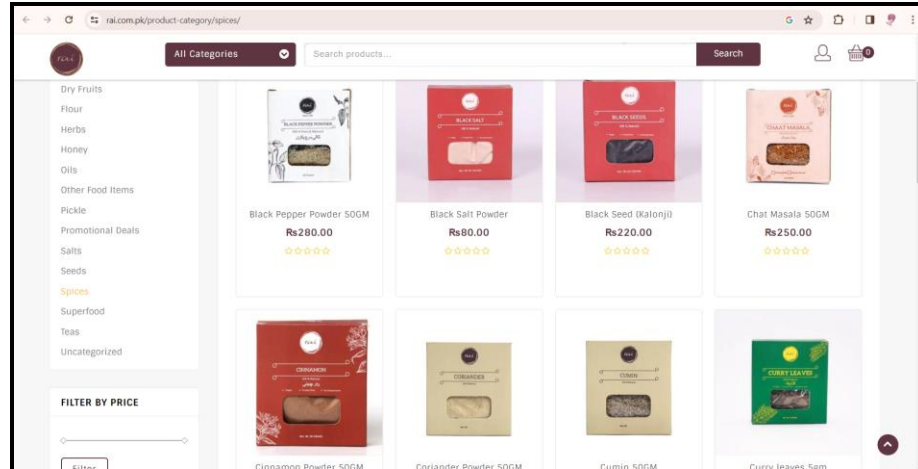
An upgrade to hand mills with automation and various speed controls. Blenders come in many sizes, while bigger blenders allow for grinding of larger quantities while smaller sizes aid portability and quicker manoeuvring of spices from the container to another jar or the wok.

### **4.4 Coffee Machines**

Coffee machines have similar functions as a spice grinder/ mixer. Such as even distribution of ground coffee, roasting of coffee beans, crushing them etc. With the increasing development and sophistication in coffee machines and their attachments, the spice industry may pursue similar levels of detail for better customer satisfaction.

### **4.5 Applications and Websites**

Beside spice grinding products, the market also offers websites and mobile applications that sell ground spices. This helps people save time from the grinding process. Some of these websites also offer whole spices.



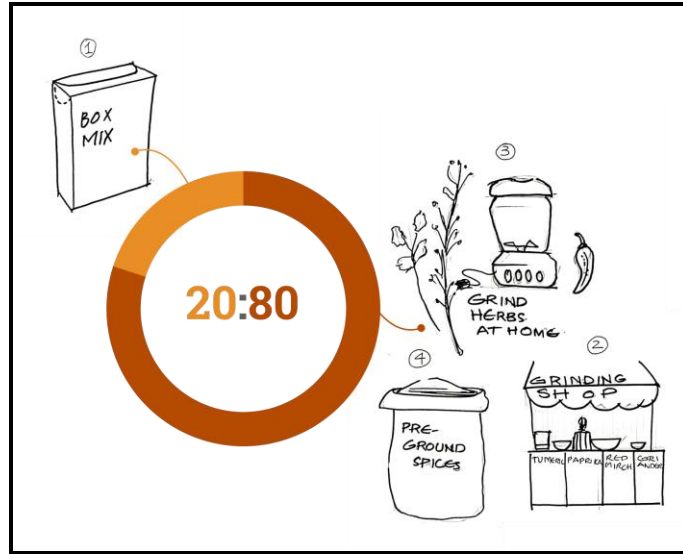
*Figure 8. Rai.com.pk*

#### 4.6 Boxed Mix Sources

About 20% of the market is boxed mix spices in Pakistan, most of which is used in urban households. There are two major brands that have been competing since decades: Shan and National and users buy from them based on their brand identity, consistency, flavour and price.

#### 4.7 Loose Spice Sources

The rest of 80% of the market is loose spices, whole and powdered. Users either buy pre ground spices from utility stores or buy whole spices and grind them at their homes in food processors or separate spice grinders. None of the users encountered in this research grind all of their spices manually in pestle and mortars. Another option for the users is the Sunday bazaar where they store whole spices and grind the spice mixes in front of the users in mills.



*Figure 9. Sources*



*Figure 10. Sunday Bazaar Mills*



*Figure 11. Spice Ratios in Sunday Bazaar*

## **5. Research methodologies**

### **5.1 Data Organization**

The secondary research conducted for this paper consists of case studies (executed by students from other universities on a similar topic), and published books and journals that have posed intriguing arguments about the origin of spices and how they have been integrated into the palettes of vast people from varied geographical demographics.

The primary research conducted for this paper consists of survey forms disseminated among youth from urban areas, group and individual interviews in campus areas and residential areas, market analysis and observational activities.

#### **5.1.1 Empathy Map**

Studying the possible challenges and motivations for the user in a set of scenarios for the particular problem statement by visualizing hypothetically, what they would think, say, do and feel.

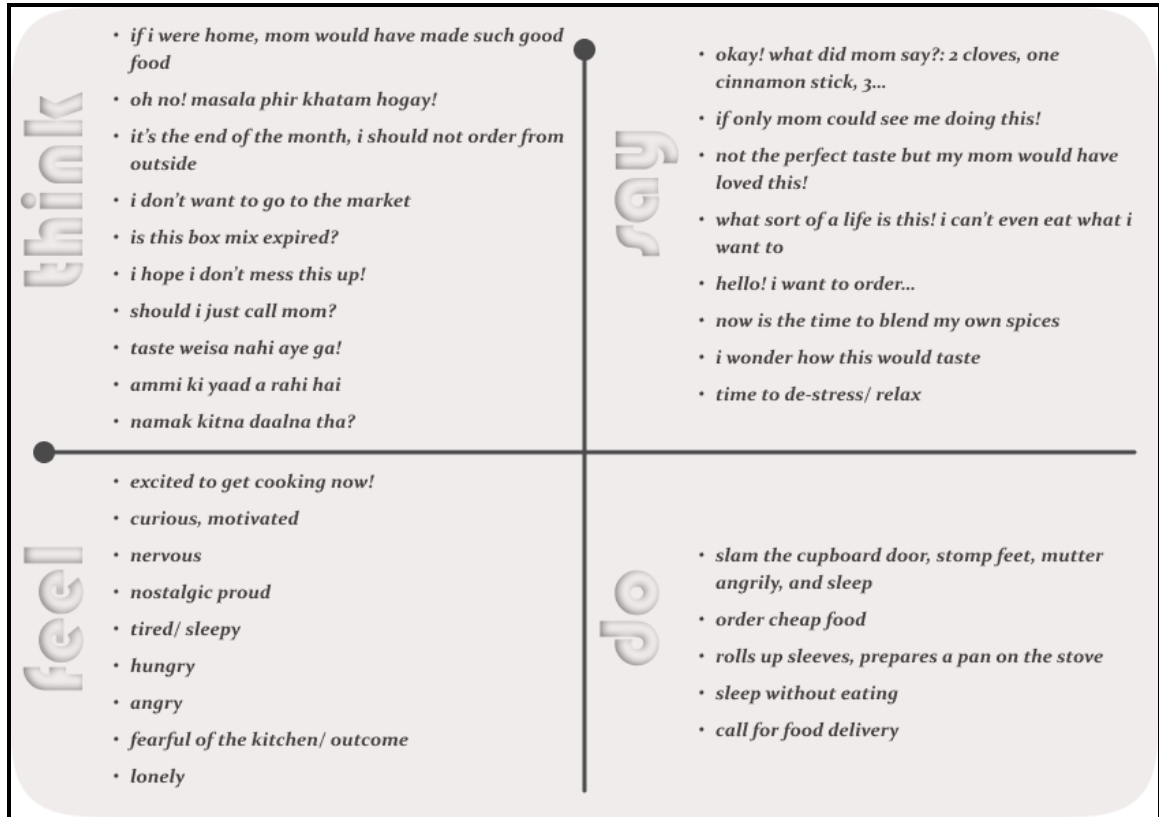


Figure 12. Empathy Map

### 5.1.2 Ecosystem Mapping

Identifying the stakeholders with this exercise by exploring every possibility of intervention and challenges.



Figure 13. Ecosystem Mapping

### 5.1.3 SWOT Analysis

Understanding the Strengths, Weaknesses, Opportunities, and Threats to identify future prospects and markets.

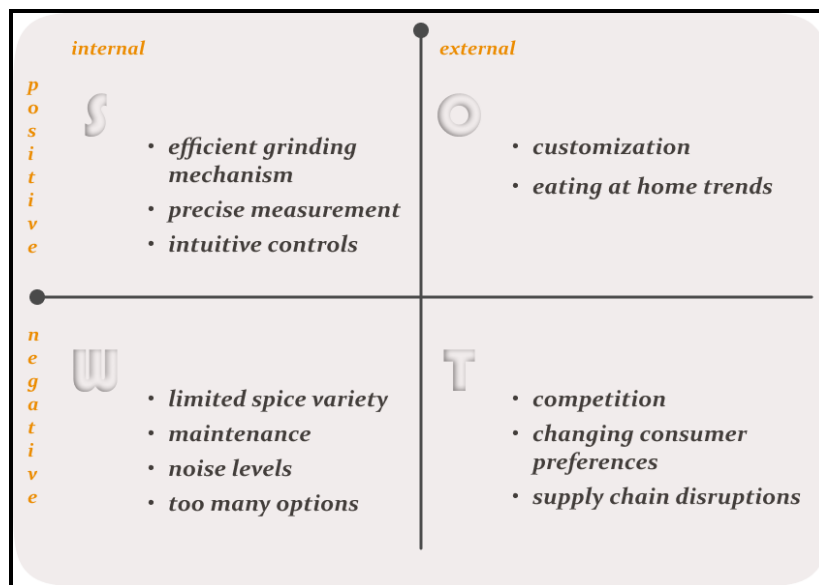


Figure 14. SWOT Analysis



## 5.2 Mechanism Implementation and Study

### 5.3 User Surveys

A survey was conducted to understand the users and the relationship of spices with them, with a sample size of about 30 people. The sample consisted of people from various backgrounds, such as students that are working part time, students that are unemployed, and middle-aged people who are employed, all residing in urban or semi-urban households. Although this survey was not restricted to any gender, there were very few male respondents.

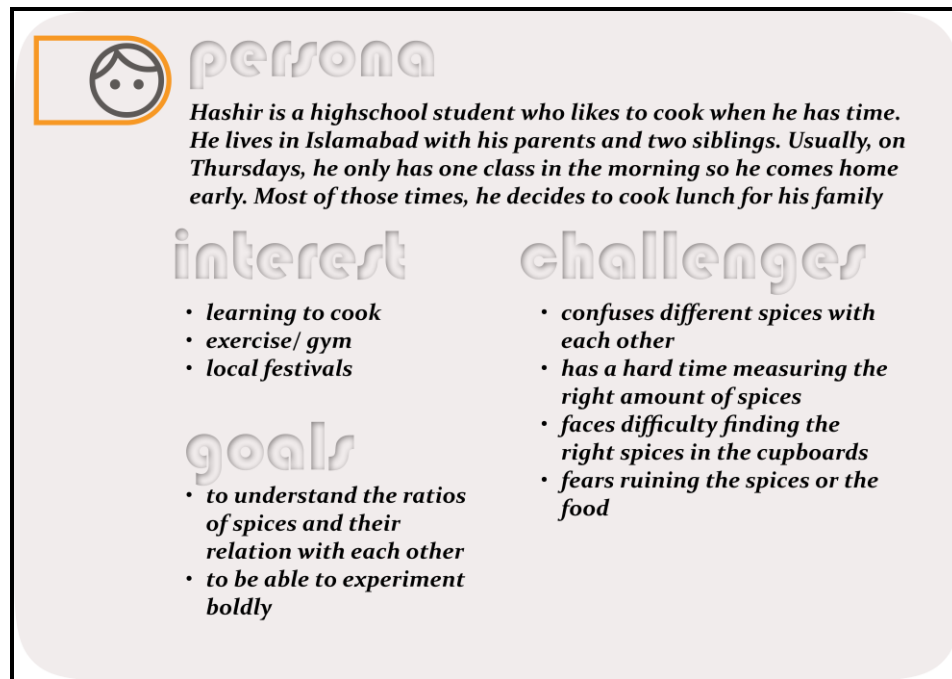
### 5.4 Field Study and Interviews

- Box mix is preferred by younger and older generations alike
- There are some anomalies that prefer grinding their own spices or are health-conscious
- Users keep spices in the original packaging
- Youth is familiar with the basic spices at home (e.g.: salt, pepper, garam masala, red chilli, dried coriander, cumin, turmeric etc.)
- Youth and adults are unaware of the exact spices to create a particular blend for a dish
- A mixture of answers related to measurement of spices, use of both spoons and eyeballed ratios
- Complaint about how spices get stuck at the edges of containers, cluster up or lose taste over time
- All subjects had learnt to cook food/ understand spice ratios through their mothers

## 5.5 User Persona

Derived from the interviews and surveys the user persona can be found in **figure 15**.

There is only one type of user for this project, hence a singular persona. This is for users that are living in urban residences and are willing to learn to cook or are learning to cook. These users cook thrice a week or less due to their work schedule or schooling.



*Figure 15. Persona*

## **6. Design Criteria and Ideation**

### **6.1 Design Objectives**

- 1. Clear Identification and Recognition of Spices**
- 2. Engaging**
- 3. Allowance of a Fearless Spice Blend Experimentation**
- 4. Easy Cleaning**
- 5. Accessible Storage**
- 6. Encouraging Creativity**

### **6.2 Design Ideation Process**

Initially the project took inspiration from saltshakers, mortar and pestle, and glass jars that are found in kitchens to store spices. In the beginning, there was exploration of various concepts like recognition of spices, automation of the dispensing and grinding process, and replication of other kitchen appliances.

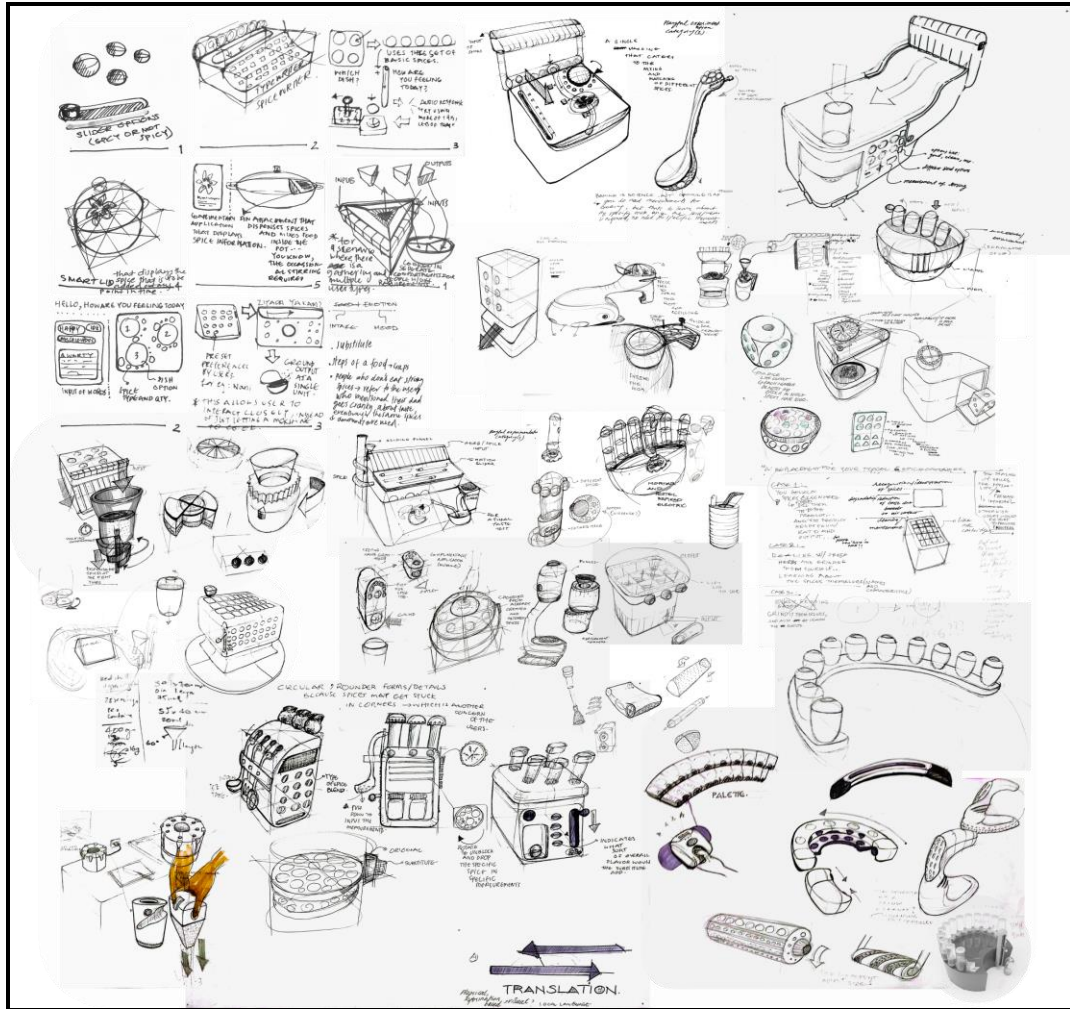
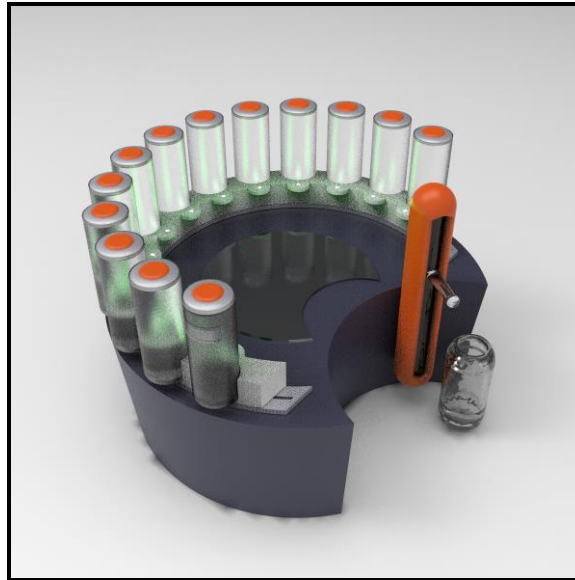


Figure 16. Initial Ideation

### 6.2.1 Concept 01



*Figure 17. Concept 01*

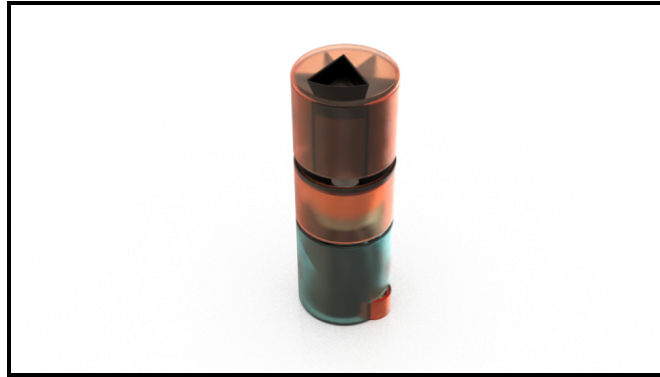
This was a very crude first concept with a ring which has placeholders for holding the glass containers that store ground spices. The ring has metal bearings that aid the rotation of the ring. The orange cylinder was meter for measuring the amount of spices, which will then be dispensed into the glass jar.



Figure 18. Further Ideation

Further ideation was done, this time refining the idea by streamlining the process and combining the different stages into a coherent design. The flow could either be store, measure, grind, dispense, or store, grind, store again, measure, and dispense. Concentration was spent on

how to automate the dispensing of the ground spice with a user-friendly flow. Initially user intervention was required midway so that users can grind spices into cartridges (similar to printers) and load them in the next module so that they can be measured and dispensed.



*Figure 19. Concept 02 (a)*



*Figure 20. Concept 02 (b)*

Concept 02 was further developed into concept 03, since it lacked significant touch points and an interface that allows for changes/ commandeering.



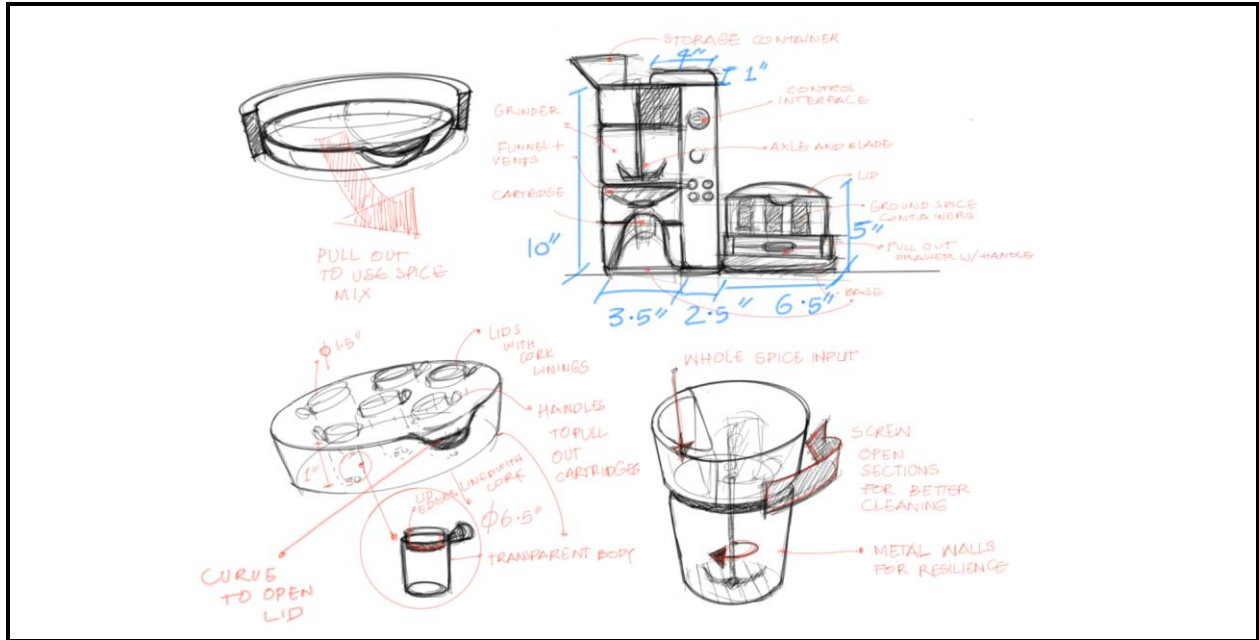


Figure 21. Concept 03 Sketch



Figure 22. Concept 03 3D model

## 7. Final Proposed Solution

Attempting to bridge the gap between the youth and spices, the final proposed solution features a kitchen appliance that helps user store whole spices, grind them, measure and dispense them in blends required for traditional dishes.



The product allows users to select a dish from the existing database, or any dish they had added in manually. After which they choose the serving size and press the button to measure/blend the spices. To fill the product with ground spices, they input whole spices and press grind to fill in the cartridges. They can manually control the product as well through the buttons on the control panel.

## **7.1 Specifications and Features**

### **7.1.1 The Form**

The product has separate compartments for each function mentioned, connected by rings that can be twisted to secure and unsecure for easy cleaning. It has a glass lid that helps input whole spices, and a control panel that helps user customize blends and give commands for grinding etc. without depending on the mobile application.

Below the control panel is the grinding compartment which has an axle rooted at the top with a blade that can crush the spices. The reason for this upside-down axle is to make the dispensing automated. Below this are circular flaps that open when done grinding, and a funnel directs the flow of powdered spices into glass containers with the capacity of 5 to 6 tablespoons. The glass containers have silicon lining on both ends and are placed on rotating discs that dispense the powder on a time-based mechanism. One rotation gives 5 grams, this additive method helps the product measure without the need of a weight scale (typical weight scales available in the market are only able to measure weights 20 grams and above). Following, the spice gets dispensed into a glass tray with handle that the user can use to pull out and use.



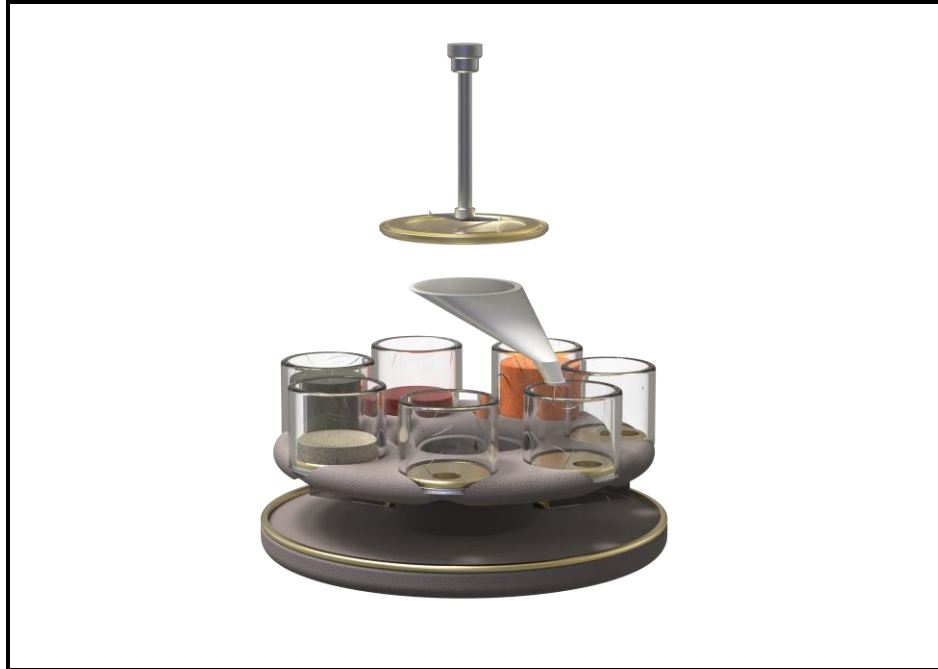
*Figure 23. Proposed Design (a)*



Figure 24. Control Panel



Figure 25. Rotating Base



*Figure 26. Internals for lower part*

### 7.3 Standard Dimensions

Total height: 1 foot 1 inch, width 7.5 inches

01 whole spice container	07 powdered spice container
02 funnel	08 revolving discs
03 spice output tray	09 axle, blade, flaps
04 base structure	10 control panel
05 exterior sheath	11 joining rings
06 powder container holder	12 exterior

*Figure 27. Technical Drawing 01*

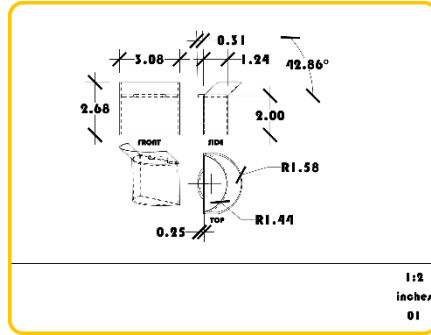


Figure 28. Technical Drawing 02

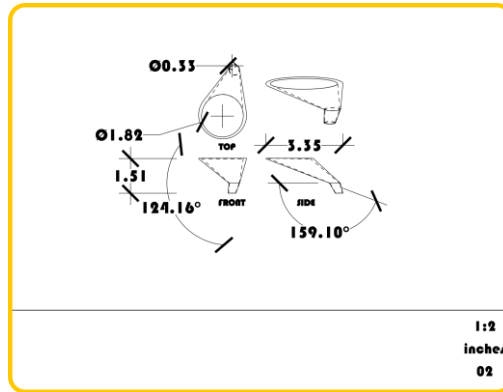


Figure 29. Technical Drawing 03

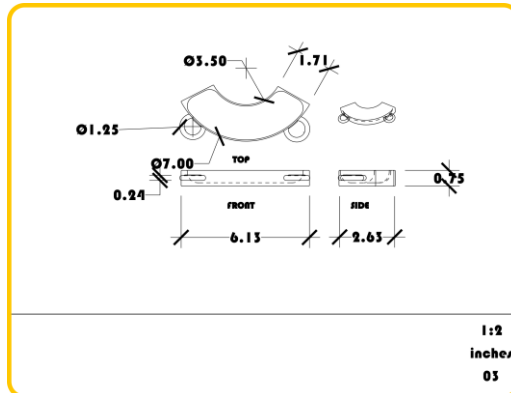


Figure 30. Technical Drawing 04

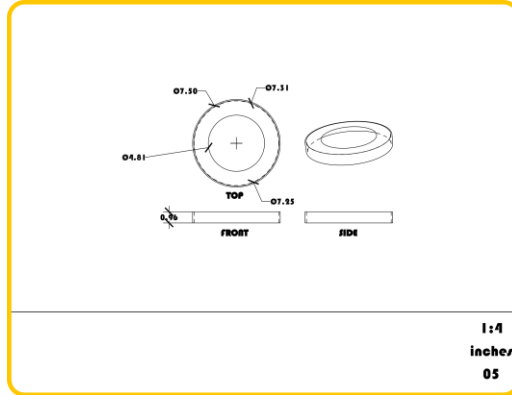


Figure 31. Technical Drawing 05

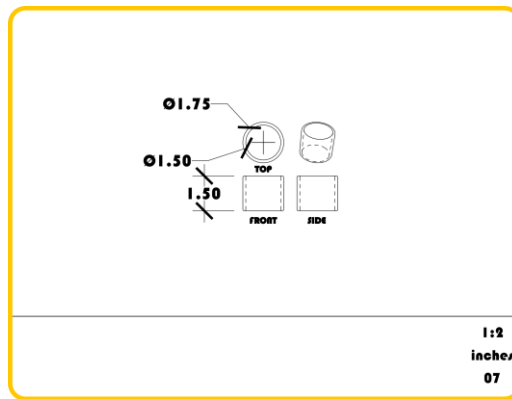


Figure 32. Technical Drawing 06

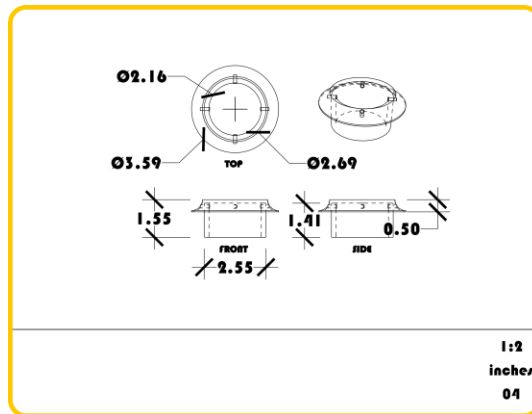


Figure 33. Technical Drawing 07

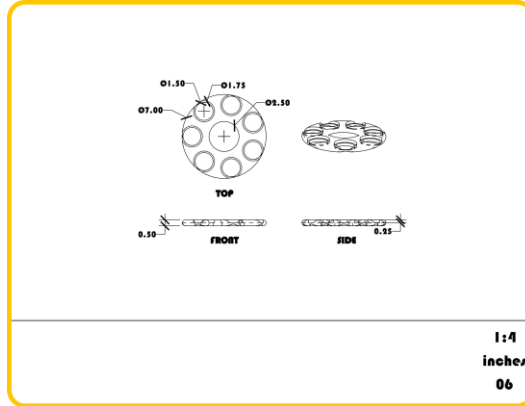


Figure 34. Technical Drawing 08

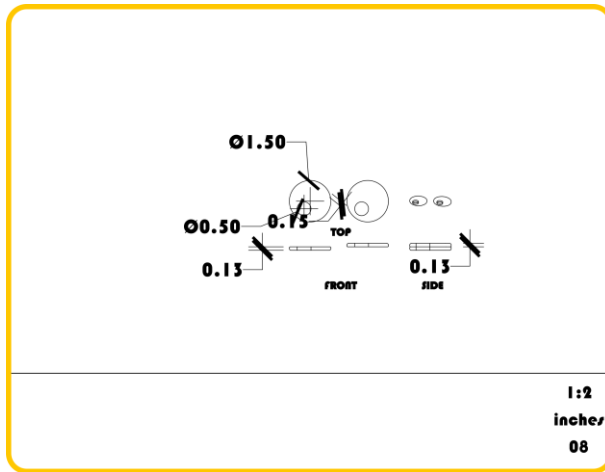


Figure 35. Technical Drawing 09

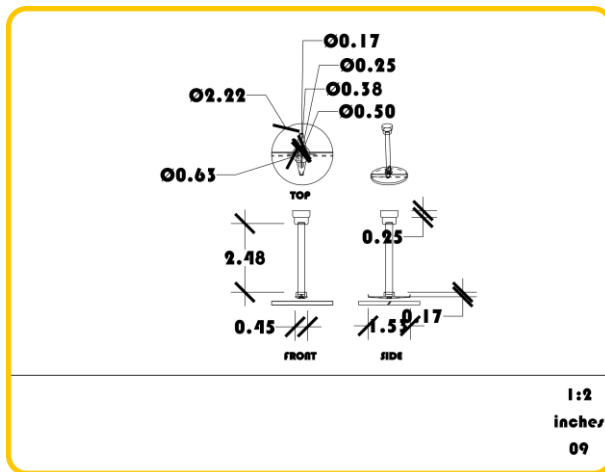


Figure 36. Technical Drawing 10

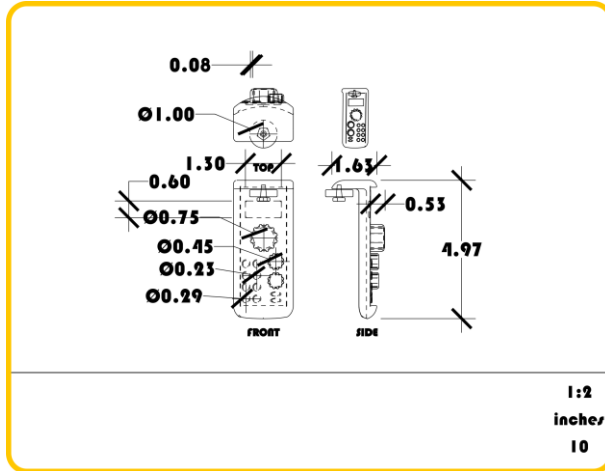


Figure 37. Technical Drawing 11

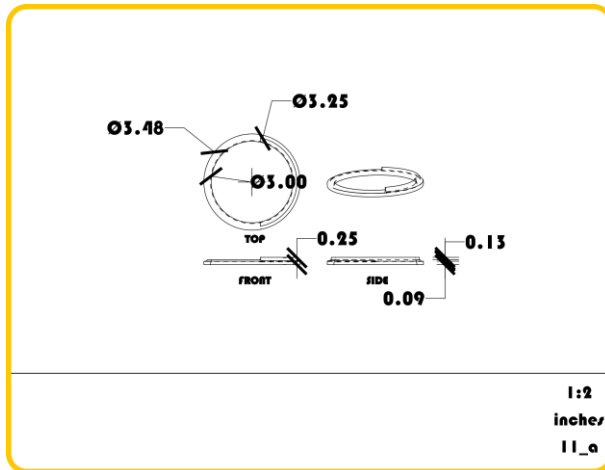


Figure 38. Technical Drawing 12

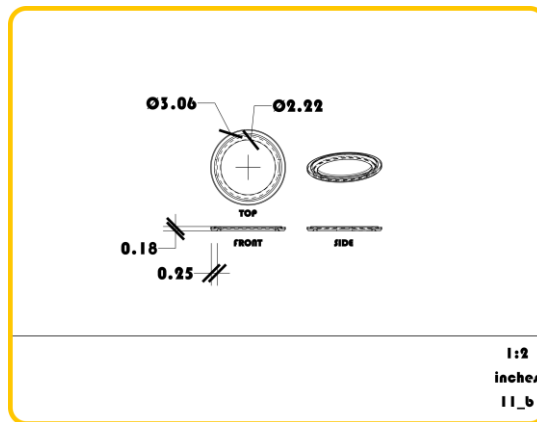
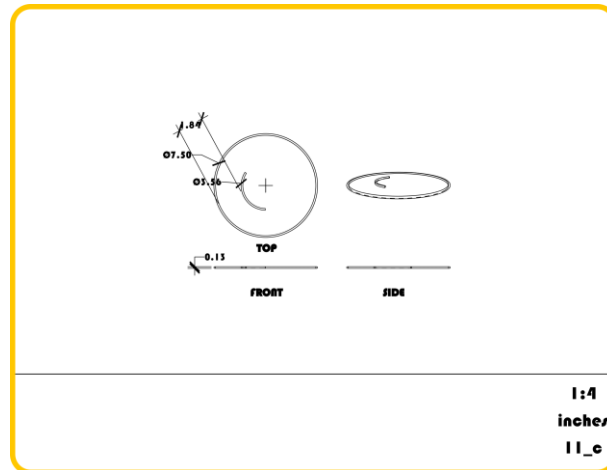
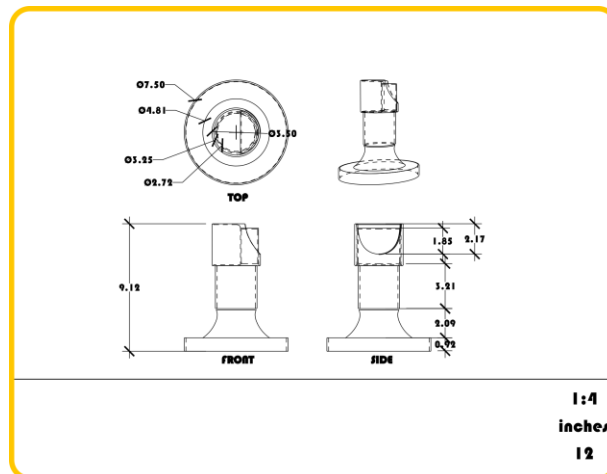


Figure 39. Technical Drawing 13





*Figure 40. Technical Drawing 14*



*Figure 41. Technical Drawing 15*

## 8. Material Research

### 8.1 Glass

Using glass for containers since it has proven to be a food grade and reliable material in kitchen appliances, specifically blenders and grinders.

## **8.2 Silicon**

Silicon is a flexible material that can keep things airtight. Since the product does not require heating, it will not be harmful for the spices.

## **8.3 Acrylonitrile Butadiene Styrene (ABS)**

A flexible material that can be moulded into complex forms with ease, hence a good choice for the outer sleeves. Further, it is also available in food grade variations allowing for healthy contact between plastic and spice.

## **8.4 Stainless Steel**

This is a rust-free option that offers durability and strength for parts like blades, axles, and rotating discs. Many food applications already use this material hence manufacturing is possible.

# **9. Product Branding**

The logo was inspired by traditional spice grinding practices: the pestle and mortar. Introducing a hint of yellow to represent the spices. Yellow is also referred to as a hunger inducing colour. A circle was used to imply that the traditions shall keep continuing, but in a new light.



Figure 42. Logo

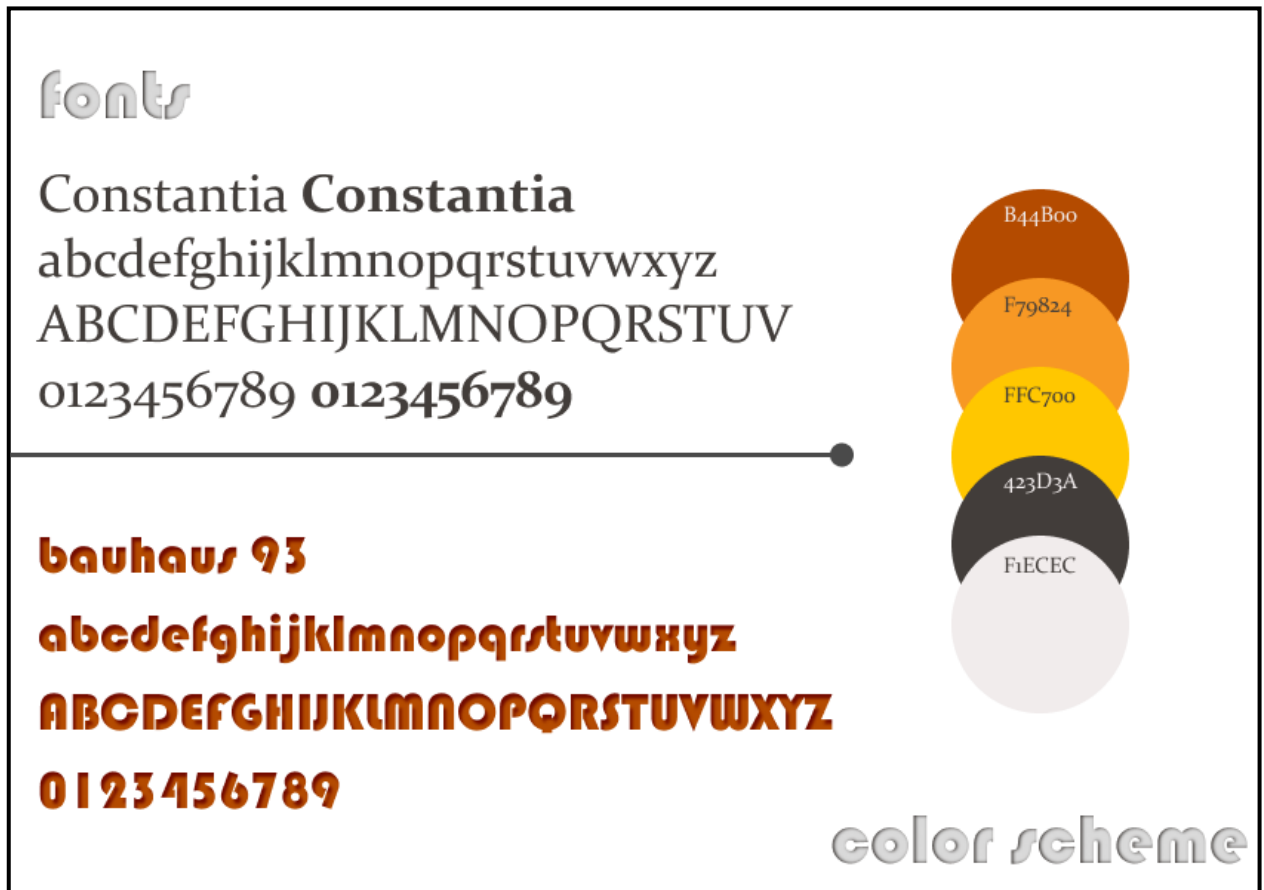
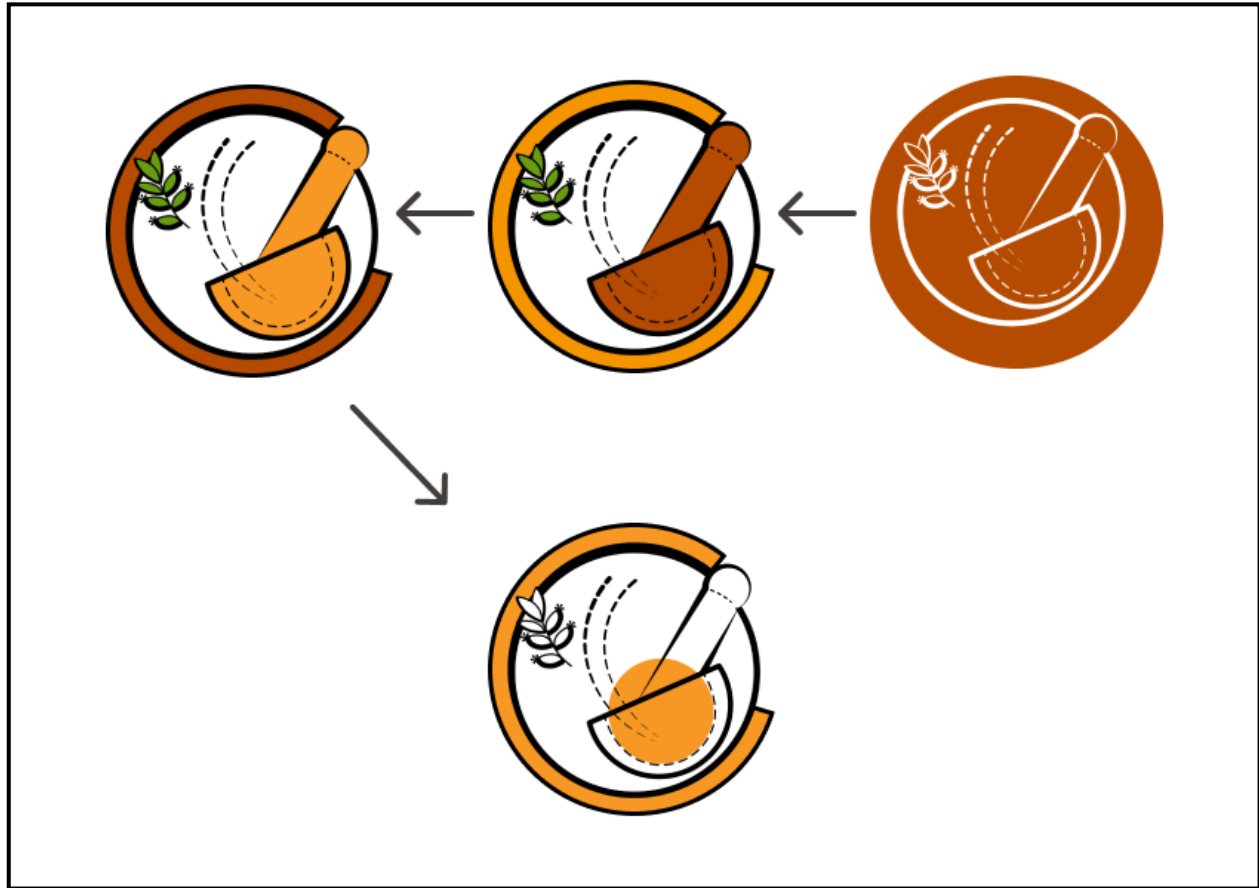


Figure 43. Brand Colour and Typeface



*Figure 44. Logo Process*

## 10. Outcomes

The product helps encourages the user to crushing spices at home and bridges the gap between the youth and spices.

### 13.2 Future Works and Improvements

Many aspects of this project require improvement such as the form, material, finish, development of the mobile application. Gathering of the database for the recipes and ratios in the app is required, collaboration could be done with the existing box mixed spices to gather the data regarding the mixing of spices. The electronic parts could be reduced to achieve a smarter and more portable product. Variations of this product can be offered by replacing the blades and

introducing a stone-based crushing mechanism for better flavour. This modification would help the youth become more engaged with the traditional spice grinding practices. The product has a lacking feature: communication – between other users, and between the product and the user. By adding a platform for the community specific to this product, the customer satisfaction can be enhanced. Further, elements can be introduced such that spices can be partially grated, ground course or fine, or used whole as well.

## **11. Conclusion**

Spices have a deep-rooted history in the subcontinent and are a very important part of the Pakistani culture. Due to a lacking communication with previous generations, the Pakistani youth is disconnected with their traditional spice blends and practices. This leaves them heavily dependent on standardized packaged spices, slowly forgetting the core of spices. Consequently, traditional practices revolving around spices have been diminishing. In due time, even the most basic spices will become unrecognizable and unknown to them. To address this issue, this paper explored the factors contributing to the disconnection between Pakistani youth and their traditional spice-related practices. The proposed product design, “Seasoned” was explained in detail, complete with preliminary research (both primary and secondary), manufacturing detail, and outcome. “Seasoned” was thus shown to have the potential to bridge the gap between the Pakistani youth and their traditional spice knowledge and practices.

## 12. References

- 1) B. H. (2005). Lead in spice mixes caused poisonings. *Science news*, 168(12), 189–189.  
[Http://www.Jstor.Org/stable/4016615](http://www.Jstor.Org/stable/4016615)
- 2) Buell, P. D., Anderson, E. N., de Pablo Moya, M., & Oskenbay, M. (2020). Conclusion—the next step: Silk Road as metaphor, Seattle, the Silk Road, and the Pacific Rim. *Crossroads of Cuisine*, 287–292. [https://doi.org/10.1163/9789004432109\\_008](https://doi.org/10.1163/9789004432109_008)
- 3) INSENT | Intelligent Sensor Technology, Inc. (n.d.). <https://www.insentjp.com/>
- 4) mil, José van. (2004). Dutch treat. *Gastronomica*, 4(3), 100–104.  
<https://doi.org/10.1525/gfc.2004.4.3.100>
- 5) Narsimhan, S. (2009). Plants and Human Civilization: Indian Spices. *Comparative Civilizations Review*, 60(60), Article 8. <https://scholarsarchive.byu.edu/ccr/vol60/iss60/8>
- 6) Podrażka, M., Bącznyńska, E., Kundys, M., Jeleń, P., & Witkowska Nery, E. (2017). Electronic tongue—a tool for all tastes? *Biosensors*, 8(1), 3.  
<https://doi.org/10.3390/bios8010003>
- 7) Qureshi, J. A., & Syed, N. A. (2016). Branding agricultural commodity-based industry: the case of spice industry in Pakistan. *Pakistan journal of agriculture, agricultural engineering and veterinary sciences*, 32(2), 246–257. Retrieved from <https://pjaaevs.Sau.Edu.Pk/index.Php/ojs/article/view/122>
- 8) Savage, N. (2012). Technology: The taste of things to come. *Nature*, 486(7403).  
<https://doi.org/10.1038/486s18a>
- 9) Rajanbabu, R. & Ganesan, S. (2015): CONSUMER PURCHASE BEHAVIOUR OF PROCESSED SPICES PRODUCTS IN TIRUCHIRAPPALLI CORPORATION. 127-142.

## **13. Appendix**

### **16.1 Survey and Interview Questions**

**1. What is your age group?**

15-19

20-24

25-29

**2. What is your current occupation?**

Student

Employed

Self-employed

Unemployed

Prefer not to say

**3. Where do you live?**

Urban area

Rural area

Semi-urban

**4. How often do you cook your own food?**

Every day

A few times a week

Once a week or less

Never

**5. How did/ are you learn(ing) to cook?**

From family members and friends

From cookbooks or magazines

From TV shows or videos

From online sources or apps

From courses or workshops

Other

**6. How do you decide what to cook?**

Based on what I have at home or can buy easily

Based on what I like or crave

Based on what is healthy or nutritious

Based on what is cheap and affordable

Based on what is new or trendy

Other

**7. How do you use spices in your cooking?**

Ready-made spice mixes or packets



Whole spices that I grind or crush myself

Powdered spices that I buy from the market or store

Fresh herbs or plants that I grow or get from the garden or farm

A combination of all of the above

Other

**8. How do you measure the amount of spices in your cooking?**

Standard measuring tools such as spoons, cups, scales, etc

Approximate measures such as pinches, handfuls, dashes, etc

Use my own judgement based on experience, taste, smell and colour, etc

**9. How do you store your spices?**

I keep them in their original containers or packets

I transfer them to glass jars, plastic bottles, metal tins, etc

I store them in a cool, dry, and dark place such as a cupboard or a drawer

Other

**10. How often do you buy new spices or replace old ones?**

Every month or more frequently

Every few months

Once a year or less

**11. How do you choose which spices to choose?**

Based on the brand name or reputation

Based on the price or value

Based on the quality or freshness

Other

**12. Where do you buy your spices from?**

Local markets or shops

Supermarkets or malls

Online platform or apps

Other

**13. How important are spices for you in your cooking?**

1 Not important

2

3

4

5 Extremely important

**14. How satisfied are you with the spices that you use in your cooking?**

1 Not satisfied at all

2

3

4

5 Very satisfied

**15. Why do you use spices in your cooking?**

To enhance the flavour and aroma

To add colour and texture to the food

Because of health and nutritional benefits

To preserve and extend the shelf life of the food

To reflect the cultural and regional diversity of the food

**16. Spices are expensive and hard to find**

1 Strongly disagree

2

3

4

5 Strongly agree

**17. Spices are time consuming to prepare or use**

1 Strongly disagree

2

3

4

5 Strongly agree

**18. Spices are inconsistent or unreliable in quality or quantity**

1 Strongly disagree

2

3

4

5 Strongly agree

**19. How do you think spices affect your food consumption and behaviour?**

**You can talk about your eating habits, moods and the emotions you associate with the spices**

**20. How do you think spices affect your social and cultural identity and values**

They connect me with my family and friends

They help me express my personality or preferences

They represent my heritage or background

They influence my beliefs or practices

**21. How do spices influence your beliefs or practices****22. What colours and materials do you associate with the spices in your kitchen?****23. What emotions do feel, when you think of the spices in your kitchen?**

- 24. Feel free give any feedback or tell about problems related to spices or cooking that you face in your daily life**

## **14. Acknowledgement**

I would like to acknowledge my project supervisor, Dr. Mubashir Karim, who had guided me throughout this project, my parents who had been supportive, and the volunteers and study participants who had helped authenticating the assumptions formed for this project.

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