Discovering Food Product Design

By Shaping Sheep's Cheese Perception in New Zealand

An exegesis presented in partial fulfilment of the requirements for the degree of Masters of Design at Massey University, Wellington, New Zealand.

Pilar Fallas, 2018

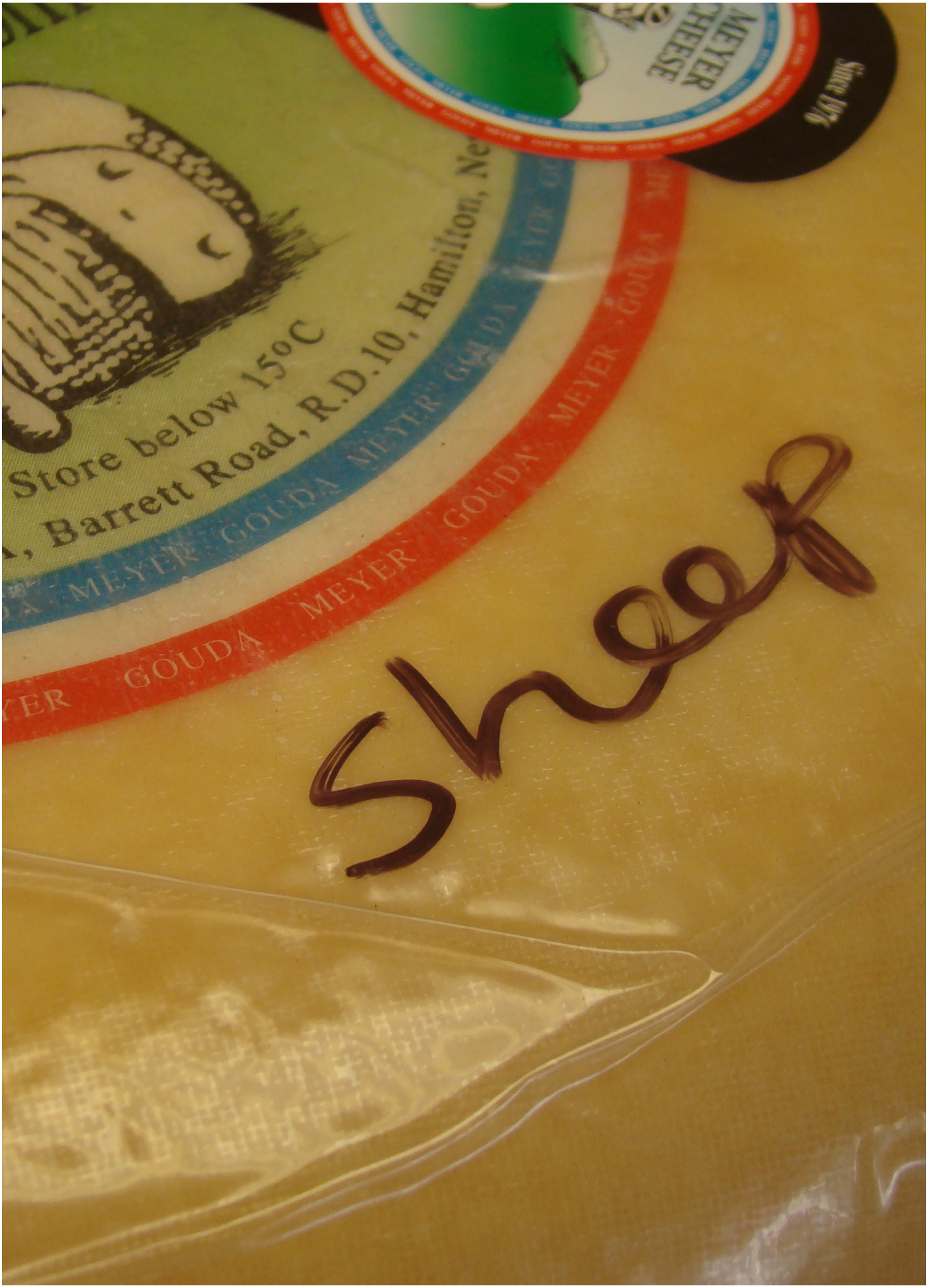

Figure 1. Meyer sheep cheese produced in Hamilton, New Zealand. Original, 2017.

KEYWORDS

Food
Product
Design
Cheese
Sheep
Experience
Perception
Emotion
Industry
Stereotype

GLOSSARY

Formulation: This a combination of raw materials in specific proportion. To make a formulation the product qualities must be defined previously, data about raw materials must be collected (qualities and cost), quantitative techniques are used to control the tests (linear programming, experimental design and mixture designs) as well as product profile tests and technical tests related to the product qualities (Earle & Earle, 2009).

Prototype: A prototype from the food science perspective is a preliminary version of the product; after several iterations the product is perfected into a final product. From the perspective of design, a prototype is “anything that takes an idea out of your head and makes it visible for others” (McElroy, 2016, p.1). For this project, prototype is understood as the materialization of an idea which is made with the real materials that would be used in the final product.

Model: For this project, a model is understood as a “mock up”. It is the materialization of an idea which is made out of materials which are not the real ones. The goal is just to create a quick representation of the ideas.

Process: A series of ordered steps.

Optimization: The act of achieving standardized quality with efficiency (least time possible) for a particular task.

Experience: A meaningful moment in someone’s life.

ABSTRACT

The Food Industry is more interested than ever in creating value through differentiation and innovation, but often overlooks creativity as key factor in generating returns from food product experiences.

This project is an exploration into how design; as a creative discipline, and food science, as a technical discipline, can more closely align and collaborate to create valuable food product experiences. To explore this nexus, I exposed myself, a food scientist, to the creative research practices of design in order to develop a new cheese product.

The project is a contribution to the development of New Zealand's fledgling sheep dairy industry. I first examined New Zealanders' traditional perceptions and hidden desires in relation to sheep milk products. I then explored the different dimensions of the food object (Bassi, 2015) by developing a range of sheep's cheese products to help New Zealanders become more adventurous sheep milk product consumers.

ACKNOWLEDGMENTS

I am deeply grateful to the New Zealand Government and the NZAid program for giving me the opportunity of completing this Master's degree and presenting this project. This challenge is possibly the biggest I have ever undertaken, and the most enriching experience I have ever had on my way for becoming a better professional.

Thanks to my supervisors, Matthijs Siljee, Craig Prichard and Alistair Carr for pushing me to overcome my limits and for their support during this project.

To my friends at the studio, you guys don't now know much you helped me. Thank you so much for every piece of advice you gave me and for your support.

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Finally, special thanks to Rolo and Magda for their unconditional friendship, photography and editing assistance.

PERSONAL NOTE

As food product developer, I would like to create food product experiences. The reason is simple: food is a powerful material; it has not only physiological functionality, it has emotional and cultural power (Catterall, 1999).

Humans look for more than nutrients in their foods. There are several motivations for people to eat. A study carried out in Germany in 2012 have found a total of 331 motives for eating behaviour, where the five most common were (1)-liking, (2)-habits, (3)-hunger, (4)-health and (5)-convenience (Renner *et al,*2012). It is interesting that liking, and not hunger, is the first reason for eating, an aspect related to emotion. I believe food is more than nutrients, and we must design it considering human needs, desires and emotions.

I am a Costarican food scientist with a strong interest in food product development. My research involves finding answers to the following questions: How can I create food products to fulfill human requirements? How can I create food products people love? How can I create food that stimulates emotional reactions? How can I create food product experiences? How can I add value to food products through creativity? How can I bring together design and food science to create meaningful food products?

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INTRODUCTION

Creativity in food production

The food industry is more concerned than ever about creating value through differentiation and innovation. However, it often overlooks the importance of creativity as a key factor in achieving this goal. Through creativity it is possible to create emotional engagement, and this is the core of adding value to a product (Norman, 2004).

Producing new food products is in many respects a creative process, but most industries don't even realize this creative process underlies their activities. 'Most companies don't know what creativity really is, so they can't benefit from it. They lack creative clarity' (Kolko, 2017, p.5).

In large food-producing organizations, the development of a new food product tends to be departmentalized. Marketing professionals attempt to understand consumers and lead innovation, food scientists provide technology and create formulations, and designers resolve packaging and look after aesthetics. This departmentalization is well documented, and it impacts the creative process directly by producing a disconnection of the product elements which later become difficult to unify: 'the professionals of the different departments responsible of each element have been educated in different scientific disciplines, they follow different rules and prioritize different values, they have specific stereotypical ideas about each other and for instance cooperation is normally blocked' (H. N. J. Schifferstein, 2016, p.106).

This disconnection is a big issue, because at the end of the day, the food product must be a whole proposal delivering a consistent message, and offering a memorable experience. It is my belief that by finely connecting and balancing the different elements of the food product, it is possible to create the preconditions for the magic of food product experience to occur. To use an analogy, when creating a play, the director as the creator, connects and balances different technical elements such as light, music, acting, production, makeup, marketing and visual effects. Finally, when these elements work all together, the magic of fiction is created, but only when the public is in the room an experience is occurring.

The same applies to creating a memorable food product experience. Design is the creative discipline in charge of creating new products and experiences. Designers are the professionals specifically trained to identify hidden needs, read consumer emotions, and transform this information into stimulating products (H. N. J. Schifferstein, 2016). As the director is for the play, the designer is for the product.

I explored the nexus between food science and design by entering myself as a food scientist to the completely unknown world of design to learn about its creative methods, and by combining these new learnings with my knowledge in food product development to create a whole food product proposal. This thesis document the project.

This project challenges traditional stereotypes and points directly to the primary importace of the creative process. It explores ways to repair the disconnection between two disciplines, design and food science, with the main purpose of inquiring how this collaboration helps to better understand, and how food industry might better understand, and celebrate the creative process in order to develop food product experiences that delight consumers.

Reading guide

This exegesis is composed of five chapters:

CHAPTER I. METHODS describes the methodology, activities and approach used to execute this design project.

CHAPTER II. THE KEY POINT presents a summarized literature review. “The Key Point” contains all those aspects I kept in mind throughout the project.

CHAPTER III. INSIGHT COLLECTION unpacks the case of sheep’s milk consumption in New Zealand.

CHAPTER IV. DESIGN PROCESS provides a documentation of the design process executed in this project. The chapter is divided in four different stages: exploration, ideation, refining and final design.

CHAPTER V. FINDINGS provides a summary of the main findings and conclusions.

CHAPTER I. METHODS

In this chapter, a general description of the methods used to execute this project is presented.

General methods

To execute this project, a case study about the perception of sheep's milk in New Zealand has been undertaken in order to create a new cheese product experience.

In the discipline of food science, a linear approach is normally used to develop new products. Safety, quality and repeatability are priority, which is the reason why the earlier stages of the design process are normally restricted.

In this project, I did not focus my attention on safety and quality. I decided to generate non-edible models and prototypes, to move freely through a non-linear, more explorative, generative and iterative process, as shown in Figure 2.

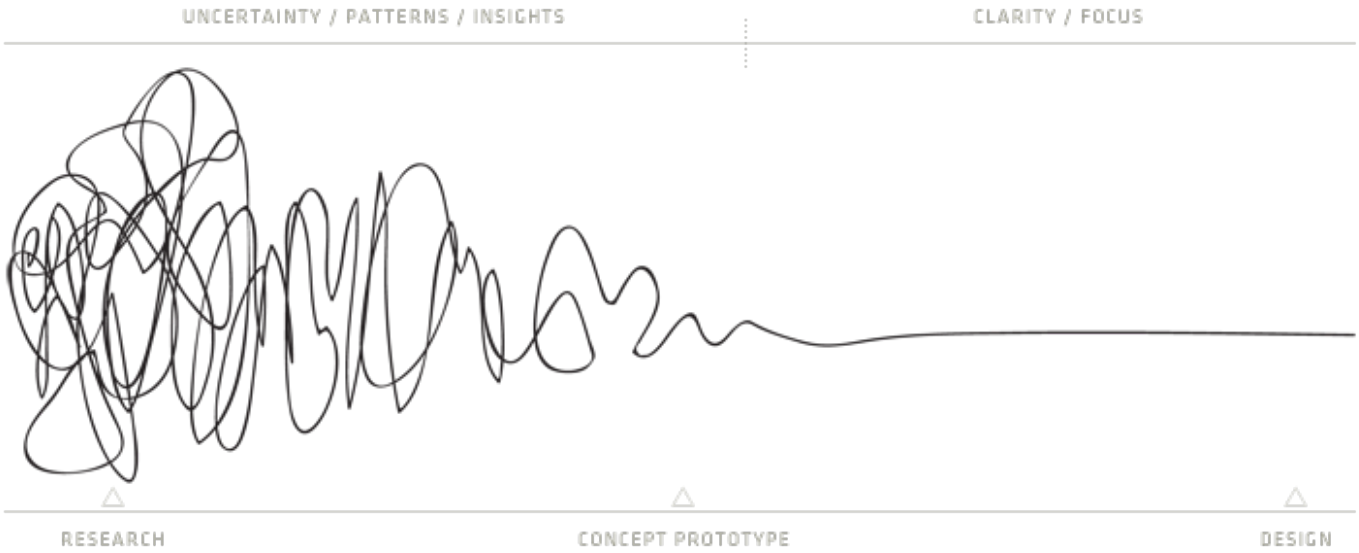


Figure 2. Design process chart. Sanders & Stappers, 2012.

Rather than a quantitative research process, I used participant observation (Brewer, 2000), a qualitative technique, in order to collect emotional responses related to sheep milk products. In the course of this observational process I have spoken with customers, sellers, and producers at a range of stores, markets, and food events. The locations I visited were: Moore Wilsons, Kingsmeade, Origin Earth, Common Sense Organics, Chalk and Cheese, The Dutch Shop, Bel Mondo, Zany Zeus, C'est Cheese, Le Marché Francais, farmer's markets, New World supermarket, Pack and Save supermarket, Countdown supermarket. The events attended were: Butchers' shop series, Food Show Wellington, Food Show Auckland, National Field Days, and Wellington on a Plate. Other activities, such as cheese tasting sessions, or cooking sessions, were organized by myself and carried out at home and friend's kitchens, university campus, and Biz Dojo co-working space.

Non-linear analysis methods (Kolko, 2014) were used to analyze the collected observations, and obtain insight into New Zealanders' traditional perceptions and hidden desires relating to sheep milk products. As a result, observational and insight statements were written. Based on those statements, product requirements were defined. Those requirements were used as a source of inspiration to build new provocative stimuli: sketches, objects, concepts to shape current perception into a more positive one. I went through an iterative process of observation and crafting to fine-tune ideas and obtain a final product.

To consider

As a food scientist, I haven't been trained as a designer. The traditional level of aesthetics proper to a design professional won't be found in this piece of work. On the other hand, all that is in this document is made by myself. I decided to keep it this way so that the reader could appreciate an honest reflection of this process and to capture the true essence of how I made sense of creativity and design.

CHAPTER II. THE KEYPOINT

The food product experience is the keypoint where different important factors for this project convey. In this chapter this topic is briefly but concisely presented.

The food product experience

“A product experience is the result of the interaction between a human and a product where psychological effects are elicited. Those effects include sensory stimulation-perception, emotional evocation-reaction, and meaning and value attachment”(H. Schifferstein & Hekkert, 2008, p.2).

The way consumers experience food starts before they put the food in their mouths. The experience starts when they put food in their minds. “Consumers may fantasize about how a product will perform like and feels like” (H. Schifferstein & Hekkert, 2008, p.3).

“The packaged food product experience has different stages: choosing the product from a shelf and purchasing, storing, opening the package, cooking if necessary, eating, and discarding. During the first stage, pre-existent attitudes and stereotypes play a major role. Packaging is critical at this moment, because its sensory characteristics as a container affects directly how food is perceived, it creates expectations, confers meaning, affects product attitude judgements and reinforces existing associations to the product. During the other stages, direct sensory experience and interaction with the product is more important, but specifically, during the eating stage, taste is the most important sensation” (H. N. Schifferstein, Fenko, Desmet, Labbe, & Martin, 2013).

Taste is determined by the product formulation and process. The formulation of a food product is a combination of ingredients and additives in a certain proportion; it can be understood as a recipe, but for industrial purposes, amounts are represented as percentages and weight units. The development of a formulation and process is commonly known in the food industry as food product development. This is normally the responsibility of a food scientist; who prioritizes two main goals: safety, the most important and non-negotiable one, and quality: sensory, microbiological and physicochemical. Food product development requires a safe processing environment, specific equipment, ingredients, additives, and certain level of technical knowledge. From my professional experience, depending on its complexity, a food product development can last from six months to two years.

To create a packaged food product experience, one needs to consider more than just formulation and processes: This is where food science and design meet. These two disciplines can work more closely when the food product is visualized as an expressive object: “Expression shapes experience. Like the theme in a play, the function of the design object is personally meaningful to the receiver, its meaning changes from person to person. When the person feels ‘connected’ to the play or to the design object, we can say that the person is having a meaningful experience. When you examine a design object, and you feel connected, the more meaningful the object is to you, the more carefully and slowly you will examine the object, the experience with the object is more intimate, awareness of sensory qualities increase, and a bond between you and the object is being formed” (H. Schifferstein & Hekkert, 2008, p.241).

The food product as an expressive object communicates through different sensory modalities, from its first stage of sitting in a shelf until the last stage when it is being discarded by the consumer. It stimulates all five senses, vision, audition, touch, smell, as well as taste. According H. Schifferstein & Hekkert (2008, p.133), “The greater the number of sensory modalities that are stimulated, the richer the experience will be”. In order to optimize sensory stimulation when creating a packaged food product experience, it is vital that formulation and packaging must not be divorced during product development; these two elements conform the total object (Bassi, 2015).

Bassi (2015) describes “food product design” as a process of designing a food artefact as a total project, including factors like form, technological aspects, development strategy, communication, consumption, and others. Considering this definition, in my research study the overall design concept is the convergence point of all the elements presented in the food product. By aligning all the elements it is possible to create a precondition for dialogue and experience between product and consumer. To support and enrich the overall design concept, I altered my role as food-scientist-as-product-developer to include food-designer-as-product-developer. This required me to still consider safety and quality, while developing my awareness of design aspects like shape, size, colour, composition, balance and others to form the total proposal.

CHAPTER III. INSIGHT COLLECTION

This chapter summarizes field research I have done with the purpose of understanding attitudes, stereotypes and current perceptions around sheep's milk products in New Zealand. Its content is presented in three sections: identifying observational statements, identifying insight statements and defining product requirements.

Figure 3. Data chart for obtaining insight. Original, 2017.

Identifying observational statements

The 2015 Business Plan for the New Zealand Dairy Industry (BPNZDI) states that New Zealand has the world's largest sheep production. However, sheep's milk products are not highly consumed in this country.

The dairy industry plays a strong cultural and social role in New Zealand. Dairy is part of New Zealand's national identity. (Wevers, 2017). However, it has traditonally been associated only with cow's milk.

Traditionally New Zealanders consume fluid cow's milk, cow's milk cheddar cheese, cow's milk butter and many others cow's milk products; but most of the New Zealanders I spoke with in the course of my observation have never tried, or don't frequently consume sheep's dairy products. Figures 4-6.

"Dairy remains a very important part of the New Zealand lifestyle. Dairy farmers in New Zealand have been regarded as trusted, honest workers synonymous with New Zealand values"

Figure 4. Maori farm. New Zealand Geographic.

Every Kiwi baby-boomer remembers having to drink quarter-pint bottles of warm milk at playtime, which at my school had been left outside on the steps of the hall in the morning sun."

Figure 5. Milk at school. New Zealand Geographic.

"The only cheese we ever ate was in large blocks of Tasty or Colby – bright yellow processed Chesdale" (Wevers, 2017). "I grew up eating cow's cheese not sheep's cheese, mom had no money to buy beautiful cheeses. We just use to eat you know the normal traditional cow's milk cheddar".

Figure 6. New Zealand cultural identity tattoo, unknown author.

While in France, Netherlands, Greece and Italy sheep's milk is highly appreciated for cheese production and consumption, this is not the case in New Zealand (Figure 7). According to the BPNZDI (2015), the lack of a sheep milk consumption tradition in New Zealand is the main barrier for introducing sheep's milk products to this country.

From my observation, I have identified two groups of people who represent this culture: those who don't know about sheep's milk products and their value, and those who know, but don't feel good about them. Considering the first group, most people in New Zealand have never tried or seen sheep milk products. Why is this happening?

"Not many people ask for sheep milk cheeses or sheep milk products, I don't know why. I'm from France and we love them!"

Figure 7. Maturation cave of traditional sheep's milk Roquefort cheese with Denomination of Origin. Société Roquefort.

When visiting supermarkets, I found a huge variety of cow's milk products, but few or none sheep's milk products. At this moment, there are a total of only 13 sheep milk producers driving sheep's milk product's consumption all around New Zealand, a country with more sheep than people.

Figure 8. Cow's milk cheeses (left) vs sheep's milk cheeses (right), Moore Wilson's. Original, 2017

By talking with producers, I identified sheep's milk products as difficult to sell in supermarkets. One producer said during Wellington Food Show, "Halloumi is traditional Greek cheese made from a mix of cow's milk and sheep's milk. In New Zealand, I can sale cow's Halloumi very well in a supermarket. With sheep's milk Halloumi I just surrendered, I have tried everything to sell this product, I have talked to people, I have given free samples, but it has been too difficult" (Personal communication, May 26, 2018).

On the other hand, consumers perceive sheep milk products as a novelty. While giving away sheep cheese samples for tasting at National Field Days in Hamilton, I observed most of the consumers were impressed, as they tasted the product for the first time. They would frequently ask where to get Blue River products, a brand of sheep's cheese that is been distributed in most supermarkets in New Zealand (Figure 9).

Both facts form a cycle, producers are frustrated because consumers don't buy sheep's milk products, they stop promoting them, and consumers don't buy sheep's milk products because they don't notice them, or don't know about them. As a result, exposure to sheep's milk products is poor.

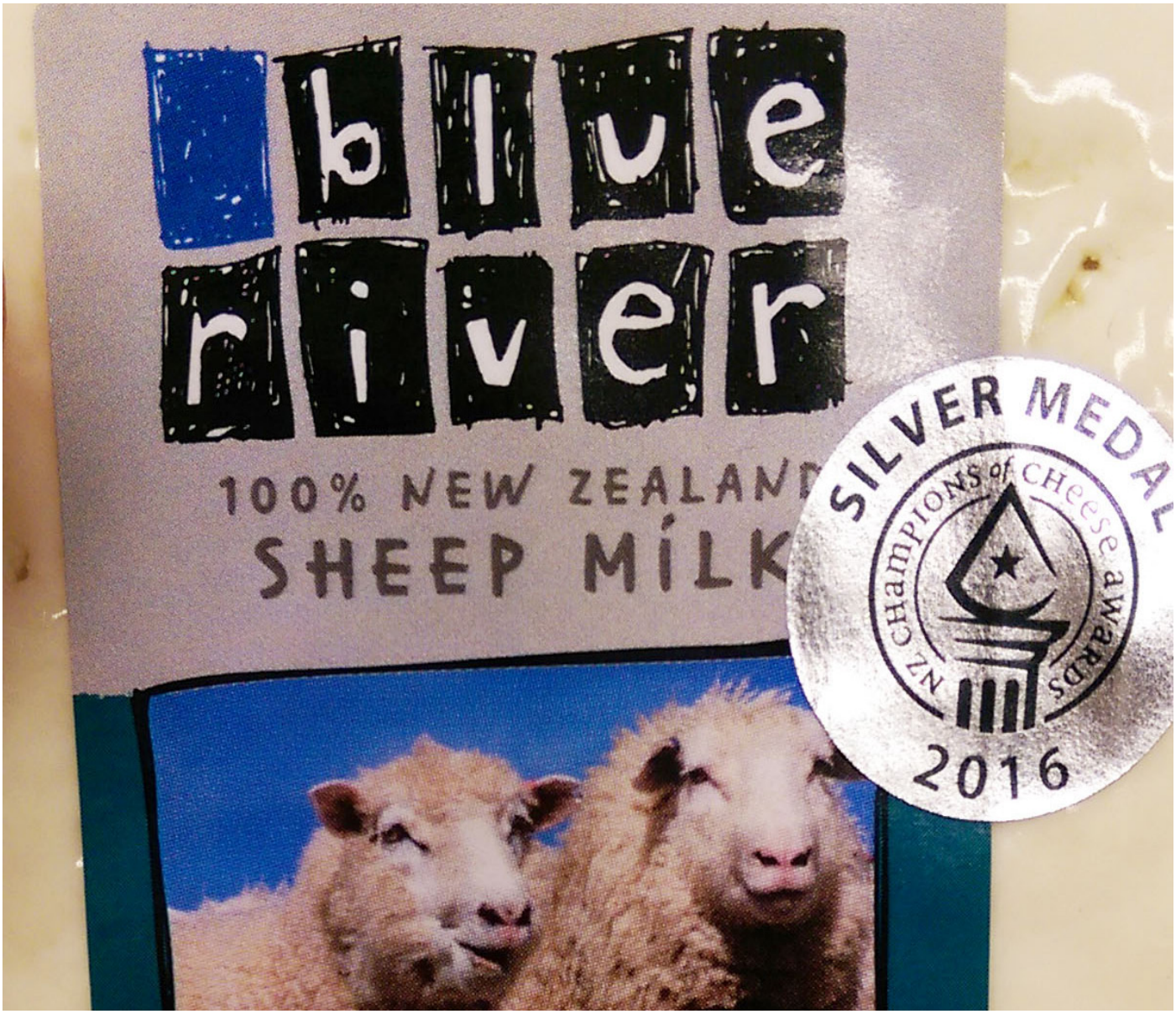


Figure 9. Common sheep's cheese brand in New Zealand's supermarkets. Original, 2017.

In the course of my research it became clear that consumers in New Zealand perceive sheep's milk products as expensive. They normally compare them against cow's milk prices and don't find any extra benefit that sheep's products might give them in exchange for their money.

Figure 10. Cow's milk price: $1.75/L (left) vs sheep's milk price: $8/L (right). Original, 2017.

In addition to this, I noticed that consumers without dietary requirements don't relate to sheep's milk products. The small fraction of people who consume sheep's milk products frequently in New Zealand, do so because they have some dietary restrictions that keep them from consuming cow's milk products.

While visiting *The Dutch Shop* in Jackson Street, Petone, I found this advertisement: "Sheep gouda is back!!". I asked who was waiting for sheep's cheese to come back, to which the sales lady answered that it was people who cannot consume cow's milk. Figure 11.

Similarly, Janet King from Kingsmeade cheese explained that: "What people love the most are the healthy characteristics of sheep's milk products... "One of my clients is a lady with stomach cancer; it is the only thing her stomach can tolerate. It is amazing, isn't it?".

Due to this association of sheep's cheese with a particular target market, the rest of the population could assume these products are not for them because they don't have any medical restrictions.

"People who always ask for this cheese are those who cannot consume cow's milk and found sheep's cheese as an alternative".

Figure 11. Sheep gouda is back. Original, 2017.

The second group is people who know about sheep's milk products but don't feel good about them. Why is this?

I have found that most of these consumers haven't had any interaction with sheep's milk products but they associate them with previous negative experiences. "To consume sheep's milk products comes wrapped in the experience of lambing and crutching, in dags, sweat, urine and the stress of a wool shed in full flight. It's a bad thought" ("Bottoms Up?," n.d., p.1) (Peterson & Prichard, 2015).

Some consumers have had negative experiences with goat's milk products. They automatically assume that goat's milk is the same as sheep's milk, or can be even worse". This confusion caused by a previous bad experience with goat's cheese stems from the cultural perception that: "sheep and goats are similar animals". Figure 12.

Finally, I have observed that the widespread nature of negative perspectives affects the consumption of sheep's milk cheeses in New Zealand. Sheep's milk products have the reputation of being strong, "different" or too "sheepy". These are some of the expressions I have collected during observation: "I don't like sheep's cheese. I don't have anything against it, it's just you know... different" (apologizing with a tense smile and shrugging). "There are people who have really hurt the sheep cheese image by saying openly on radio programmes that a good quality sheep's cheese should taste like an old humid sock".

In summary, these are the observational statements I collected:
•Dairy industry plays as strong cultural and social role in New Zealand, but it is totally associated with cow's milk production and consumption.
•Most people in New Zealand have never tried, nor even seen sheep's milk products.
•Exposure to sheep's milk products is poor. There are few products in the market to stimulate consumption.
•The few available sheep's milk products in New Zealand are not being noticed or valued.
•People don't relate to sheep's milk products, they don't look at them as one of their dairy options.
•Associations and negative previous experiences attached to sheep's milk products are influencing consumption.

Figure 12. Goat's cheese as sheep's cheese. Original, 2017.

Identifying insight statements

Having the observational statements in mind, I decided to focus my attention on what happens when people give sheep's milk products a chance. What is the context? How do they react and behave? How do they feel? What are the factors which make it easier for them to skip over cultural and social conventions?

To this end I participated at the Hamilton National Field Days and the Auckland Food Show to represent Massey University and promote the sheep's milk industry. Figures 13-14. During these events, I observed people's reactions while they were walking around our installation. From their faces it was clear that some found it gross, others ridiculous or funny, while several seemed surprised.

Most of consumers who came to talk to us were attracted because they found it interesting that sheep-milking exists in New Zealand. They would frequently ask about the farms and their locations.

I also attended the Butchers' shop series, an open forum where representatives of the milk industry and the wider community were invited to talk about the cultural significance of milk production in New Zealand. There, I confirmed that New Zealanders have a strong connection with farming, it is one of the pillars of their culture, but nowadays, due to the nature of the supply chain and the modern massive food production mechanism they feel far away from the farm (Wevers, 2017). This disconnection between traditional food production mechanisms, and farms is well explained by Bassi (2015).

When consumers visited our installation, we offered them cheese for tasting. Their first reaction was to look carefully at the samples and then try to decide if they wanted to try them or not. One young woman was about to try a piece of cheese when suddenly she said, "This is so scary, maybe it is too sheepy". However, many people's curiosity won out, and they were eager to try new, and even intimidating foods.

I observed that consumers were careful and they established certain conditions to reduce risk when trying sheep's cheese for the first time. Asking for small pieces, or starting with the mildest samples were common reactions: "I'm not sure...just a small piece", "First a small piece, and then let's see what happens". Progression is important, going gradually makes the consumers feel more secure. Once the consumers discovered a small piece was good, they relaxed and decided to go for more.

I observed that when tasting sheep's cheeses for first time, consumers picked cheddar cheese as the starting point if they had multiple options. It was familiar and made them feel confident.

On our table, we had not just one, but many different cheeses. I noticed that consumers would often come to the stand, try the first cheese, and not like it. They would then throw it into the rubbish bin and complain, all while preparing to taste a second cheese. Most consumers didn't just taste one or two cheeses, they tasted all of them and discovered that at least one was not that bad: -"Oh, it is not that bad, I like it", and then bought it to take home.

Having observed this behaviour I can infer that if we had had just one cheese for tasting, a significant percentage of consumers would have gone home thinking, "If that is sheep's milk cheese, I don't like it". Sheep's milk cheeses vary substantially in a number of flavour and texture characteristics. Therefore, more than one cheese is required to illustrate to consumers what they can expect from sheep's milk cheeses.

When consumers are provided with more than one experience of a product group like sheep's cheeses, they have the opportunity to make comparisons and develop a more nuanced view of the products. Giving consumers more than one cheese to taste facilitates exploration and makes it easier for them to understand that there is a range of sheep's milk cheeses available, and that they may enjoy some, but not others.

Figure 13. National Field Days Hamilton. Unknown author, 2017.

Figure 14. Sheep's milk mozzarella cheese tasting at National Field Days Hamilton. Unknown author, 2017.

Based on these findings, I decided to carry out one more activity to see how consumers reacted to sheep's cheese in a different environment, I set up a "food adventure" environment in Biz Dojo co-working space, I provided a range of different ingredients: three different sheep's cheeses, popcorn, olives, chocolate, basil, peppermint, spring onion, kiwifruit, tomatoes, tortillas, coconut, almonds, apples, peaches, caramel, blackberries, peppers, salami, and others. A total of 23 people were asked to make a plate which represented their favorite person. Figures 15-21. Appendix 7-8.

People came to ask what the activity was about and participated enthusiastically. Nobody seemed to be intimidated by sheep cheese. Participants' attention was distracted from the fact that the cheese was sheep's cheese, because firstly, sheep's cheese was not the focus, it was just one ingredient amongst many; and secondly, I gave participants a task which became their 'immediate objective'. According to Stanislavsky (1942), there are two types of objective in a current dramatic action; the 'super-objective' is an over-reaching objective linked to the overall outcome. The word super-objective is used to characterise the essential idea, the core, which provides the impetus for creating a situation. An 'immediate objective', on the other hand, is the reason for the actions happening in one specific moment. In this case, there was a super-objective' (eating sheep cheese), but I deviated participants's attention from it, and motivated them to focus on completing an immediate task of building a plate.

During the activity, I observed most participants used tiny pieces or thin slices of cheese. I confirmed that as at my previous stall consumers had a preference for small samples when experimenting with sheep's cheese. I also observed, that participants were making unexpected combinations of sour and sweet ingredients. They didn't go for traditional cheese and basil. This suggested to me that by providing the right conditions it is possible to encourage consumers to experiment.

Based on all my observations, I asked the question: How can I create a packaged food product which helps consumers to go for non-traditional sheep's cheese and makes them believe it is awesome?

In summary, these are the insight statements:

•Consumers feel they are getting disconnected from farms.
•Consumers assume "sheepiness" (sheep flavour) is intense.
•Consumers feel intimidated when trying sheep's cheese for the first time.
•Consumers feel more comfortable when they have the power to modulate how far they want to go in terms of intensity.
•Familiarity helps consumers to try sheep's milk cheeses for the first time.
•Consumers generalise judgments of sheep's cheese based on the number of experiences they have had: none, one or multiple.

Figure 15. Tasting sheep's cheese workshop setup, Biz Dojo. Karasinska, 2017.


Figure 16. Plate made during sheep's cheese-tasting workshop, Biz Dojo. Karasinska, 2017.


Figure 17. Participants working in sheep's cheese-tasting workshop, Biz Dojo. Karasinska, 2017.

Figure 18. Sheep's cheese for tasting workshop, Biz Dojo Karasinska, 2017


Figure 19. Sheep cheese plate making, Biz Dojo. Karasinska, 2017




Figure 20. Participants' reaction during sheep's cheese tasting workshop, Biz Dojo. Karasinska, 2017.

Figure 21. Sheep's cheese tasting workshop tweet caption. Swift, 2017.

Defining product requirements

Based on the observational and insight statements, I started exploring how to shape the current New Zealand consumer's current perception of sheep's cheese into a more positive one through a food product experience. At this point, my questions were as follows: how can the product make consumers feel intrigued and invite them to try sheep's cheese for the first time? Could the product facilitate the exploration and would including more than one cheese in the product assist with this? Could the product reduce feelings of tension and anxiety and make people feel in control when trying sheep's cheese for first time?

From these questions, I defined product requirements:

•It invites people to try sheep's cheese; whether it means to experience sheep's cheese for the first time or to give it a chance from a different perspective.
•It presents more than one sheep's cheese style.
•It provides tiny bites of cheese, just the right amount to have a tasting experience.
•It informs consumers about different about the variety in flavours in sheep's cheeses – from mild to strong.
•It celebrates cheese, cheese is the focus of attention.
•It provides a rich opportunity to interact with the product, at all four steps of the encounter: understanding, opening, consumption and discarding.
•It makes clear the connection between sheep cheese and New Zealand farms.
•It can be mass produced.

In addition, I identified the core message I would like to communicate through the food product experience: "Explore, discover, rediscover and enjoy New Zealand sheep's cheese".

Coming from a different discipline where quantitative methods are commonly used, I have discovered the value of qualitative techniques, the importance of observing and being empathetic in order to collect perceptions and reactions, rather than facts as valuable resources to stimulate the creative process. As mentioned by Kolko (2014), "bias is desirable in the creative process".

CHAPTER IV. DESIGN PROCESS

This chapter shows the decisions I made as I moved through the different stages of the design process: exploration, ideation and refinement. In the exploration stage four main lines are described: novelty and familiarity, form, formula and process. In the ideation stage three different food product concepts are presented and compared against the product requirements previously defined. In the refinement stage, different actions to refine the strongest concept are described. Finally, in this chapter, a description of the outcome is provided.

Exploration

Figure 22. Observing form and texture of Gouda, Camembert, and basil green cheese. Original, 2017.

Novelty and familiarity

The earlier exploration of this project focused on creating a range of unusual cheese products as a mechanism to stimulate curiosity and provoke consumption. Figures 23-29. Appendix 1.

As mentioned previously, New Zealand's consumers perceive sheep's cheese as a novelty; novelty generates curiosity and motivates them to try sheep's cheese for the first time. "People are constantly on the move towards something new" (Schweizer, 2006, p.1), which is the reason companies use innovation as their main strategy to differentiate products and capture the consumer's attention.

The objects created caused multiple positive reactions in potential consumers. Nevertheless, phrases such as following were also part of the feedback obtained: "I like my cheese pure, clean, untouched, if someone is going to add an ingredient I would like it to be me". "That's disgusting, it looks like worms, I'll never eat it".

According to Braghieri *et al.*, (2014), cheese is considered a traditional product, normally appreciated by consumers because of the quality of its sensory characteristics, place of origin, and traditional manufacture procedures. Introducing novelty in traditional food products must be done carefully, as "any modification can significantly change the intrinsic product characteristics which is considered degrading to the authenticity of the product among consumers" (Stolzenbach, Bredie, & Byrne, 2013, p.149).

By matching the obtained feedback with this theory, I could infer that, for this design to work, a balance between familiar and novel is essential. According to Stolzenbach *et al.*, (2013, p.149), "When a product is highly unusual or 'too' novel, it becomes a frustrating, unpleasant object for the consumer". Sheep's cheese is already novel, the intention is not to create a product that could be 'too' novel for consumers resulting in negative emotional responses. This finding changed the direction of the exploration from thinking of how to make unusual sheep's cheese products to how to make an attractive sheep cheese product.

Figure 23. Sheep's cheese micro balls model. Original, 2017.

Figure 24. Sheep's cheese bliss balls model. Original, 2017.

Figure 25. Sheep's cheese caviar preserve model. Original, 2017.

Figure 26. Sheep's cheese fruit paste lollie model. Original, 2017.

Figure 27. Sheep's cheese cheesecake model. Original, 2017.

Figure 28. Sheep's cheese into fruit paste. Original, 2017.

Figure 29. Sheep's cheese popsicle sketch. Original, 2017.

Form

“A product form represents a number of elements such as shape, scale, tempo, proportion, materials, colour, reflectiveness, ornamentation and texture, chosen and blended into a whole to achieve a particular sensory effect” (Bloch, 1995, p.17).

Product form is critical to gain consumer’s attention, create an initial impression and establish communication between the product and the consumer. This communication occurs when product form produces psychological (cognitive and affective) and behavioural (approach and avoidance) responses in consumers. “A beautiful product form provides sensory pleasure and stimulation” (Bloch, 1995, p.17).

To start discovering cheese form, I modelled different cheese shapes using clay. Figure 30. Appendix 2. Cheeses are conventionally shaped as cylinders, pyramids or squares. For this project, I was interested in looking for a new appealing cheese shape to create distinction, as is done for example with Oszczypek, a Polish cheese made from sheep’s milk in the Tatra region. Figure 31.

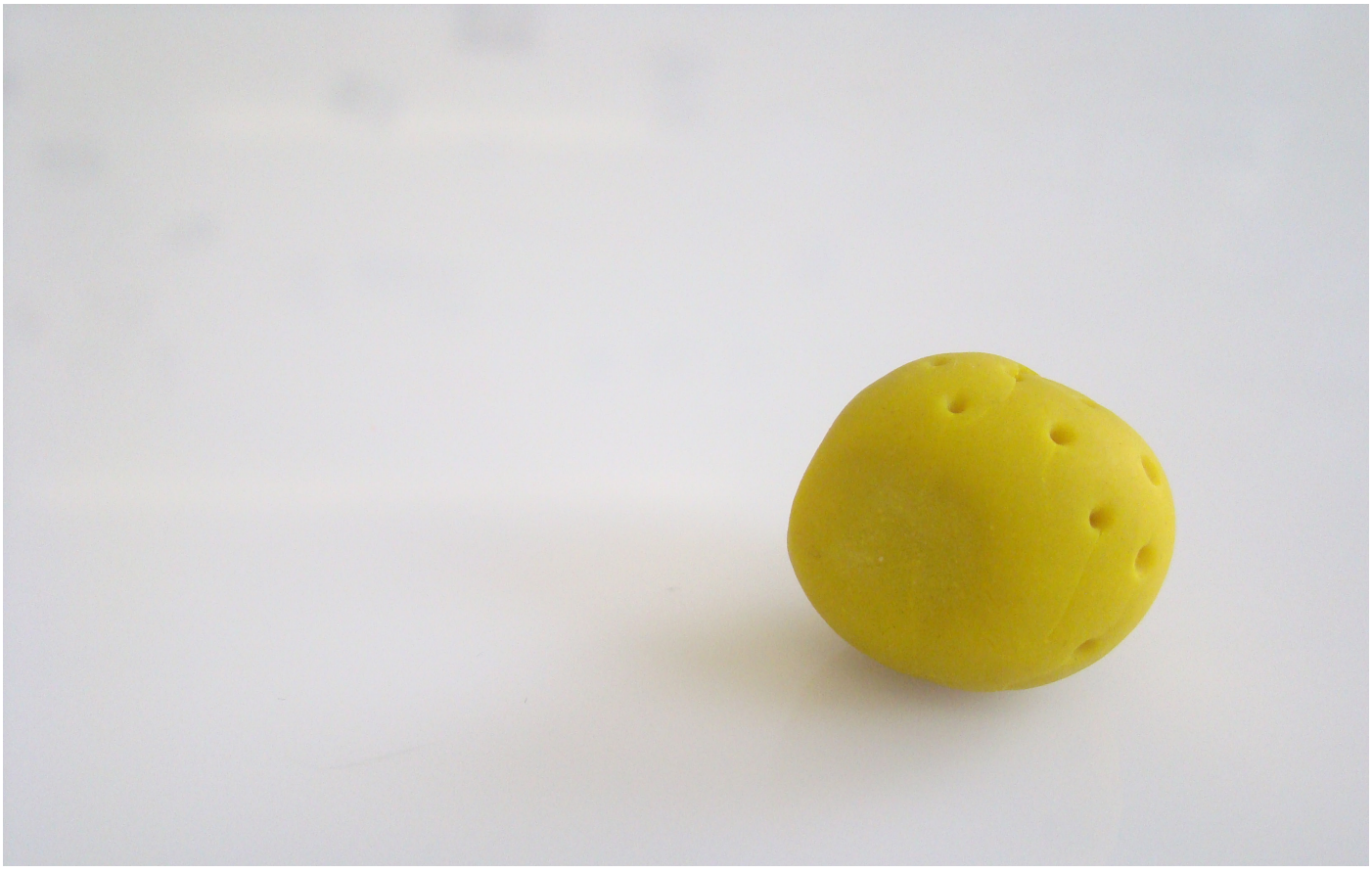


Figure 30. Cheese form exploration using clay. Original, 2017.

Figure 31. Oscypek cheese. Paty photography.
https://fineartamerica.com/featured/oscypki-pati-photography.html

I developed a particular interest in rocky shapes and mineral appearances. I was attracted by their irregularity and their layers, which result from the connection and fusion of different substances through the years. I was also interested in how a rock itself is a piece of physical evidence of the existence and history of a particular place. These are characteristics I would like to communicate through the product. Figure 32. Appendix 2.

Figure 32. Rock shape exploration. Cheese mould and pattern making. Original, 2017.

As is the case with rocks, I wanted to put together different substances, at least three cheeses in a single product. I developed three cheese shapes that could fit together. By visualizing the whole final packaged product, it was possible to create individual cheese shapes that together formed an assembly. In this case, packaging provided the space and the protection for putting together the different cheeses, making evident how formulation and packaging are intimately connected and determine each other. Figures 33-35. Appendix 2.

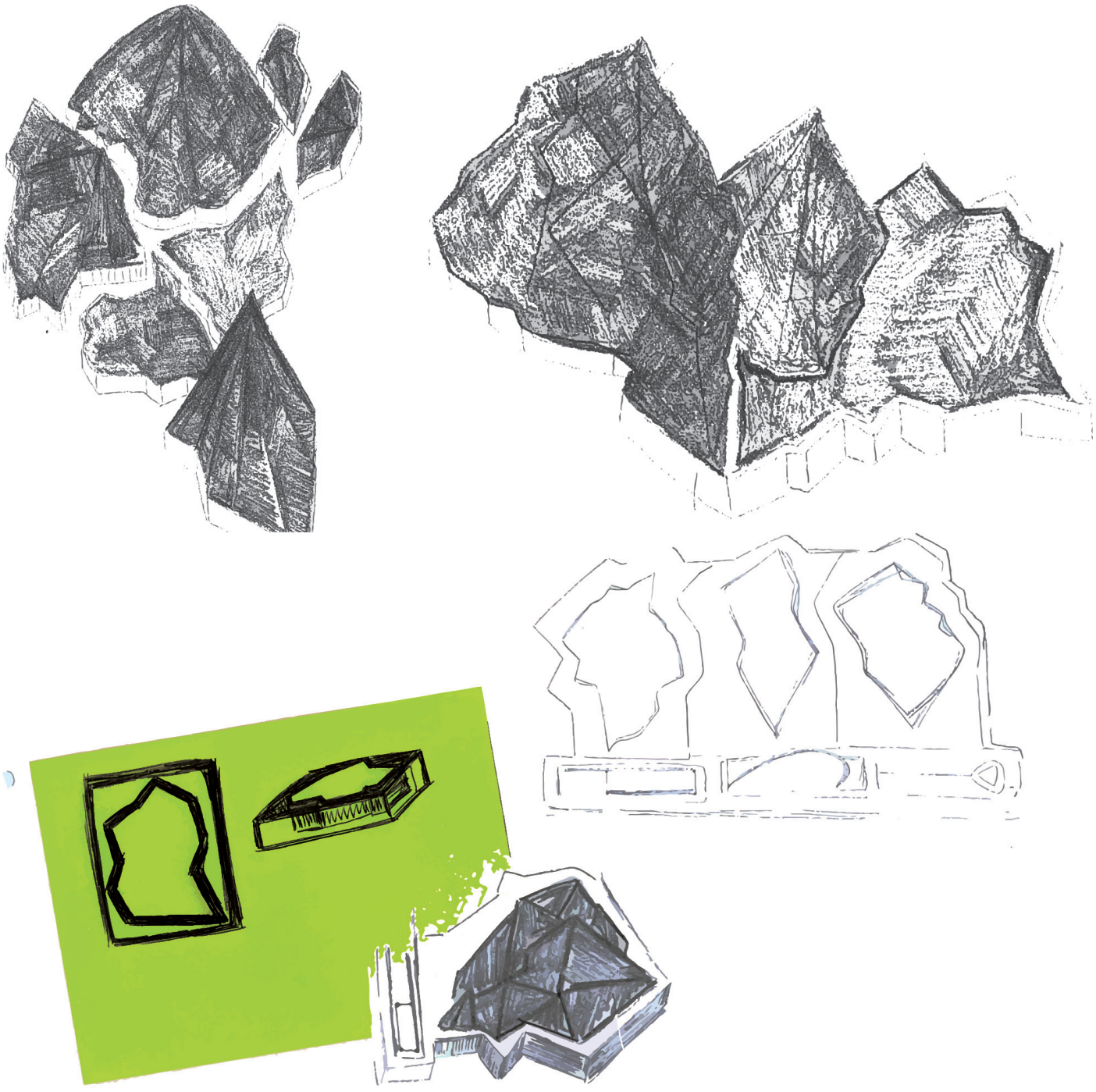


Figure 33. Rock-shaped cheese product sketch. Original, 2017.

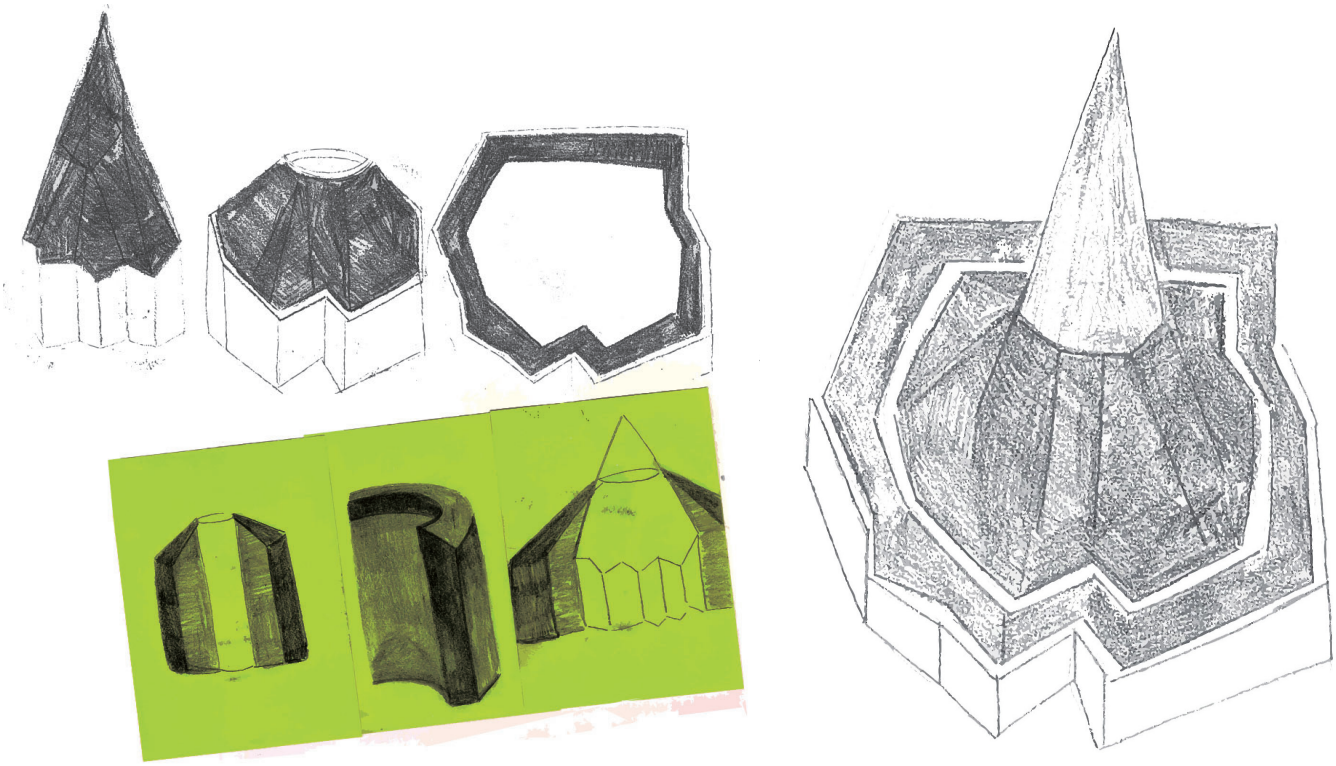


Figure 34. Modular rock-shaped cheese product sketch. Original, 2017.

Figure 35. Modular-rock shaped cheese product model. Original, 2017.

By observing these models and reflecting on my goals for this design, I could better understand the desired proportion and size for the product, and so I was able to make the model presented in Figure 36.

This model presents three tiny mineral-shaped pieces of cheese. The tri-dimentionality and irregularity observed on the top is, from my perspective, aesthetically pleasing, but complex to produce considering industrial cheese-making processes. Furthermore, this shape could be extremely new and uncommon, so much so that it could result in being intimidating for consumers and decrease the value of the product (Stolzenbach *et al.,* 2013), which makes it not worth the extra effort of making it possible.

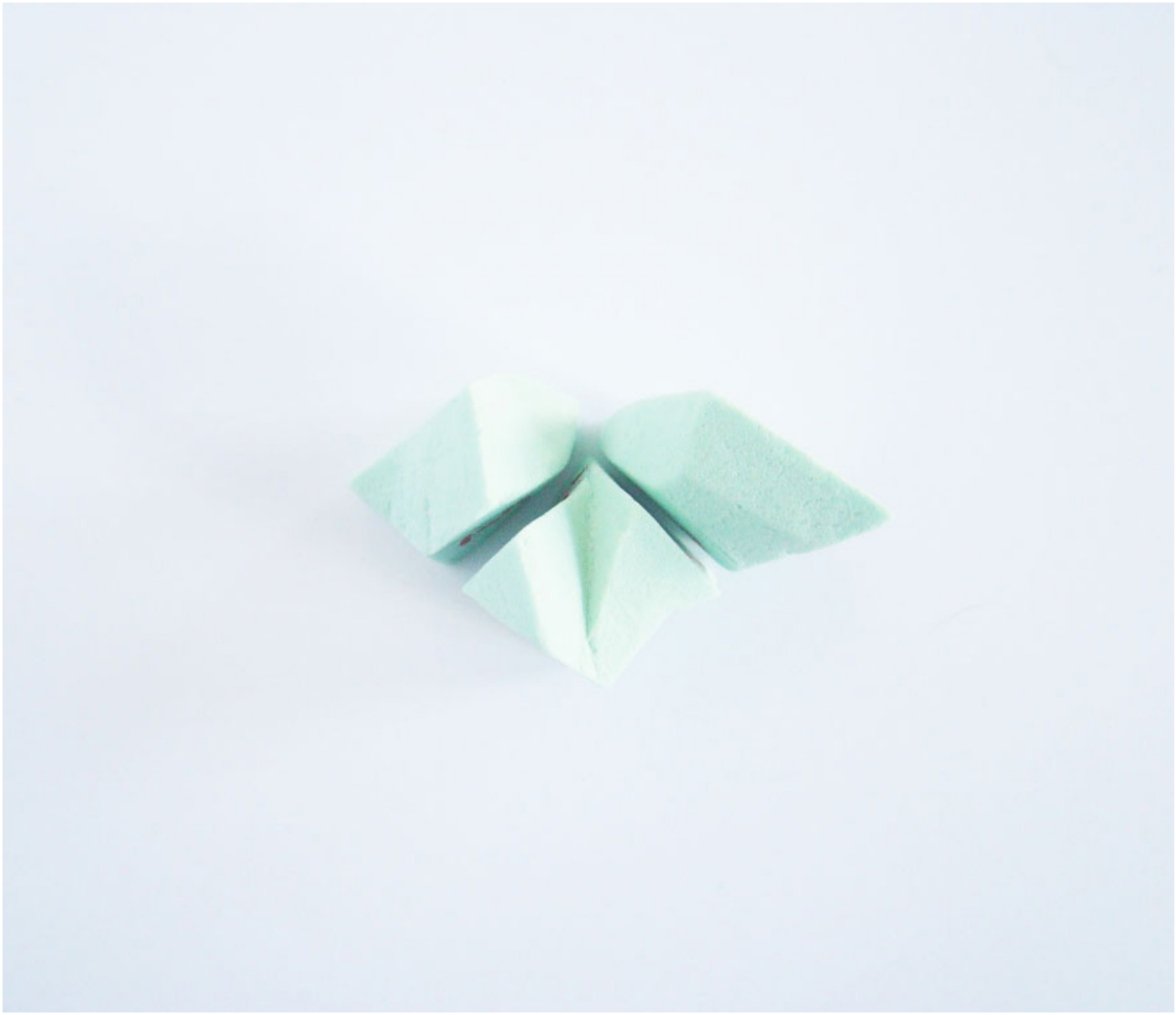
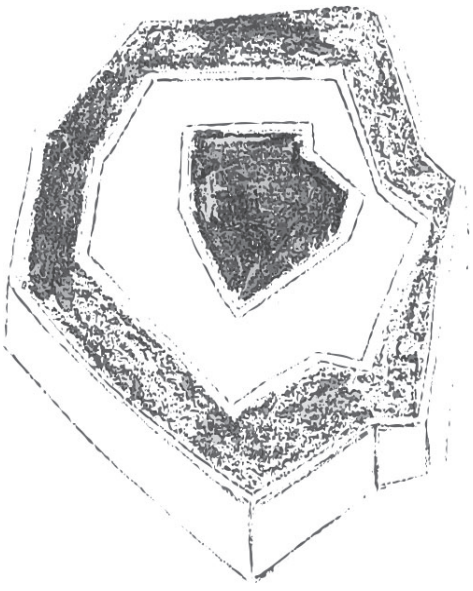


Figure 36. Bite-sized, rock-shaped cheese product model. Original, 2017.

I sketched and modelled cheese products with flat surfaces at the bottom and at top (Figure 37) to explore how to keep the feeling of a mineral shape, but also considering the process for cheese production. This simple change simplified the production process during steps such as moulding, demoulding and shrinking the curds.

By making those models, I lost the sense of size and proportion again. New models were made considering those factors, in particular how to communicate cheese flavour intensity through form and how to introduce modular functionality to motivate a prolonged food-consumer interaction. Figures 38-40.



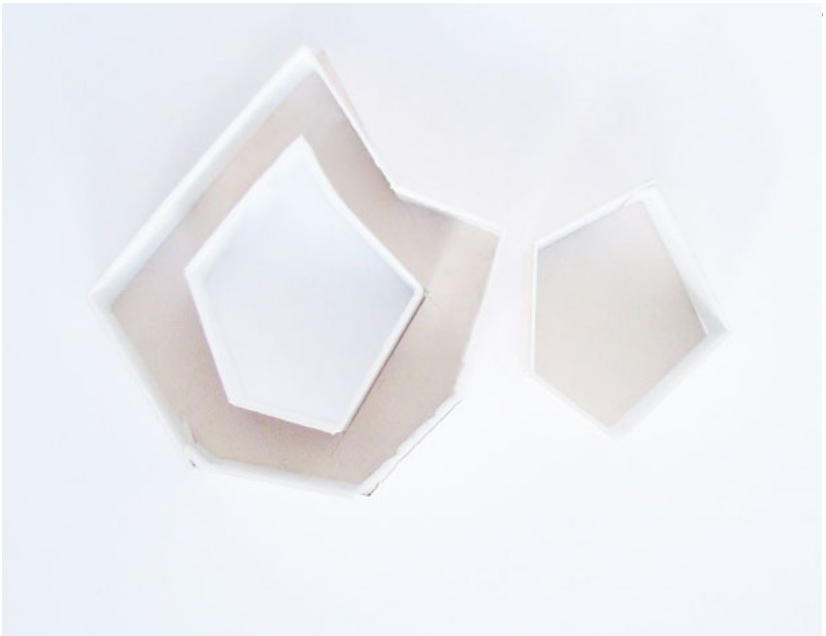


Figure 37. Flat rock-shaped cheese product model. Original, 2017.

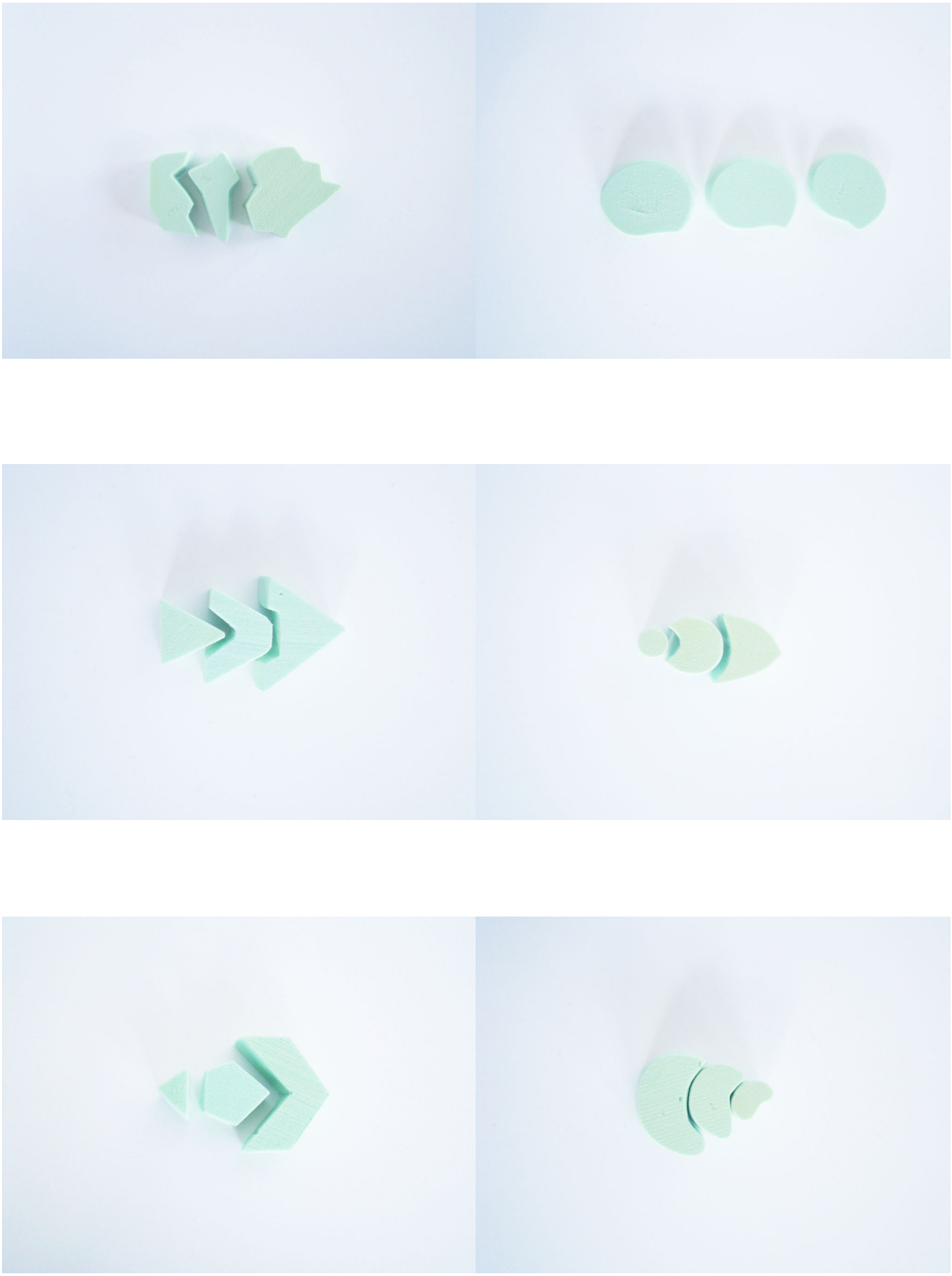


Figure 38. Bite-sized, sequential cheese shapes. Original, 2017.

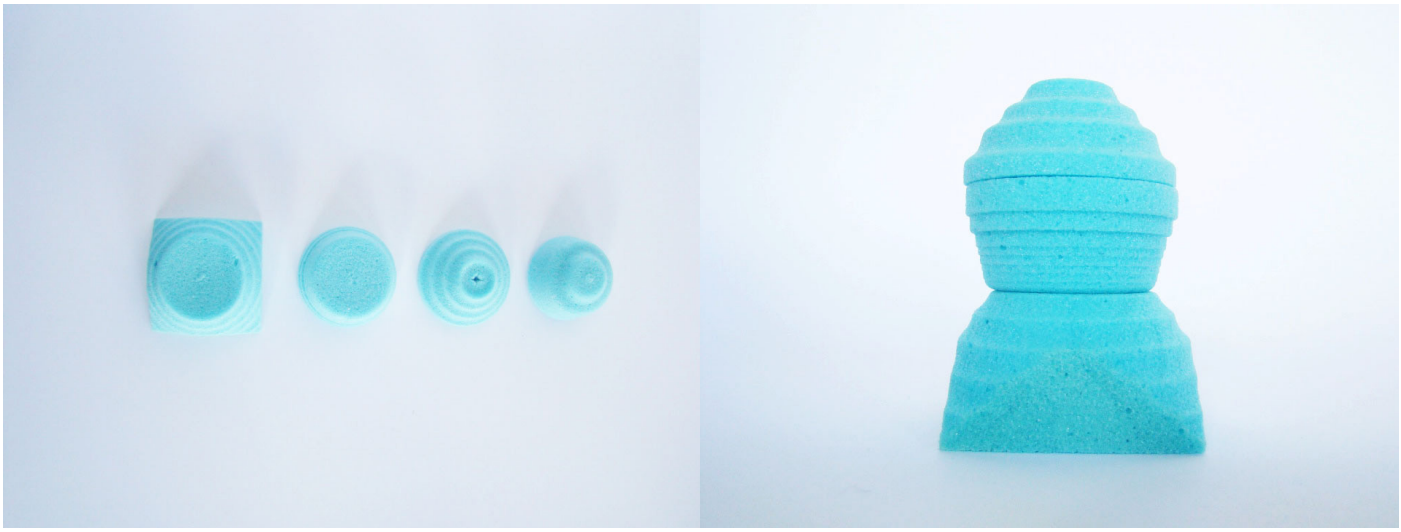


Figure 39. Bite-sized, modular cheese shapes. Original, 2017.

Figure 40. Simple bite-sized cheese shapes. Original, 2017.

Formulation and process

Cheese form and material properties are determined by formulation and process constraints, so it was insufficient to model cheese forms using materials such as clay, foam, cardboard, and others. Only by making cheese was it possible to determine which forms were actually possible.

Lack of access to professional facilities such as a food preparation installations, cheese-making baths, cheese cutting lyres, agitation systems, pasteurizers, laboratory equipment such as a pH meter, calibrated analytical scales, stainless steel utensils, maturation chamber with temperature and humidity control, food additives supply, and others posed a challenge. Figures 41-44.

Furthermore, the time for executing the project was short in comparison with the usual times required for food development. To tackle these limitations, I decided to adopt a different approach whereby I focused on exploring cheese form and produced my cheeses in non-industrial, small-scale conditions. Safety and quality standards could be not be properly controlled in these conditions, and as a result, this product is not appropriate for consumption.

Figure 41. Example of required instalations for food product development. PDLab. Massey University Palmerston Noth. Original, 2017.

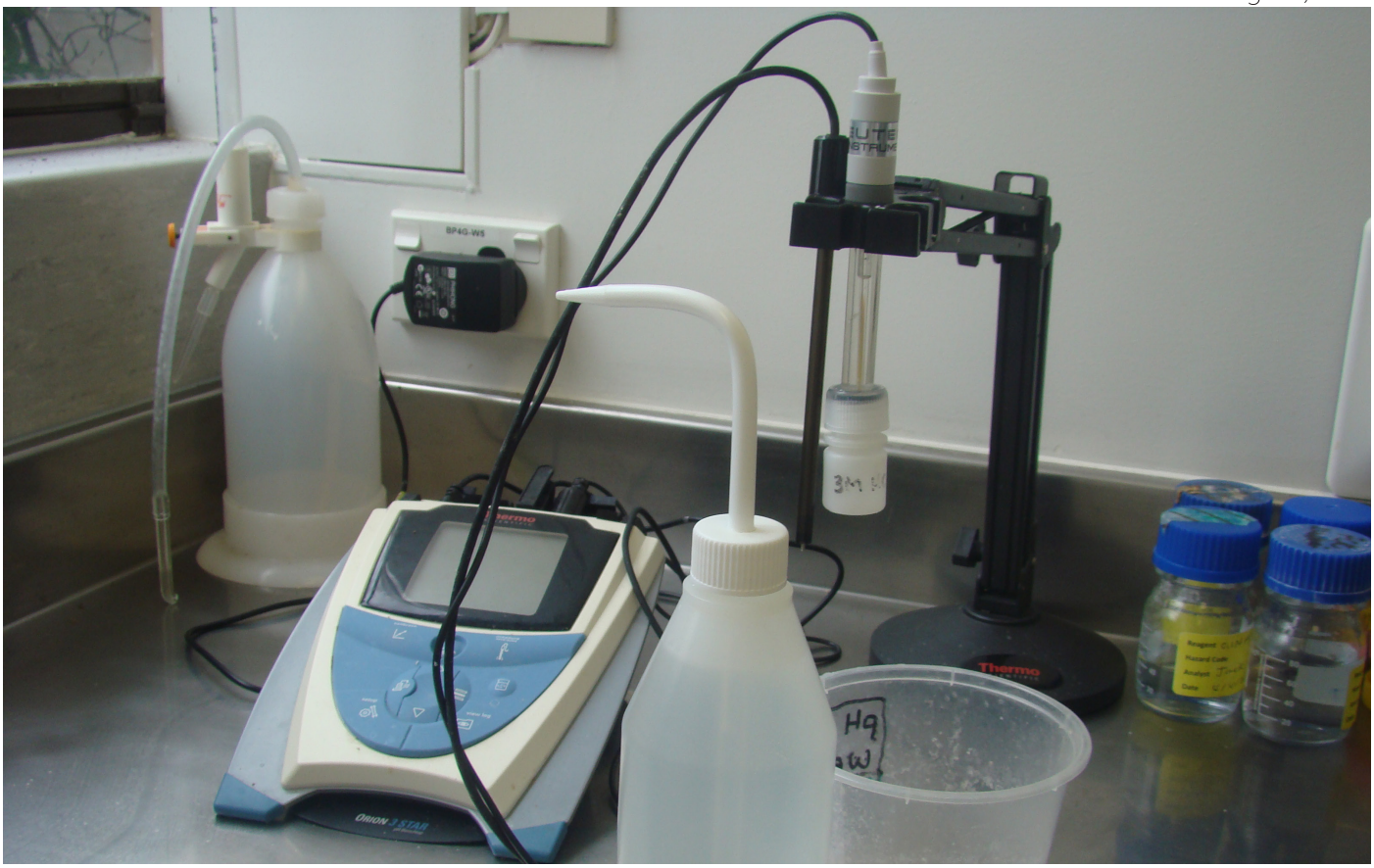


Figure 42. pH meter. Essential laboratory equipment for cheese making. Original, 2017.

Figure 43. Equipment used to produce cheese at home for this project. Original, 2017.

Figure 44. Common quality problems in cheese samples prepared for this project due to the lack of access to equipment to control temperature and humidity parameters during the maturation process. Original, 2017.

In total, I have made eight different cheese styles: processed cheese, fresh cheese, mozzarella cheese, cheddar cheese, sheep's milk hard Spanish cheese style, white mold cheese, blue mold cheese and hard white mold cheese. Figures 45-52.

During this period, I became interested in creating a colour contrast between the white curd characteristic of sheep cheese and different rind colours. I explored how to create natural colours in the rinds through maturation, using natural substances like wine or annatto, and artificial substances such as edible paint.

During the process of using wine to colour the Manchego style cheese, the presence of salt in the surface and the soaking method applied caused crystals to form over the rind. This resulted in a burgundy-colored, multifaceted, light-reflecting surface on the cheese, providing a new and interesting sensory experience. The red crystal surface was also particularly striking from an aesthetic point of view. Figure 52. To my knowledge, cheeses with wine-coloured crystalline surfaces have never previously been marketed and this development represents a major innovation.

To make the cheeses, I used various types of moulds made with a range of conventional and unconventional materials like silicon, MDF, wood and plastic. Producing small-sized cheeses is difficult, but it allows me to keep the rind on all the faces, which is important for this design.

Moulds without acute interior angles make cheese production easier, because the curd can reach all the empty gaps. Also, dramatic curves in the moulds are better, because the subtle waves are lost once the cheese starts losing water. Finally, moulds must allow an effective draining of the curd. During the refinement stage, I worked on how to get the cheese mould right for this design.

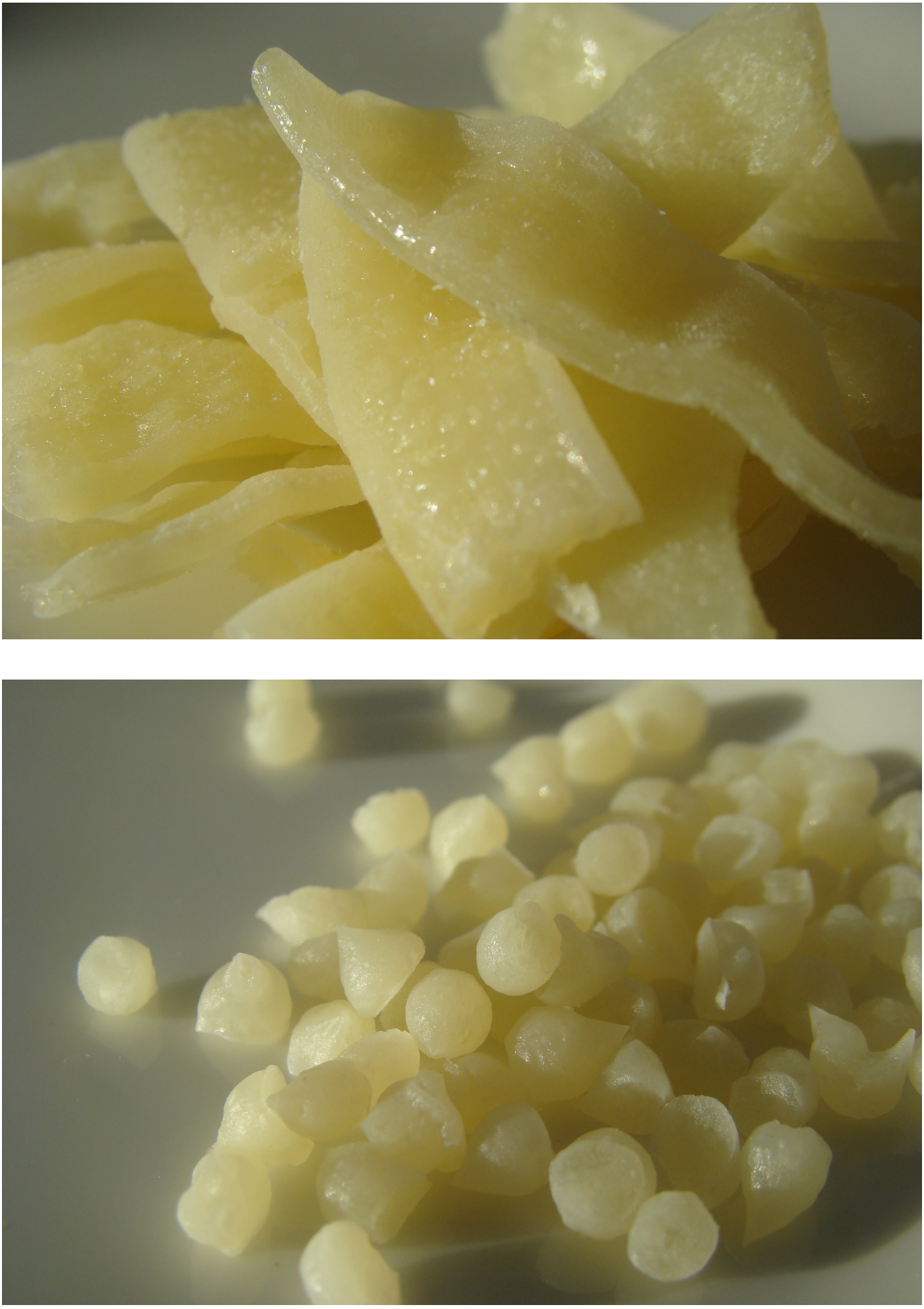


Figure 45. Processed sheep's cheese. Original, 2017.

Figure 46. Sheep's milk fresh cheese. Original, 2017.

Figure 47. Sheep's milk fresh mozzarella. Original, 2017.

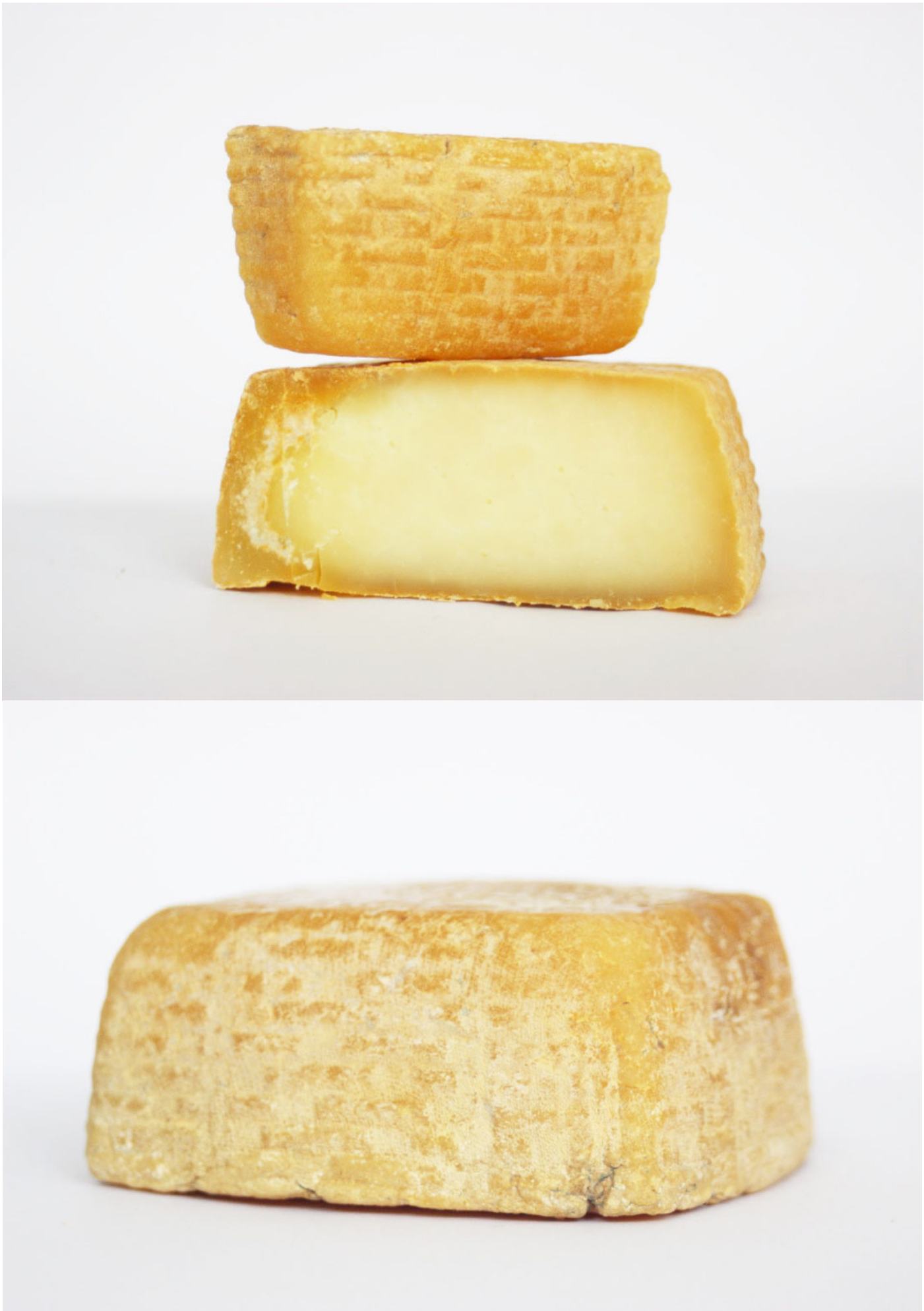


Figure 48. Sheep's milk cheddar cheese. Original, 2017.

Figure 49. Soft sheep's milk white mold cheese. Original, 2017.

Figure 50. Blue cheese. Original, 2017.

Figure 51. Hard sheep's milk white mold cheese. Original, 2017.

Figure 52. Sheep's milk Spanish style cheese with red wine rind. Original, 2017.

I explored how to imprint patterns in cheese curds as a mechanism to differentiate the product and inform the customer about its regional origin. For example, Manchego cheese and Parmigiano Reggiano patterns are distinctive; any time I walk through a store and see the particular patterns in the cheese rind, I can immediately make associations with its origin and identify the product. This mechanism is effective in producing distinctive cheeses, without compromising traditional form conventions. Figures 53-54.

Figure 53. Manchego cheese rind pattern. Unknown. https://patanegrarestaurant.com/manchego-cheese-don-juan

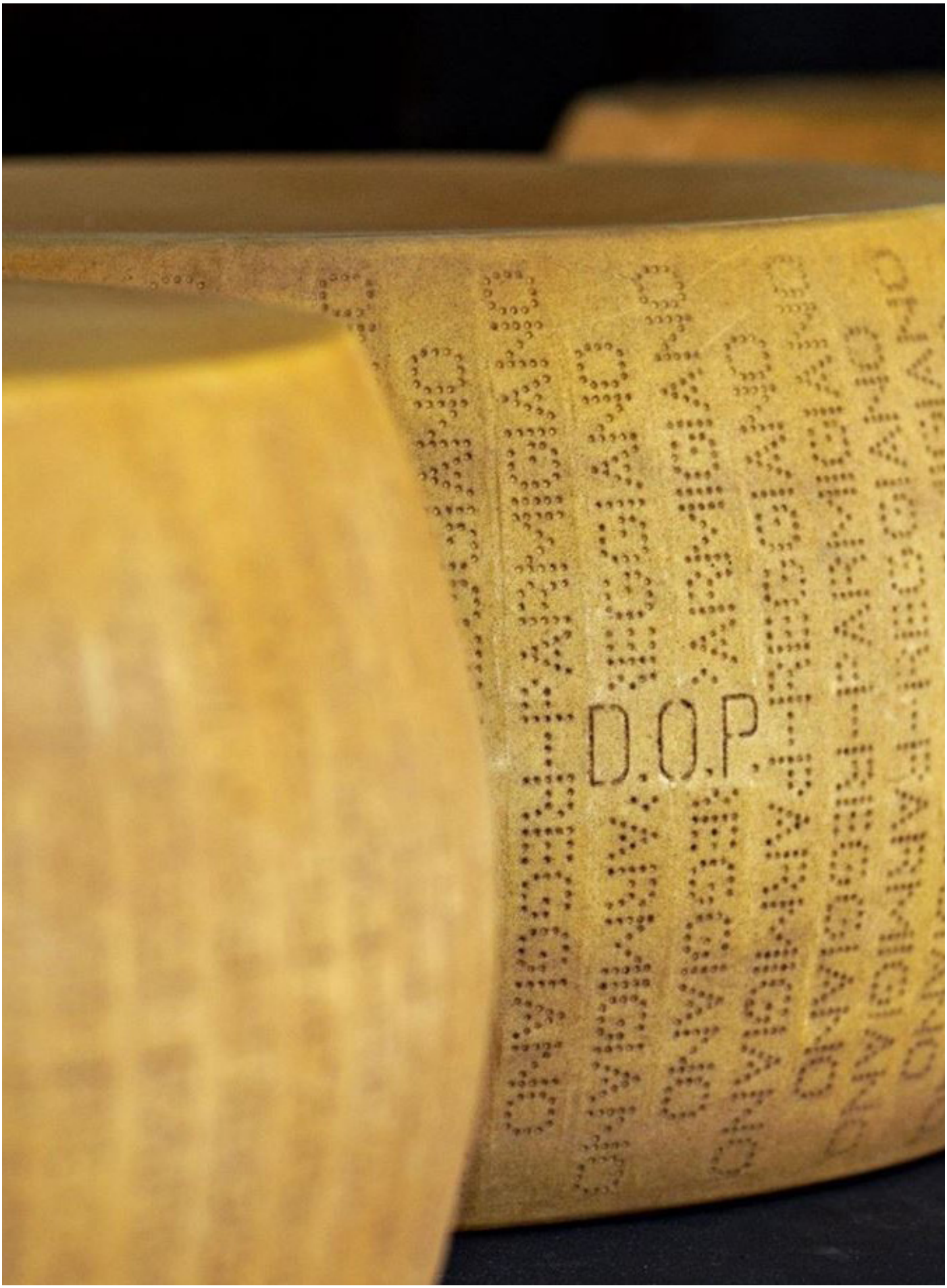


Figure 54. Parmigiano Reggiano rind pattern. Liguori. https://www.flickr.com/explore/2017/12/16

I picked different regions of New Zealand, then I used representative icons, such as the boot from Taihape, and the carrot from Ohakune, to create patterns and cheese moulds.

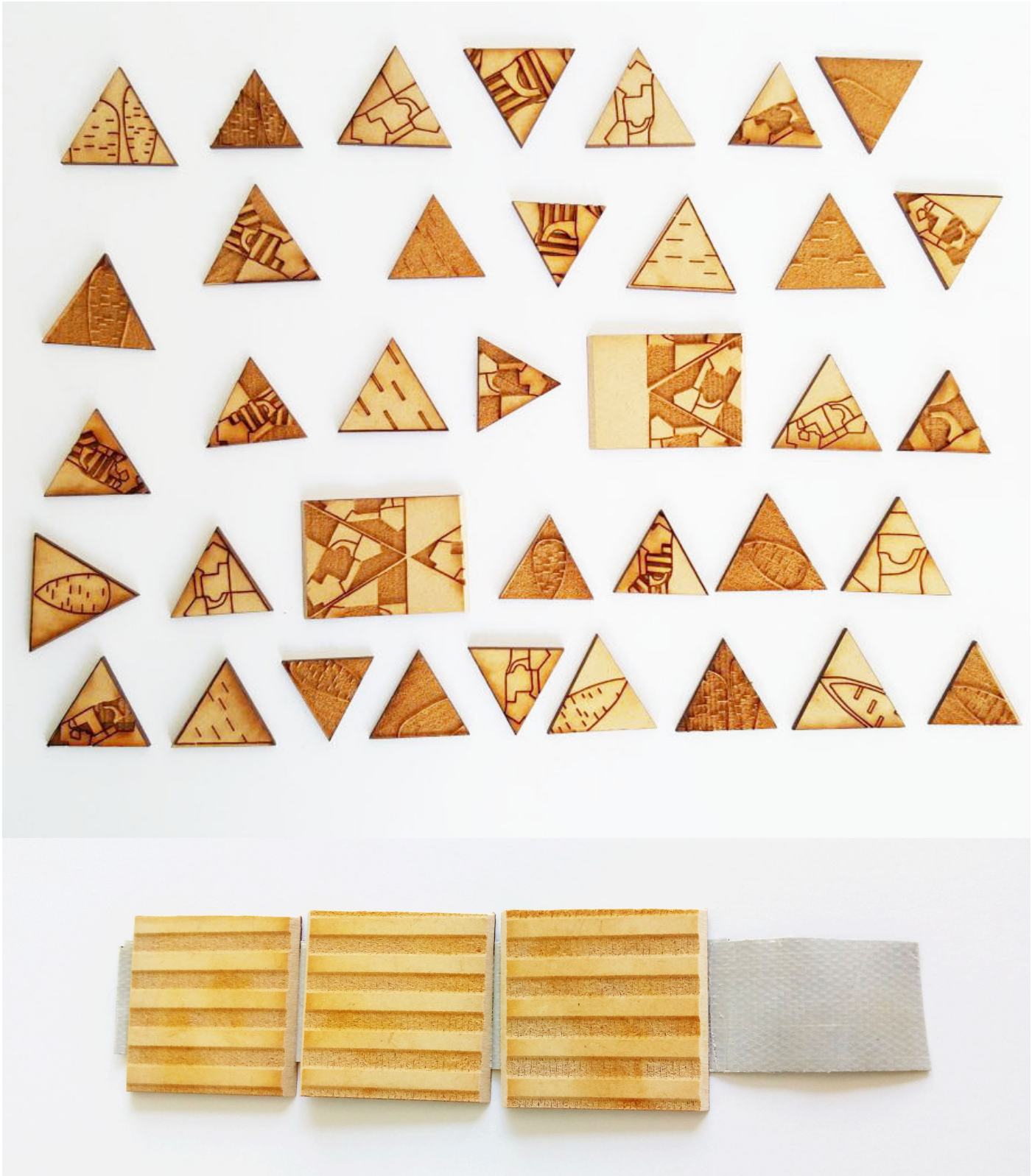


Figure 55. Pattern carving for cheese mould-making using MDF material. Original, 2017.

By making cheese using MDF moulds, I found that the surface on which to imprint the pattern was very small. Consequently, the pattern needed to be simple and bold.

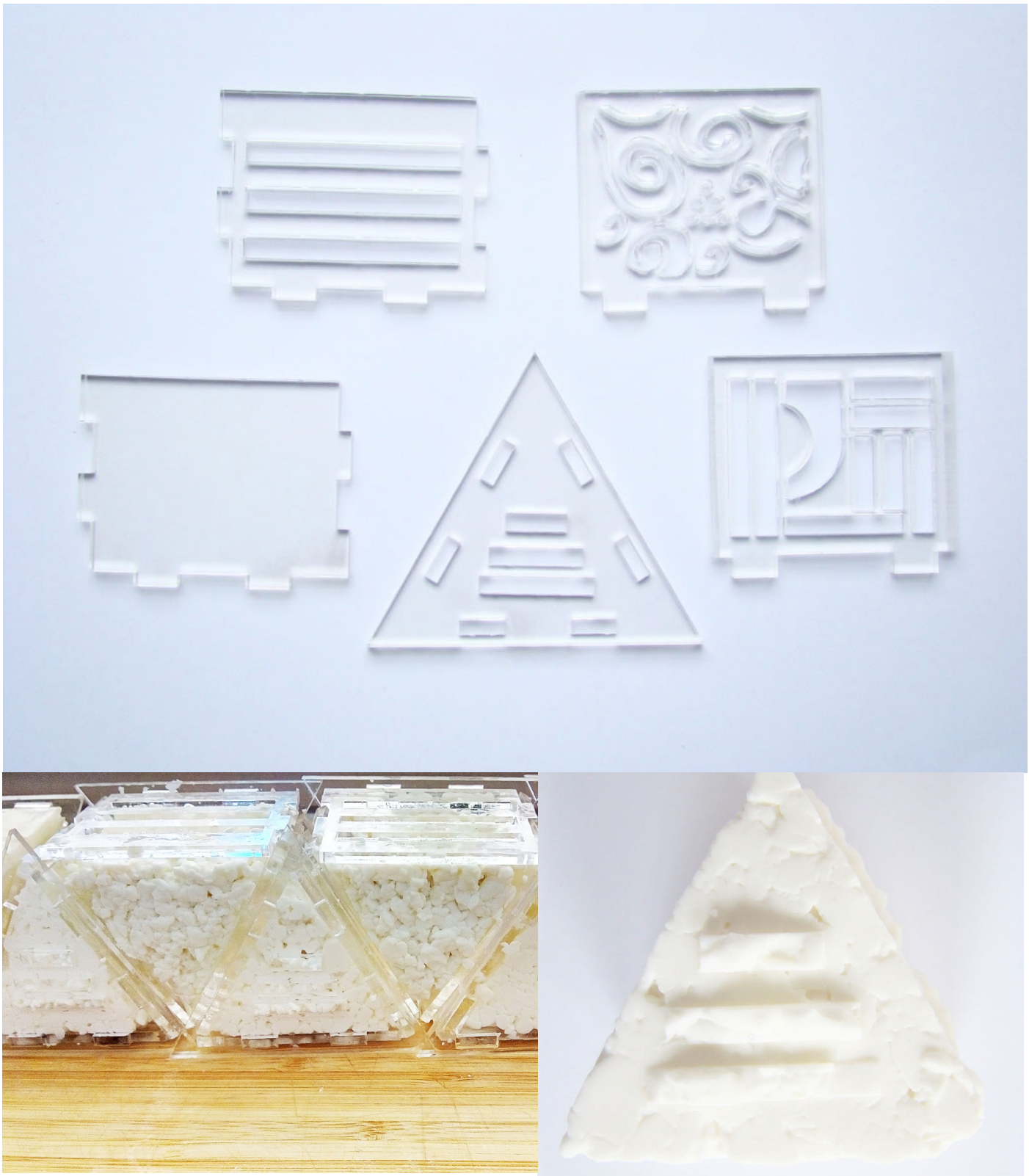


Figure 56. Pattern carving for cheese mould-making using acrylic material. Original, 2017.

In addition, I used alternative ways to imprint patterns, such as creating a mesh and letting the cheese rest over it, as well as creating burning tools, and using paint to stamp shapes over cheese rinds. Figures 57-59.

Figure 57. Making patterns over cheese rind using metal tools. Original, 2017.

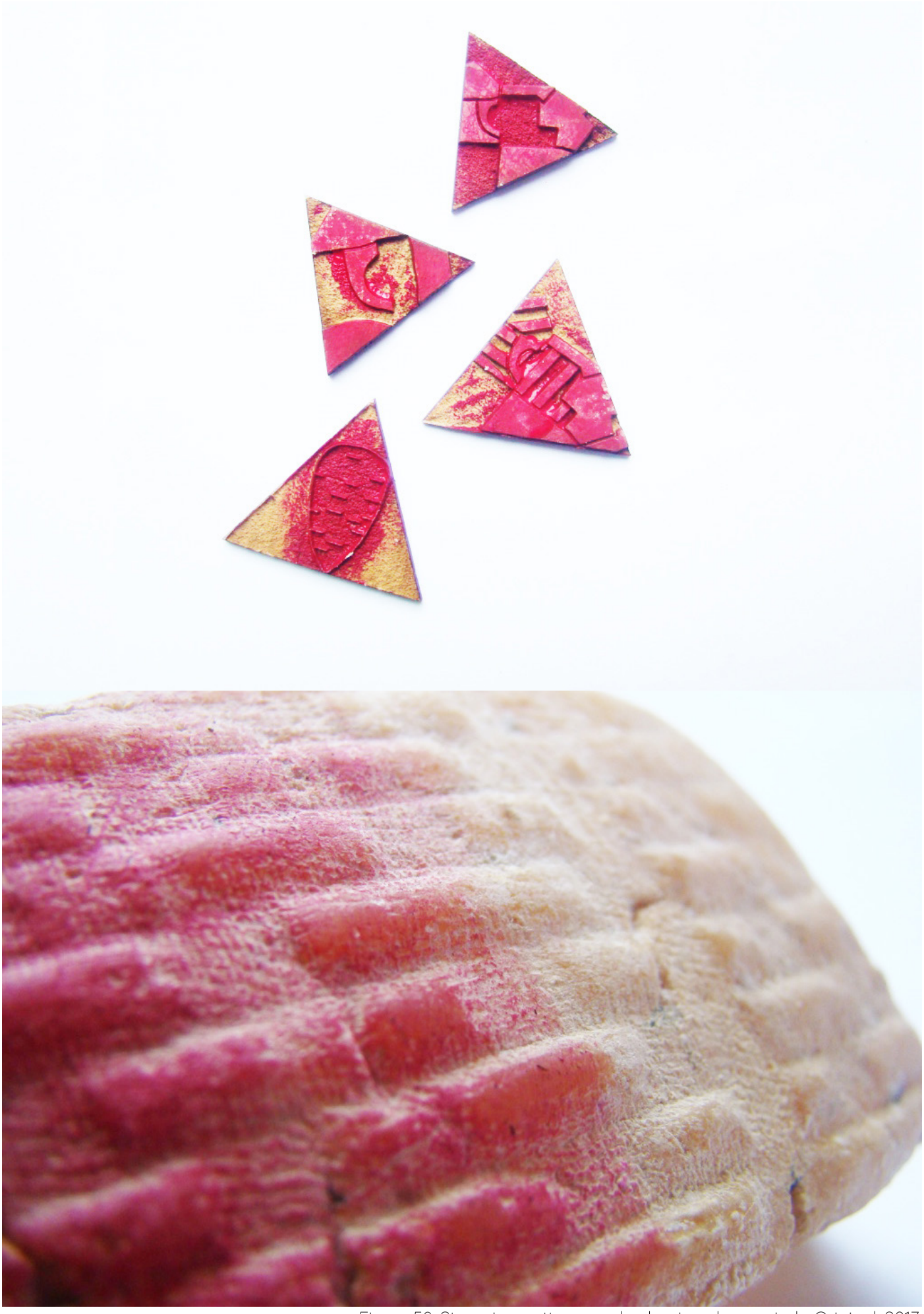


Figure 58. Stamping patterns and colouring cheese rinds. Original, 2017.

Figure 59. Stamping patterns over cheese rinds using colour. Original, 2017.

This exploration informed the design process. I was able to determine which were the cheese styles that presented the best sensory visual quality, taking into account the limitations for food processing I needed to face.

In addition to this, I was able to determine which cheese styles allowed for a wider range of forms, and which cheeses would be able to adapt to the project objectives.

Processed cheese can be shaped into a great variety of forms, but does not develop an elegant rind. Another factor against making processed cheese is that people perceive it as synthetic and unnatural.

Fresh mozzarella cheese is complex to produce because of the specific protein and mineral composition in sheep's milk. It requires a liquid environment to be protected, and it cannot be texturised.

Fresh cheese is easy to produce, can be texturised by moulding, or letting it rest over a mesh, but it does not develop a rind. Fresh cheese has a short shelf life and would be complicated to package and store together with other cheese styles. Therefore, if a fresh cheese is going be considered, it should be visualised in a product where all the cheeses are fresh.

Blue cheese is difficult to include in this product because the blue mold used to produce it is very strong and can easily contaminate other cheeses. Blue mold grows extremely quickly and its effects in cheese are notorious and undesired when it grows in uncontrolled temperatures. Visually, the strong colour of the blue mold dominates any line on the rind.

Hard matured cheeses provide more chances to play with the form. It is possible to develop interesting variable rinds, create textures, imprint colours, icons, burned signs and other embellishments.

Ideation

Figure 60. Sketching top view of product concepts, Massey University, Wellington. Original, 2017.

Concept 1

Based on my exploration, I built four concepts to present three different bite-sized sheep's cheeses in a product.

The first concept presents three different spherical pieces of cheese in sequence, from a smaller to a bigger size. The smallest cheese is the strongest and the biggest cheese is mildest Each cheese is wrapped in different materials depending on the formulation protection requirements. All cheeses are set on a cardboard base which can be easily discarded once the product is consumed. This concept is inspired by spherical boulders, a rare type of geological formation linked to native ancestral populations around the world. Spherical boulders are found in widely separated countries including Guayabo, Costa Rica, and New Zealand (Moeraki boulders). Figures 61-64.

Figure 61. Product concept 1 diagram and materials. Original, 2017.

Figure 62. Spherical stones in Guayabo, Costa Rica. http://www.icomoscr.org/content/index.php/patrim-arqueol/272-arqueologico-2012-07-27

Figure 63. Product concept 1, model 1. Original, 2017.

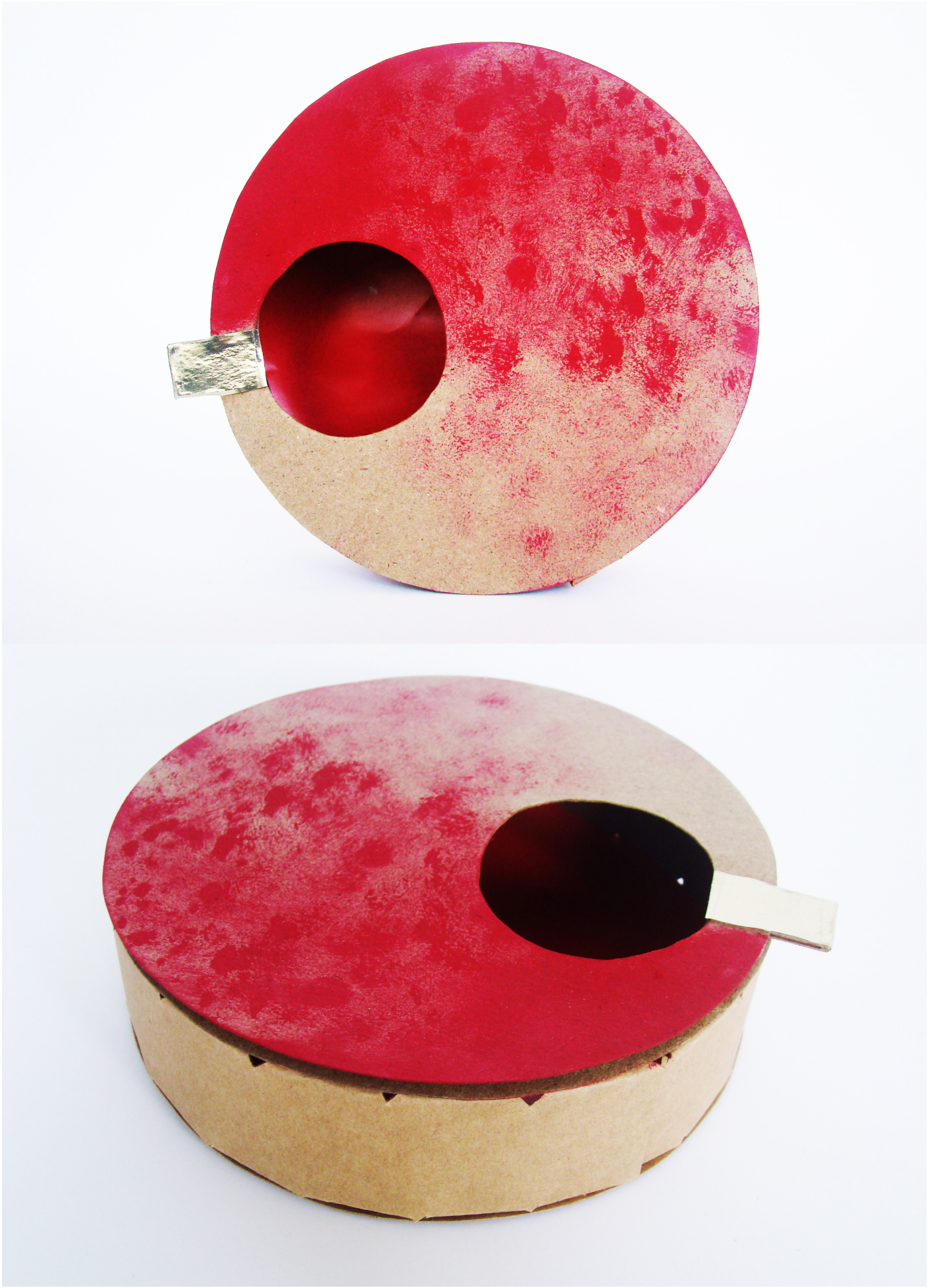


Figure 64. Product concept 1, model 2. Original, 2017.

Concept 2

The second concept is a modular box made up of three boxes which are the same in appearance, but contain different cheese styles in different states. Firstly, there is a ball of mozzarella cheese floating in water, secondly there is shredded cheddar in a airbag, and finally there is a solid block of blue cheese. The necessary materials for packaging are hard plastic, cardboard, strings and cheese-wrapping paper. This concept was inspired by the different states of matter. Figures 65-66.

Figure 65. Product concept 2 diagram and materials. Original, 2017.

Figure 66. Product concept 2 model. Original, 2017.

Concept 3

The third concept evolves from the second one. A modular tower composed of three different pieces of cheese packaged individually, first a small mountain of mozzarella cheese floating in water, second a capsule with cheddar cheese and third a solid mountain of blue cheese. The necessary materials for packaging are soft plastic, cardboard, and cheese-wrapping paper. This concept was inspired by the different states of matter and the layers of the Earth. Figures 67-68.

Figure 67. Product concept 3 diagram and materials. Original, 2017.

Figure 68. Product concept 3 model. Original, 2017.

Concept 4

The fourth concept is a box with three different polygonal sheep cheeses. The cheeses are separated by the edges of the box but converge in the center of the package, creating a feeling of communication between the elements. All the cheeses rest over a fine piece of fabric and the box is tightened using a woollen string. Necessary materials for packaging are cardboard, strings, cheese paper and fabric. This concept is inspired by rock formations. Figures 69-76. Appendix 5.

Figure 69. Product concept 4 diagram and materials. Original, 2017.

Figure 70. Product concept 4, model 1. Original, 2017.

Figure 71. Product concept 4, model 2. Original, 2017.

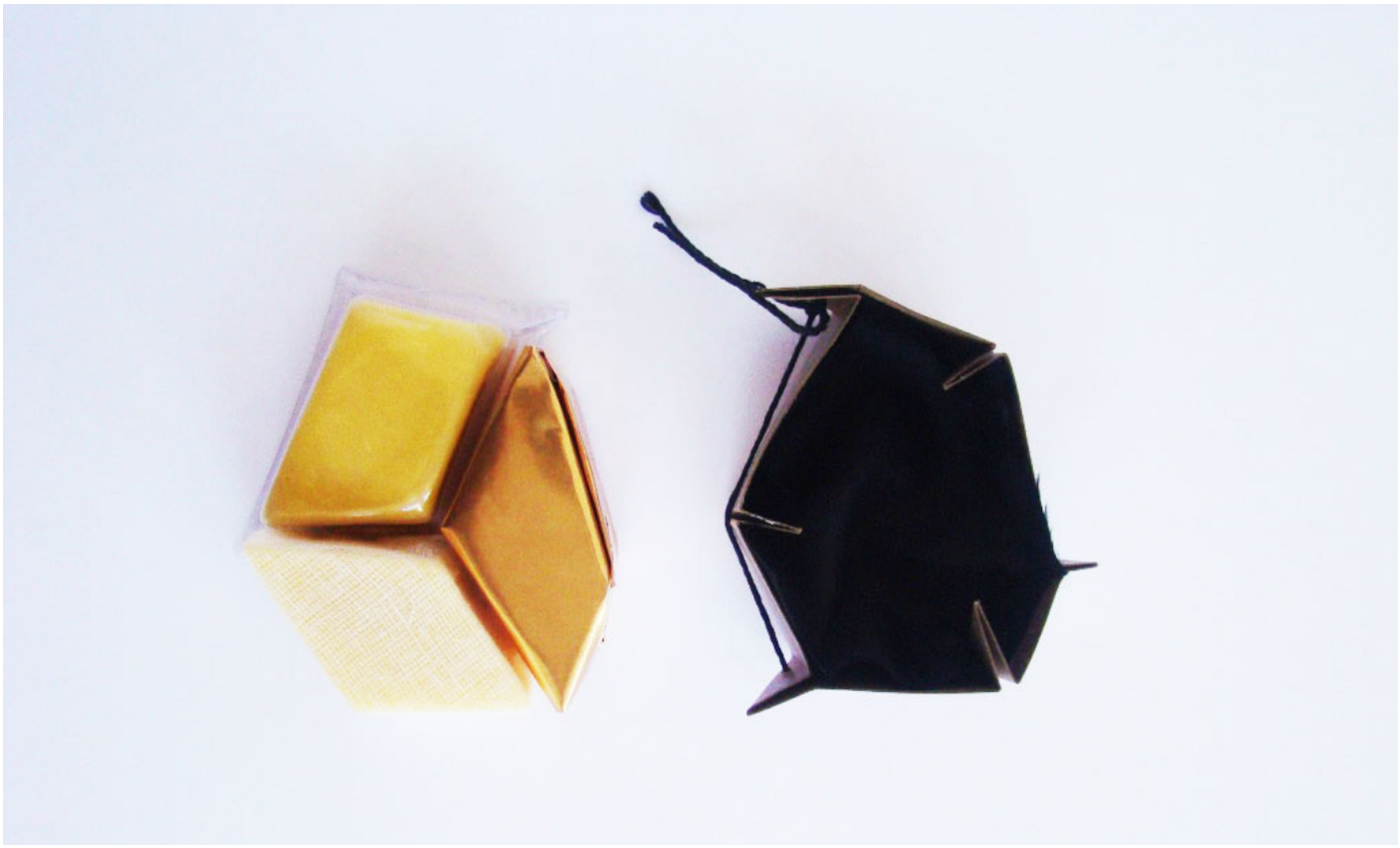


Figure 72. Product concept 4, model 3. Original, 2017.

Figure 73. Product concept 4, model 4. Original, 2017.

Figure 74. Product concept 4 model 5. Original, 2017.

Figure 75. Product concept 4 model 6. Original, 2017.

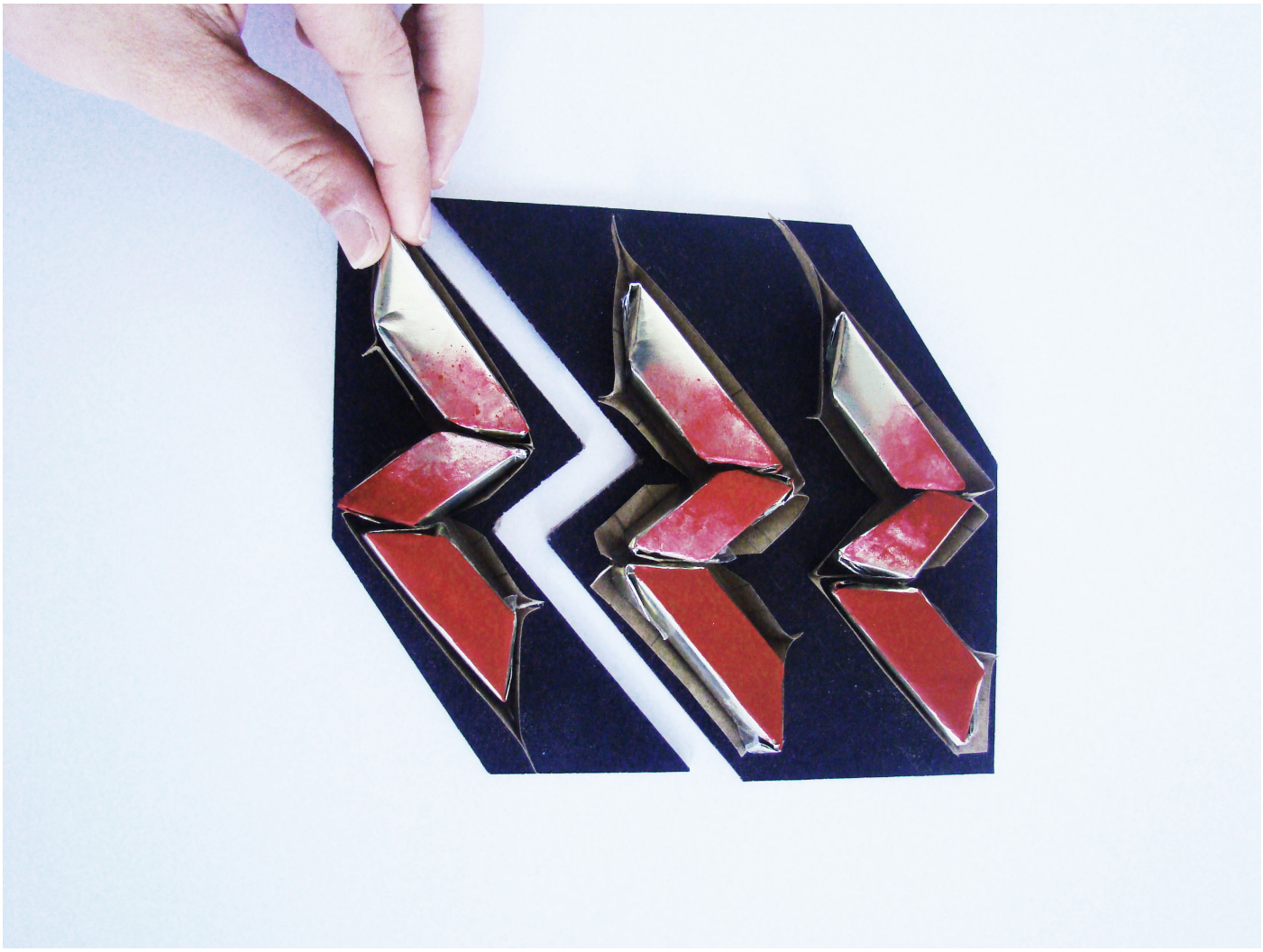


Figure 76. Product concept 4 model 7. Original, 2017.

Concept 5

Concept five developed out of concept four. Concept five comprised individual triangular and polygonal boxes, each of which contain tiny pieces of different sheep's cheese. This mechanism gives independence to each cheese, so it can exist separately from the others, but also allows for them to be put together in a coherent composition. To keep the composition in place and protect the pieces of cheese, a paper shell was created. The product contains two triangular pieces of cheese, one spherical cheese and one set of crackers. Necessary materials for packaging are cardboard, paper, cheese paper and soft plastic. This concept is inspired by rock formations and modular functionality. See Figures 77-78.

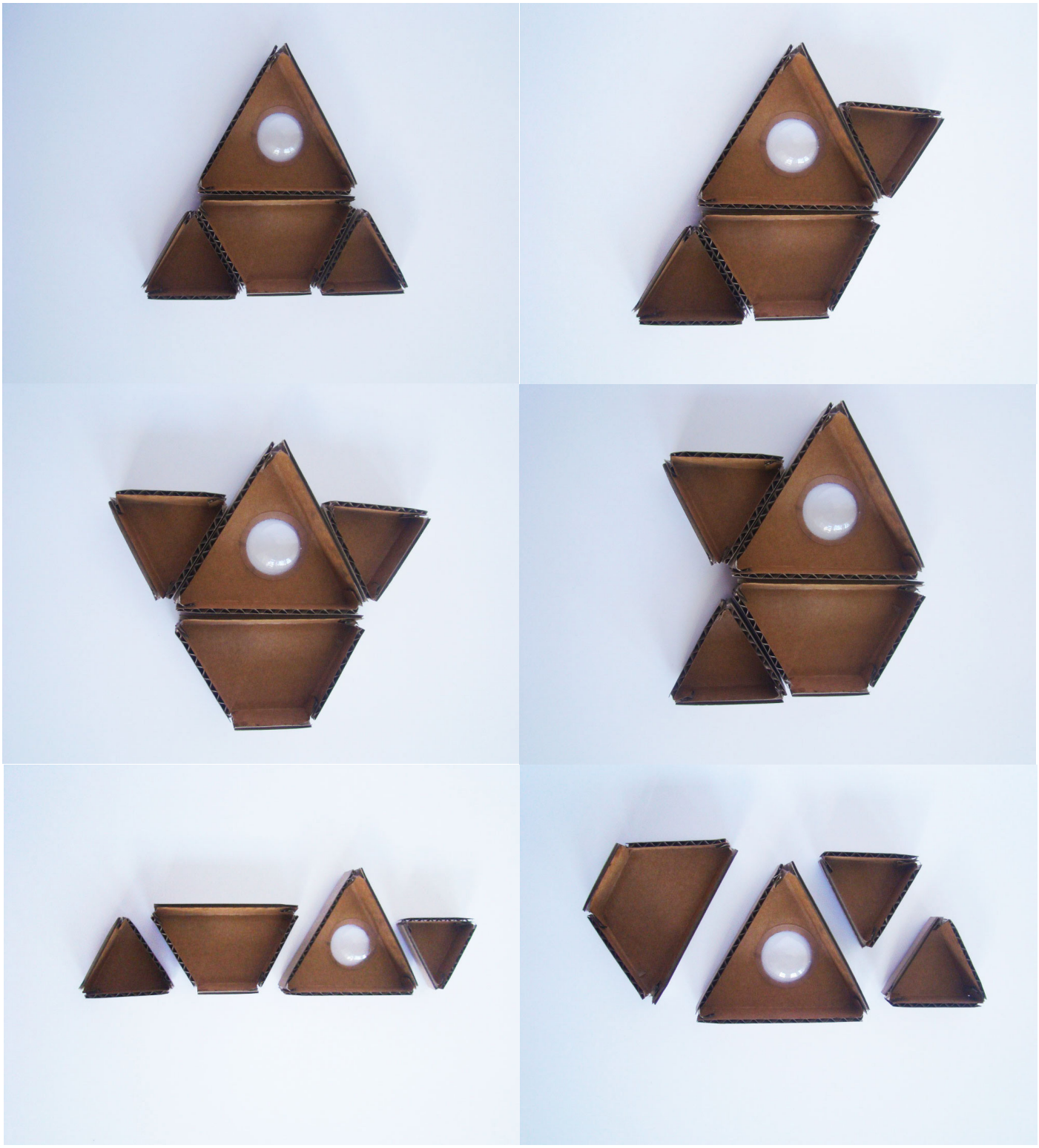


Figure 77. Product concept 5 model. Original, 2017.

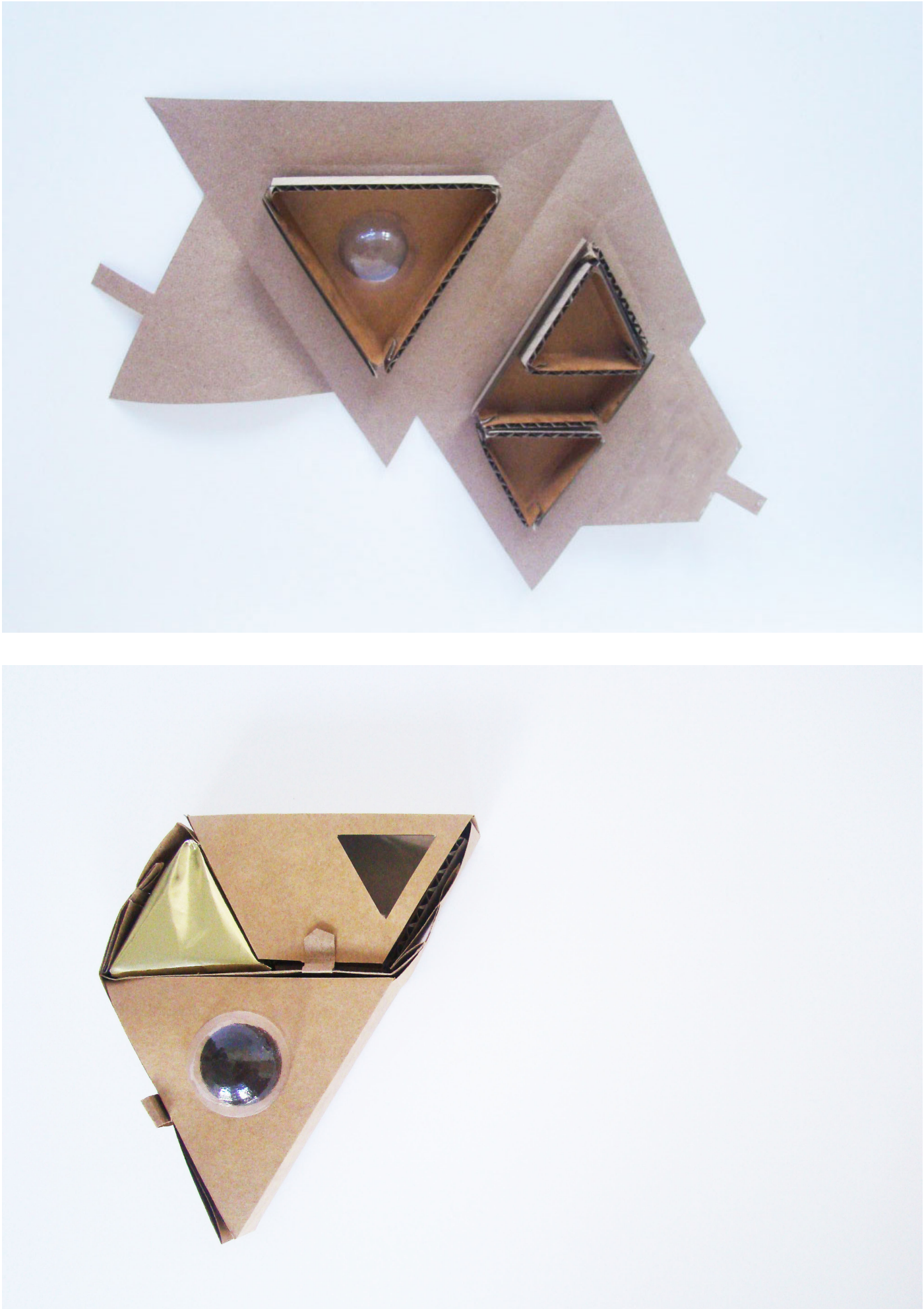


Figure 78. Product concept 5 model with paper shell. Original, 2017.

I evaluated informally the concepts, considering the requirements previously defined. A scale from one to five was used and the percentage of fulfilled requirements was calculated to compare the concepts. As a result, the first concept fulfilled a 51% of the requirements, concept two fulfilled 71%, concepts three and four 86% and concept five 100%. Appendix 5.

Additionally, the supervision team in charge of this project, made up of a professional in physicology and business intelligence, a professional in design, and a professional in food science assessed the strongest concept. They determined that the shape and the size of the product was interesting and balanced, also, the contrast of rinds was captivating and each of the cheeses had an important role to play in the product. Finally, that the sensory stimulation and interaction the packaging provided during the consumption was an important element for this design.

Figure 79. Product concept assessment. Original, 2017.

Refinement

Figure 80. Product concept to be refined. Original, 2017.

The strongest concept was selected for further refinement.

From formula exploration, three cheese styles were selected: cheddar cheese, white semi-hard cheese and red wine hard cheese.

It is important to include cheddar cheese in the product because it is the most familiar cheese for New Zealand cheese consumers, and should make it less intimidating for them to try tasting sheep cheeses. This cheese has a golden rind, and a contrasting white curd, and it allows for the introduction of textures or patterns.

White mould cheese is less familiar, but still well known by most cheese consumers in New Zealand. It can be found in almost any supermarket and is not too strong in taste. Unlike the cheddar, the rind has a matte finish, and it allows the imprint of patterns by resting the developed mold rind over a mesh.

Red wine hard cheese is not a novelty in Europe, this is a process normally used to make cheese in several regions of Spain, such as Albarrachín and Toledo. But for most New Zealand consumers, the dark colour of red wine cheese is novel; it is not traditional and it therefore represents adventure. This cheese presents an interesting contrast between the white curd and the dark purple rind, plus strong sensory characteristics.

The formulations were practiced several times to improve cheese appearance. However, the sub-optimal processing conditions that I had access to limited my ability to produce optimum quality cheeses. Figures 81-83.

Figure 81. Cheddar cheese for final prototype. Original, 2017.

Figure 82. White mould cheese for final prototype. Original, 2017.

Figure 83. Red wine cheese for final prototype. Original, 2017.

To obtain the correct cheese size and shape, tests with different types of moulds were carried out. Laser carved MDF and tape moulds were made with the intention of opening the walls to unmould the cheese rather than pushing the cheese and destroying printed patterns or shapes. Nevertheless, in contact with water this material expands, causing deformation in the cheese and making it impossible to obtain proper patterns in the curd, and the material itself stains the curd.

Figure 84. MDF triangular moulds for making cheese prototypes. Original, 2017.

Laser cut acrylic moulds such as the one shown in Figure 85 work better but they are difficult to assemble and clean.

Figure 85. Acrylic triangular moulds for making cheese prototypes. Original, 2017.

The acrylic mould variation showed in Figure 86 is simpler, it has no lids, and it has round vertices rather than sharp ones. This mould is suitable for making small triangular cheese when a rind covering all cheese surfaces is needed. When this is not needed, a conventional plastic basket to produce a big block of cheese functions better.

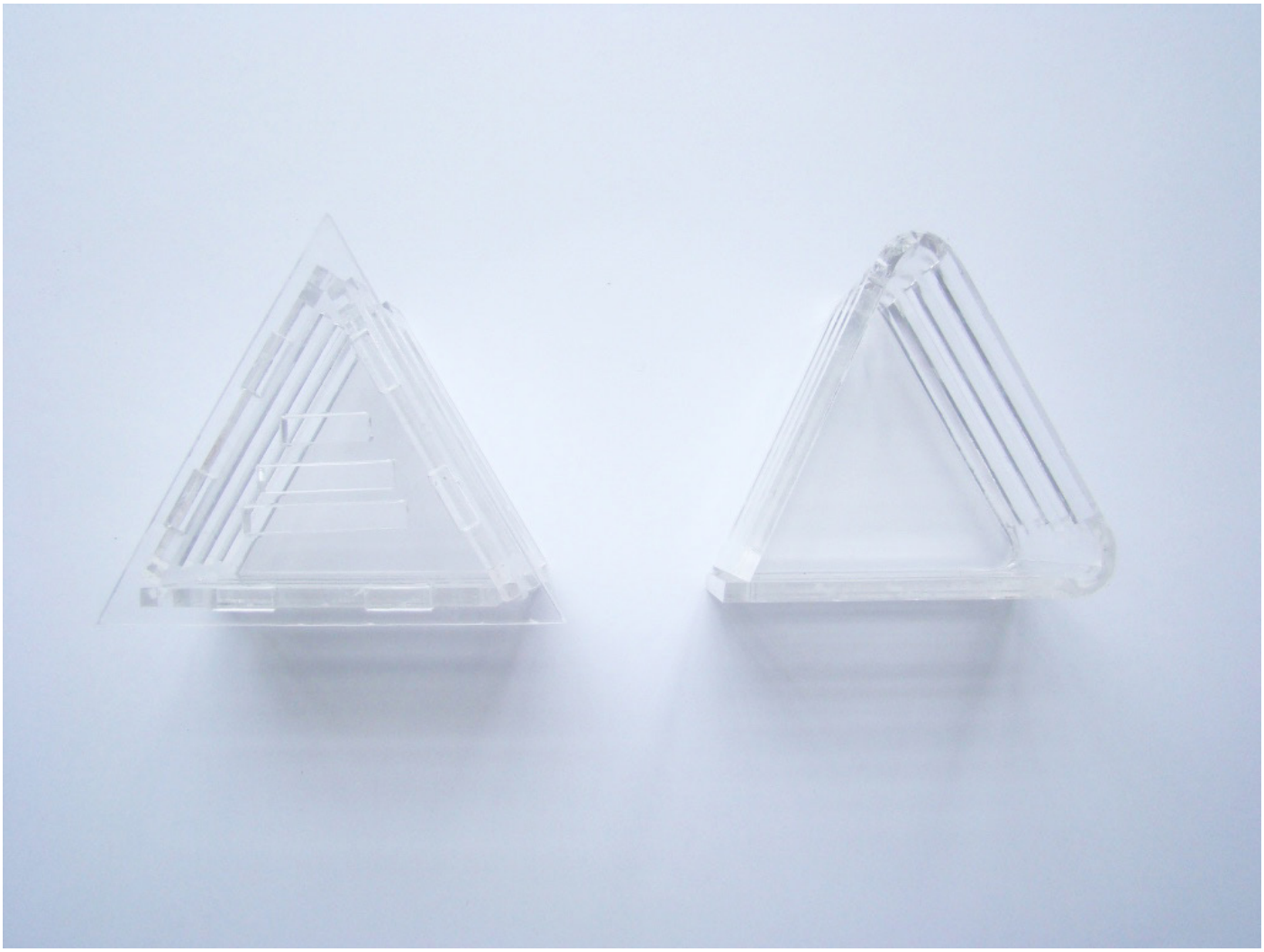


Figure 86. Sharp vertices acrylic triangular mould (left) and round vertices acrylic triangular mould (right) for making cheese prototypes. Original, 2017.

I'm interested in communicating to New Zealand consumers the high quality of the sheep's milk produced in their country, in their towns, and on their farms. I want the product to carry a New Zealand identity, not only on its label but also in its composition, in its essence. To do this, three different regions of New Zealand were selected to be associated with each cheese: Gisborne, Martinborough, and Ohakune. I picked those regions because they are already strongly associated with cultural symbols that are recognizable to New Zealand consumers.

In order to rationalise the region-specific embellishments, the milk must be obtained from those regions. Depending on the region, the pastures present certain characteristics which impact the physicochemical characteristics of the milk, and the characteristics of the milk directly affect the sensory properties of the cheese. To communicate to the consumer which region each cheese comes from, I created three patterns (following the pattern exploration presented in Chapter IV), and refined them with the intention of creating simple icons or symbols, to attach to each cheese.

The icon of sun heating the left site of a mountain represents Gisborne as the first region to receive the sun in New Zealand. Ohakune is represented by a truncated triangle composed by disconnected lines which evokes the geological complexity and volcanic origin of Mount Ruapehu. Martinbouroughis represented by a curly letter 'm' to evoke the shape of grape plants.

Different pattern printing techniques were selected to imprint the icons over the cheddar and white cheese rinds; for the cheddar cheese, direct moulding was used, while for the white mould cheese, a steel tool to press over the rind was used. For the spanish style cheese, I decided not to print the Martinborough icon in order to focus attention on its red wine rind colour as a symbol of the wine-making region it comes from.

To refine the product packaging, different cardboard weights were tested until I found one firm and flexible enough to make clean and small polygonal cheese boxes. Figure 87.

Cheese cannot be stored in direct contact with cardboard because of the moisture and fat content. Normally, cheese is wrapped in cheese paper and sits in a cardboard box. However, I didn't want to hide my cheese because I wanted the consumer to be visually stimulated by the decorative rinds during the buying stage. For this reason, I looked for a way to line the cheese box instead of wrapping the cheese itself.

After researching the cheese wrapping papers available, I selected a paper on the basis of its protective characteristics and its aesthetic qualities. Embossing techniques were used to texturise the cheese wrapping paper with the three regional icons as a mechanism to reinforce the identity of each of the cheeses. Various types of glue were tested to stick the cheese papers to the cheese boxes, although in an industry setting this would be done by laminating the cardboard.

Cheese cannot be stored in direct contact with cardboard because of the moisture and fat content. Normally, cheese is wrapped in cheese paper and sits in a cardboard box. However, I didn't want to hide my cheese because I wanted the consumer to be visually stimulated by the decorative rinds during the buying stage. For this reason, I looked for a way to line the cheese box instead of wrapping the cheese itself. After researching the cheese wrapping papers available, I selected a paper on the basis of its protective characteristics and its aesthetic qualities. Embossing techniques were used to texturise the cheese wrapping paper with the three regional icons as a mechanism to reinforce the identity of each of the cheeses. Figure 88. Various types of glue were tested to stick the cheese papers to the cheese boxes, although in an industry setting this would be done by laminating the cardboard.

Cheese is a living food, it contains bacteria and the biological processes that are part of its production continue happening during storage. Cheese papers are specially designed to allow a certain amount of air to run through the packaging, which prevents undesirable anaerobic bacteria from dominating. I decided to make perforations in the cardboard cheese boxes to allow airflow, and at the same time inform consumers about the cheese style, and the region the cheese comes from. This also allows consumers to appreciate the beauty of the cheese paper from outside.

Figure 87. Cardboard cheese boxes iterations. Original, 2017.

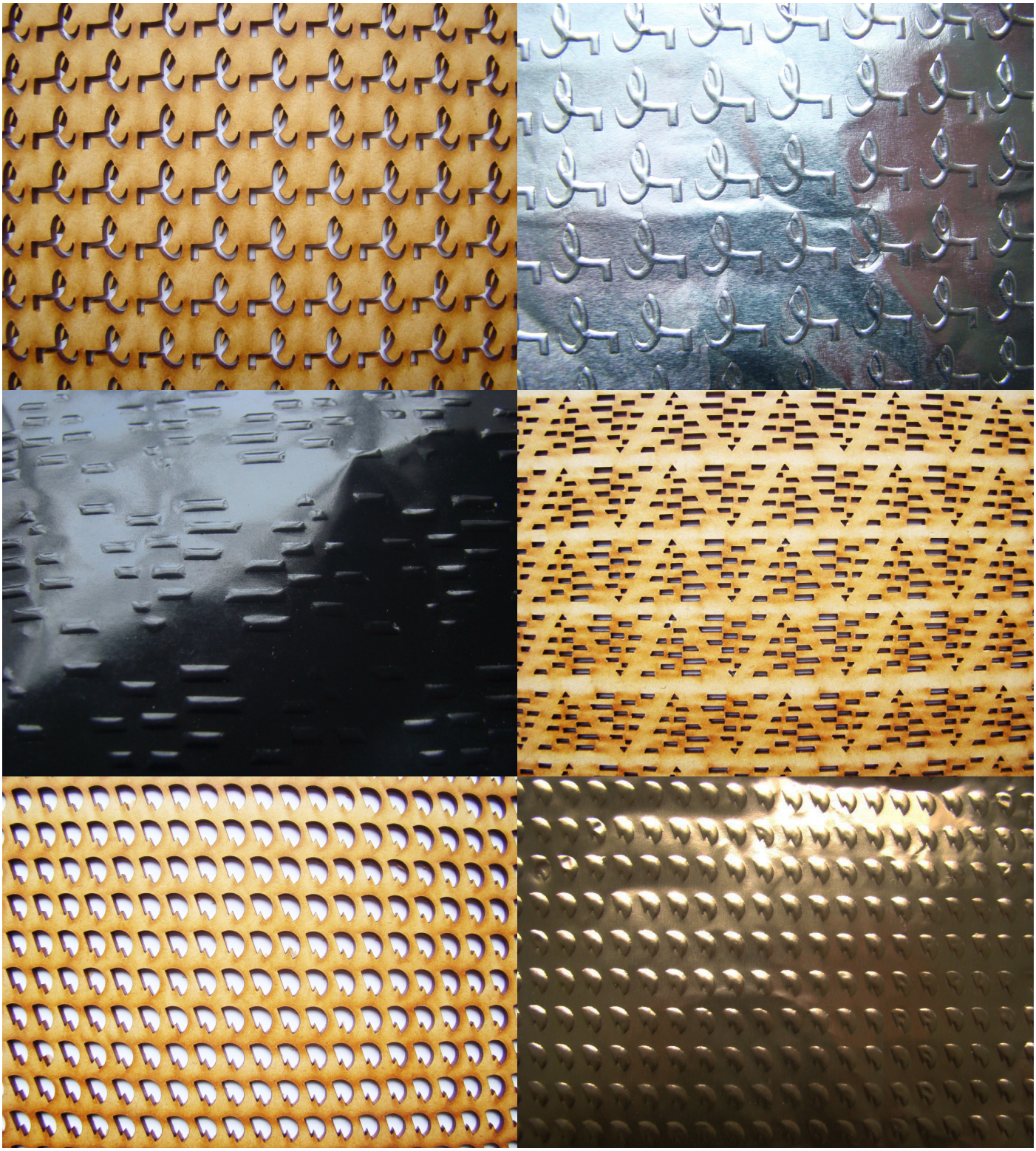


Figure 88. Cheese-wrapping paper embossing. Original, 2017.

When I started working on this concept, I was planned to use a paper shell with plastic windows as a lid for all the cheeses, but then by doing a storage test, I discovered that one cheese could contaminate the next one, because they have different active bacteria. As mentioned above, I didn't want to obscure the cheese, so transparent plastic lids were made for each cheese box. The lids needed to fit correctly and be easy to open. Incorporating the lids resulted in a modification of the paper shell design. I kept the windows but no plastic was needed in the paper shell.

Colours and the techniques to apply them were important factors to consider at this stage. The colours and textures for the paper shell were selected to give the sealed packaging a natural, mineral-like quality, and to make the box seem luxurious as the product was opened. Figure 90.

Figure 89. Paper shell design iteration. Original, 2017.

Figure 90. Paper shell colour refinement. Original, 2017.

I decided to use the paper shell not only as a packaging material but also as an interactive element. On the paper surface of the shell I intend to include cheese tasting notes given by the farmers or cheese makers behind each of the cheeses. This element is simple, but vital, since it makes the consumers feel that the product connect them to the New Zealand farms. Figure 91.

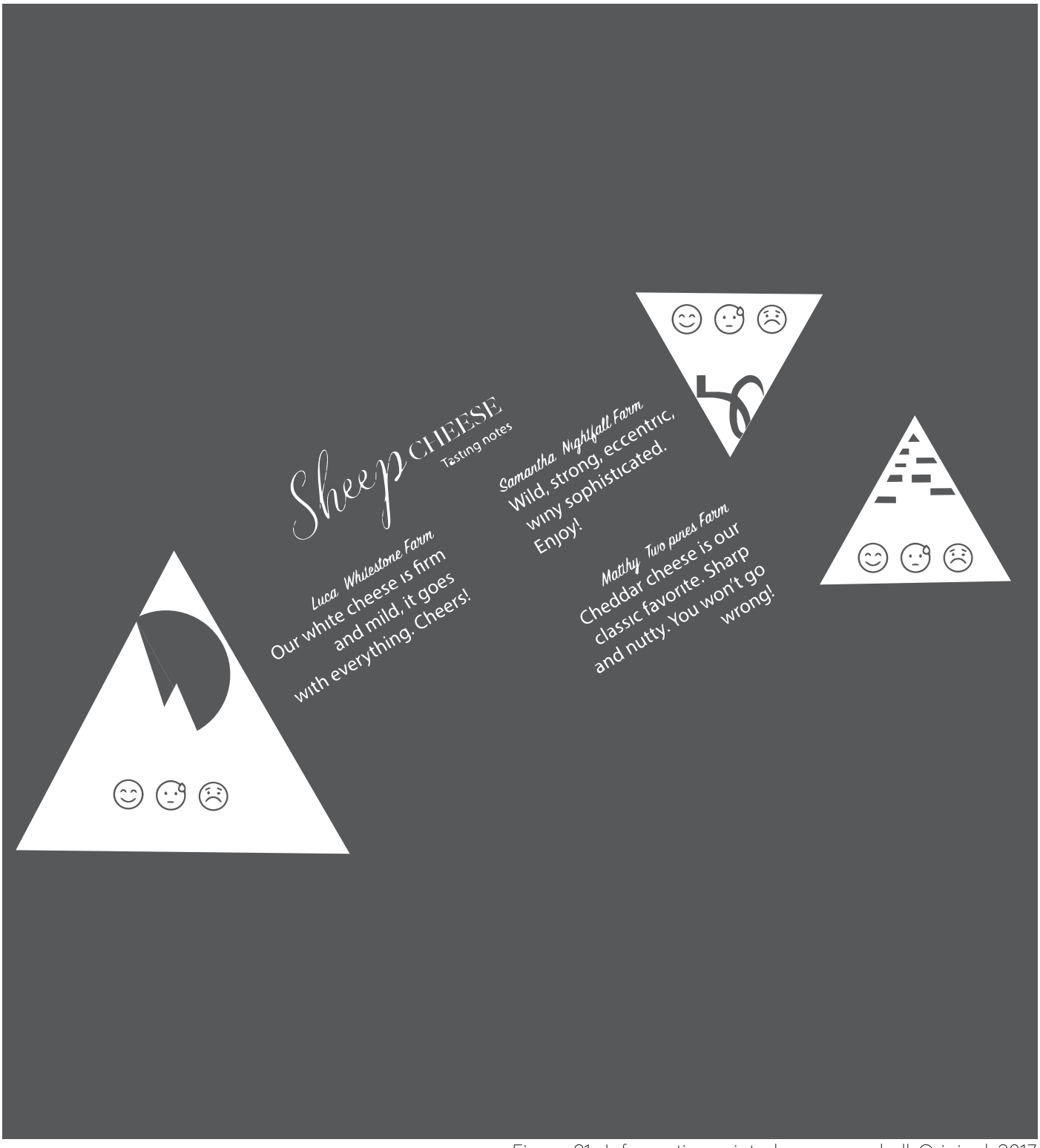


Figure 91. Information printed on paper shell. Original, 2017.

For the cheese boxes, colours were selected to contrast with the cheese curds and cheese papers. Each box's colour is intended to reinforce the personality of the cheese contained, but also all the boxes' colours together are meant to be complementary and visually pleaseant. The color is applied with the intension of making the boxes look hand made. The combination of vibrant colors and unfinished look is meant to communicate the product is artisanal but modern. Finally, the name of each region was incised in the packaging material, not as a marketing technique, but to communicate that the cheese is produced from milk, in the region, and in a farm that belongs there. Figures 92-93. Appendix 6.

Figure 92. Cheese boxes colour and design iteration. Part 1. Original, 2017.

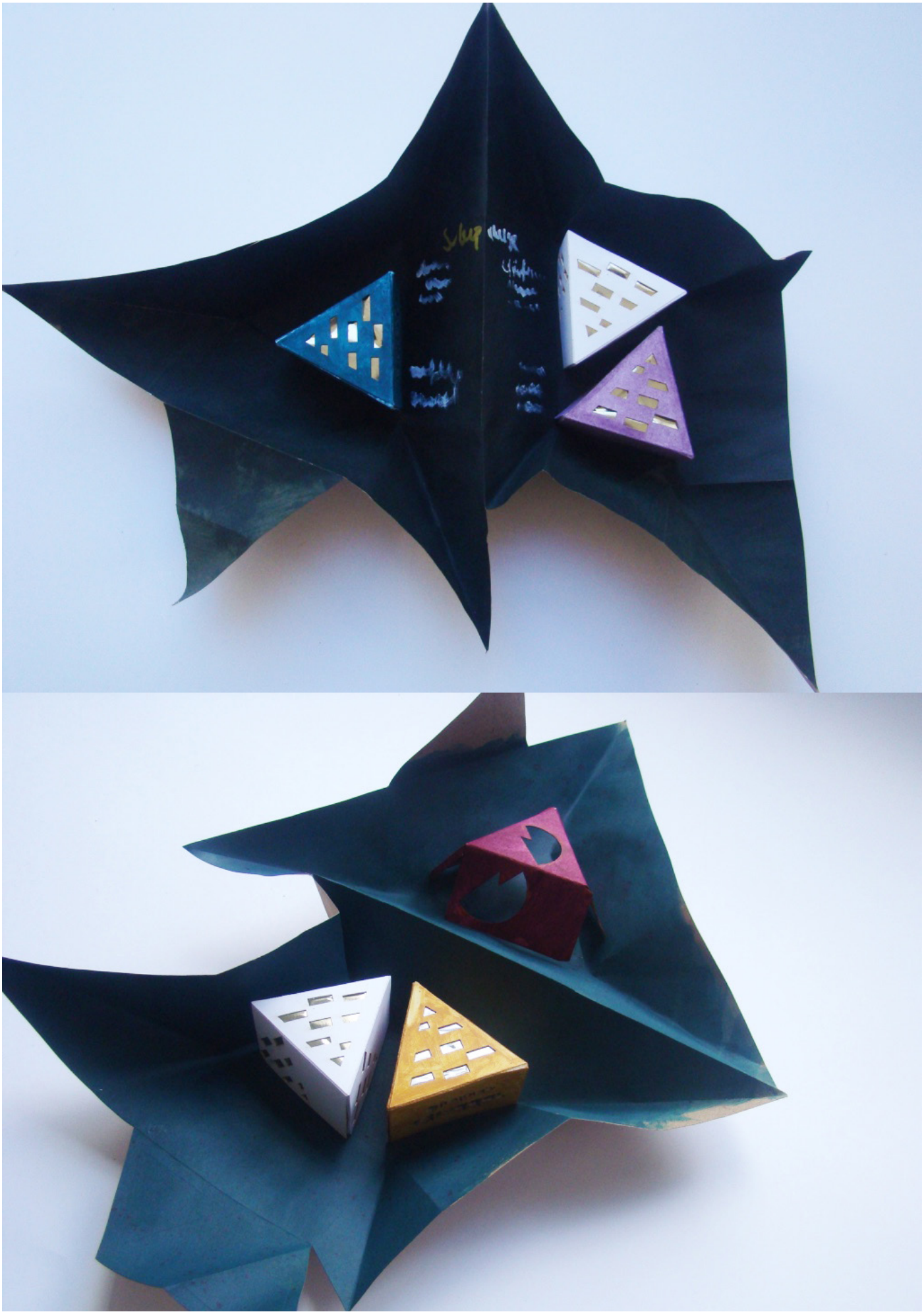


Figure 93. Combination of cheese boxes colour and paper shell colour iteration. Original, 2017.

Outcome

Figure 94. Painting final prototype boxes. Original, 2017.

Figure 95. Final cheese product prototype. Box closed. Karasinska, 2017.

Figure 96. Final cheese product prototype sharing space with other cheese products. Karasinska, 2017.

Figure 97. Visualisation of cheese rinds through the packaging of the final cheese product prototype. Karasinska, 2017.

Figure 98. Paper shell texture of the final cheese product prototype. Karasinska, 2017.

Figure 99. Opening the final cheese product prototype. Karasinska, 2017.

Figure 100. Cheese boxes inside the final cheese product prototype. Karasinska, 2017.

Figure 101. Detail of paper shell included in the final cheese product prototype. Karasinska, 2017.

Figure 102. Bite-size visualisation of the cheeses included in the final product prototype. Karasinska, 2017.

Figure 103. Detailed view of white cheese included in the final product prototype. Karasinska, 2017.

Figure 104. Detailed view of cheddar cheese included in the final product prototype. Karasinska, 2017.

Figure 105. Detailed view of Spanish-style cheese included in the final product prototype. Karasinska, 2017.

Figure 106. Final cheese product prototype use. Personal experience when buying one single box. Karasinska 2017.

Figure 107. Final cheese product prototype use. Social experience when buying more thanone box, top view. Karasinska, 2017.

Figure 108. Final cheese product prototype use. Social experience when buying more thanone box,. Karasinska, 2017.

This product seeks to provide a unique and highly sensory sheep cheese tasting-experience to New Zealand cheese consumers. The product aims to present the desirable qualities of sheep's milk and showcase the huge potential New Zealand has as a country to produce valuable products from it.

This is a packaged food product that could be found on the shelf of a supermarket or a cheese shop. It is designed to be eye-catching when sharing the same shelf among traditional blocks, wheels or cheese boxes. It is a plain brown craft paper polygon. Over the paper a bright plum colour pattern is printed. The product is meant to evoke nature, mountains, natural cheese, tradition, an environmentally friendly attitude and playfulness.

Three windows on the polygon offer an intriguing glimpse of three rustic cheese rinds: chalk white, sparkling dark purple and golden yellow.

Once the consumers touch the product they will find the polygon is not completely solid. The paper shell is thin and fragile, but something inside maintains the polygon's form, and when the product is shaken the internal elements don't move much.

To open the product there are three small belts the consumer must detach. Once the product is opened, the paper shell extends and reveals its predominant internal plum colour. On the plum surface rest three contrasting coloured triangular boxes and a transparent cracker box that fit perfectly together, giving a feeling of mistery, nature (dark forest), luxury and playfulness. The overall composition is intended to be pleasing to the eye and attractive for the consumer to touch, move and interact with the elements.

Each triangular box contains and carefully protects a bite-size triangular sheep cheese. A triangular cheese is different to most of the cheeses on the market but remains familiar and faithful to cheese tradition by evoking the action of slicing cheese with a knife. Triangle shapes also have the advantages of being simple enough to be mass produced, feel good in the hand as a bite size, and generate a feeling of symmetry and harmony when several pieces are together.

By presenting bite sized cheeses, the product provides just the right amount to have a tasting session with a couple of friends. That way the consumer doesn't need to buy a big piece of cheese and keep it in the fridge after tasting.

Each cheese triangle box contains a different sheep milk cheese style. From familiar to unfamiliar, a traditional cheddar cheese, a white mold cheese, and red wine rind Spanish style cheese. By having this variety of cheeses together in a collection, the consumer can discover and explore a wide range of different sensory characteristics offered by sheep cheeses in the same product.

The colour and texture of each cheese style is enhanced by the characteristics of its own individual packaging which gives it a specific character with its own beauty and uniqueness in this assembly of three. The cheddar cheese box uses the natural colour of paper to evoke tradition and simplicity. The white mold cheese box is deep turquoise, it creates a high contrast with the white cheese and resemble a dark forest and elegance. The purple Spanish style cheese is contained in a white box, which also creates a high contrast and evokes a feeling of royalty and luxury.

The product is designed for the consumer to have a personal experience when buying a single box but also to be shared in a social environment when buying more than one box. Normally, consumers prepare nice cheese platters or cheese boards when they are consuming cheese. This product makes it easier to create these setups, the consumer just needs to open the paper shell, take out the elements and organize them in one of many different compositions that can be created from one box or from several, depending on how many people are going to join in the tasting session. There is no need to put much effort into creating a cheese board, because the product has already done part of the work.

This product is designed to portray the connection between sheep's milk and New Zealand. Each cheese represents the specific region of New Zealand where the milk used to produce the cheese comes from. The origin of each cheese is communicated by symbolism imprinted directly on the cheese rind (icons and colours) and by the packaging (icons and region's name). Also, the product is intended to connect consumers not only with their regions, but more intimately with their sheep milk farms. Through the tasting notes included in the paper shell, the product lets the consumer hear directly from the farmer, and consequently feel closer to him or her.

By making the consumer feel pleasure and communicating the connection between sheep cheese and New Zealand regions, and more specifically, the connection between sheep cheese and New Zealand farms, consumers can learn that beautiful sheep milk cheeses are produced in their country, and recognize the huge potential for sheep milk products in New Zealand.

Finally, as a spin-off, this product presents sheep's cheese as an interesting object which has the potential to re-format cheese as a gift, placing it in a higher position in the value chain. This format changes the paradigm of how cheese is perceived and opens a new channel through which a sheep cheese trend could spread.

CHAPTER V. FINDINGS

Summary of findings

Throughout this project, I have explored the discipline of design to get a better understanding of its methods. By combining this understanding with my existing knowledge in food science I have created a new packaged food product.

Information about New Zealanders' traditional perceptions and hidden desires in relation to sheep's milk products was collected and analysed to gain insights into the qualities that would make the product more appealing to consumers. Several explorations were carried out, and multiple objects were made, as a mechanism to discover what the food product would be. Each exploration contributed to the final design concept. This was founded on the hypothesis that an innovative product that presented small samples of a variety of sheep's cheeses was more likely to encourage consumers to try a food they had previously discounted. Three different cheeses have been developed to be included in the product, with consideration given to design aspects usually ignored during the food product development process. All the formulations have been refined to obtain the best possible quality, but, it is important to acknowledge they need to be refined in a proper food product development laboratory to ensure safety and quality.

The packaging material has been conceived and refined with the goal of protecting and enhancing the characteristics of the contained food as well as presenting the food product as a total proposal, as an object (Bassi, 2015).

The most important finding was to discover the food product as an object, and the object as a carrier of meanings, semantics, and symbolisms, which are all sources of value for consumers. I have learned that what makes the object different and valuable is what it represents for the consumer.

The discipline of design is familiar with the above concepts. Designers use methods based on empathy to extract the soul of the product, those meanings, that are later materialized as a physical object. On the other hand, designers are generally not familiar with industrial food production methods.

The disconnection between these two areas of expertise has limited the development of new food products in commercial settings. When design fuses with food science, it is possible to create meaningful packaged food products that unleash experiences. By creating meaningful food products, food industries can create, and consumers can obtain, products with a higher value.

Design adds more dimensions and brings a more open minded, playful and optimistic perspective to traditional food product development. Food science brings to design a whole new range of materials, techniques and processes to explore and play with. To bring these two disciplines together, enhancing communication and collaboration is required, and many preconceptions about creativity, and the appropriate manner for the development process to progress in each discipline need to be overcome.

By going through the process of designing my product I have reinforced my beliefs about the necessity for professionals formed in both areas, food science and design, to nurture food designers as food developers. By gaining the skills given by the two disciplines, the food developer is able to create a wider range of new, interesting and valuable food products. It is my desire in future to act as a mediator to improve collaboration between designers and food scientists, and to work on projects that show the potential of merging both disciplines.

Through this NZAid funded research project, I have solved most of my questions related to the value of design discipline for food product development. I will now be able to contribute to my field from a more integrated perspective to create valuable food products, valuable food industries and consequently benefit the economy of countries like Costa Rica and New Zealand which depend heavily on the development of agroindustries.

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APPENDIX

Appendix 1. Novelty and familiarity exploration

Figure 109. Sketch and model of sheep cheese micro-balls. Original, 2017.

Figure 110. Sketch and model of sheep cheese pancake. Original, 2017.

Figure 111. Sketch and model of sheep cheese cheesecake. Original, 2017.

Figure 112. Sketch and model of sheep cheese bliss balls. Original, 2017.

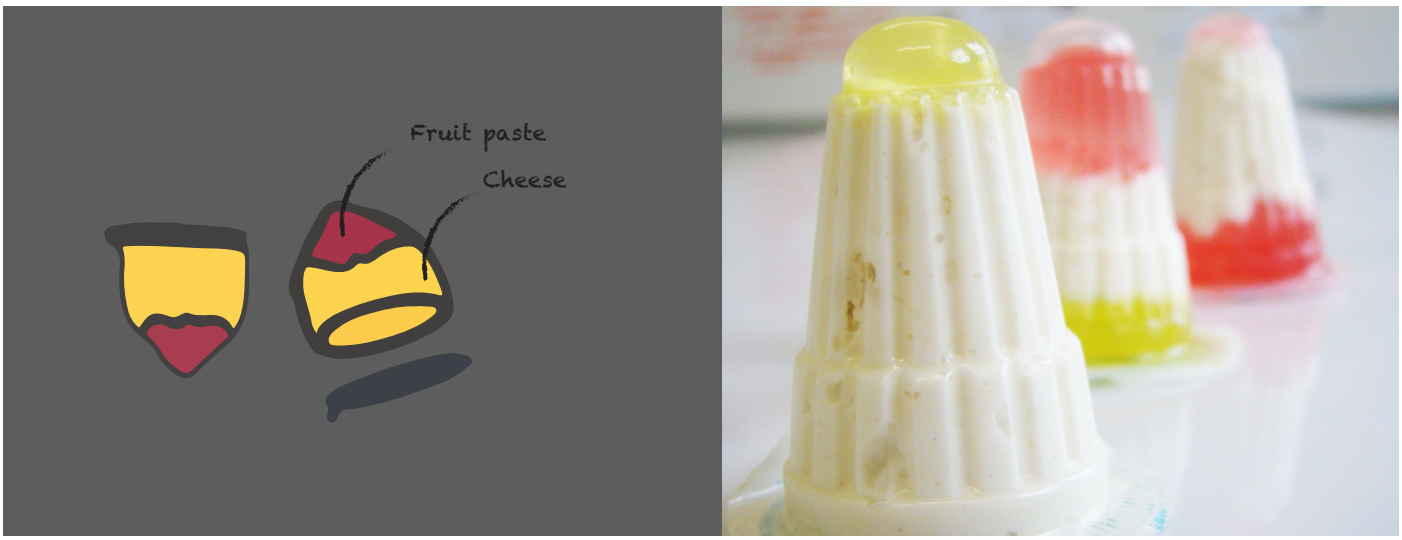

Figure 113. Sketch and model of sheep cheese snack dessert. Original, 2017.

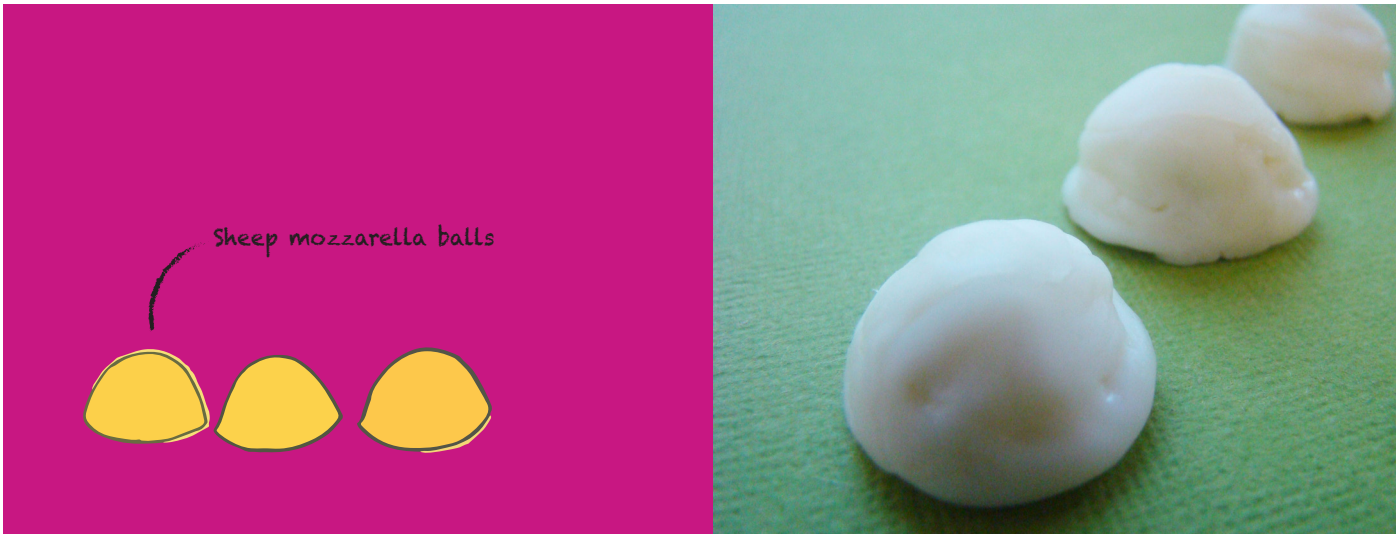

Figure 114. Sketch and model of sheep cheese mozzarella model. Original, 2017.

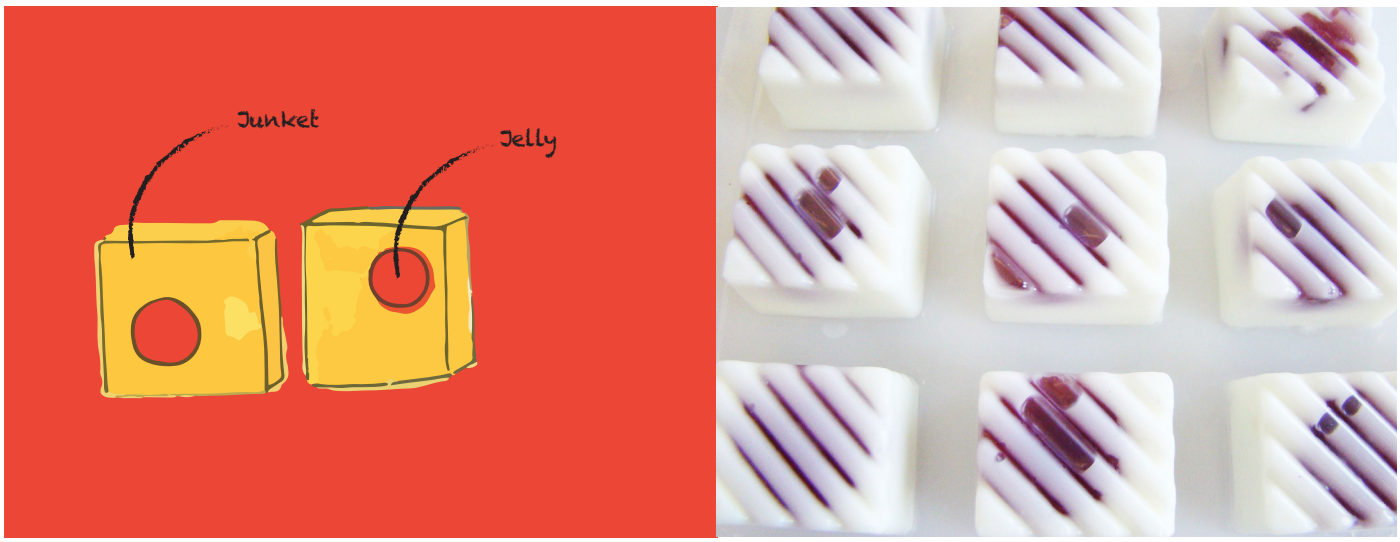

Figure 115. Sketch and model of sheep cheese junket. Original, 2017.

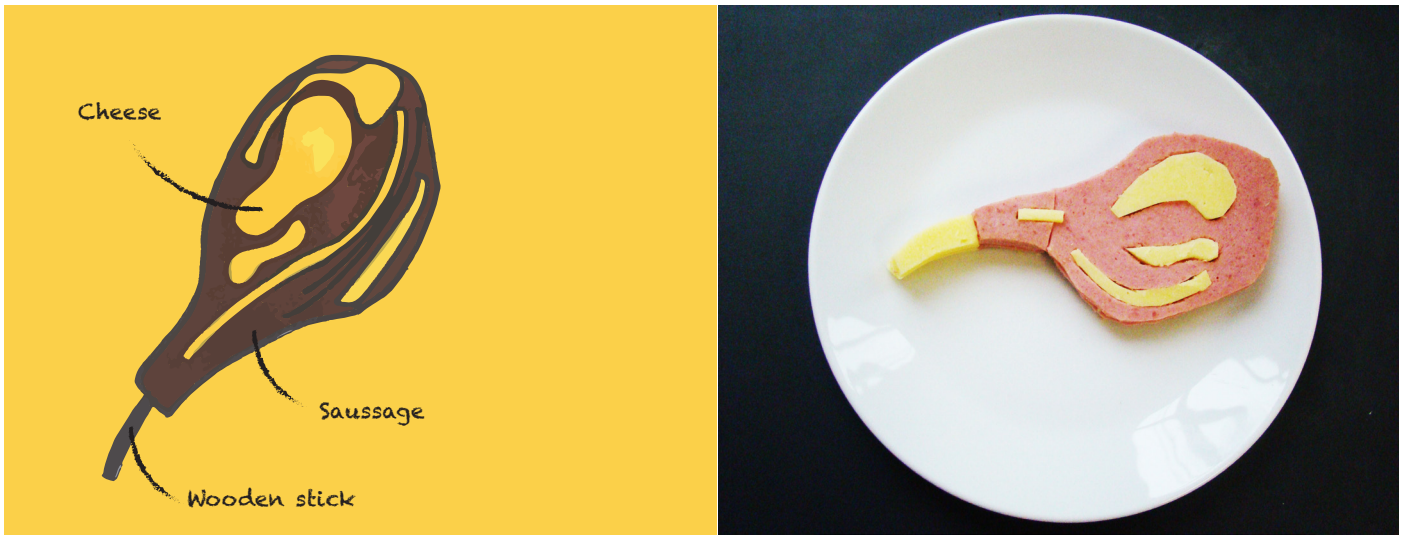

Figure 116. Sketch and model of sheep cheese lamb sausage. Original, 2017.

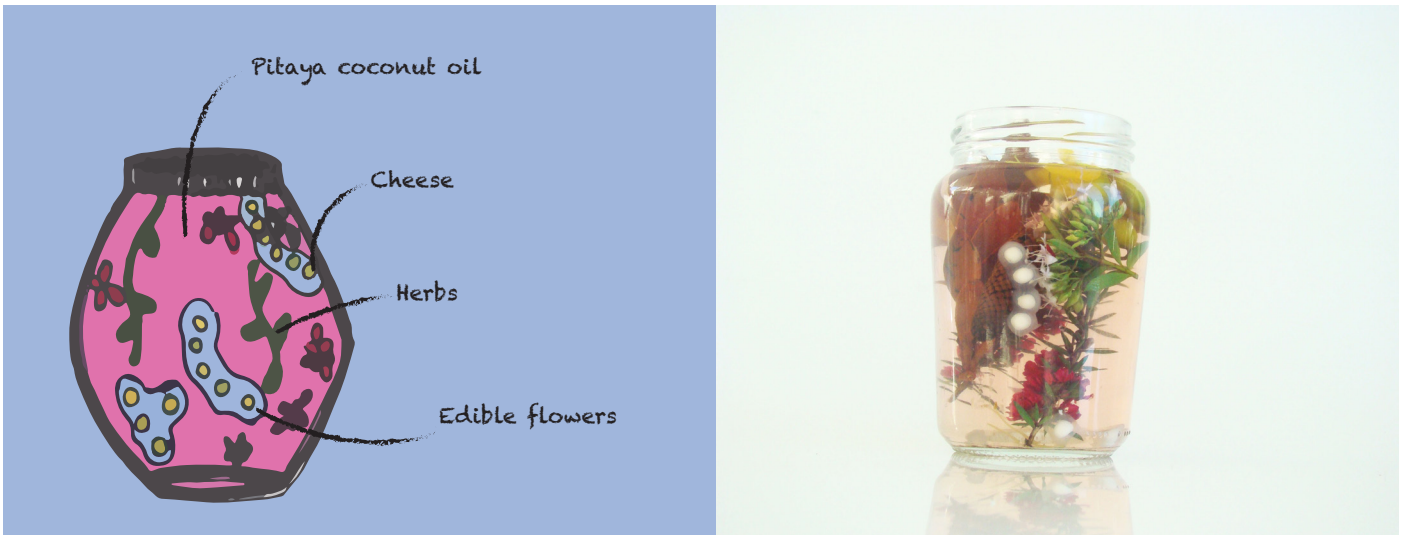

Figure 117. Sketch and model of sheep cheese caviar preserve. Original, 2017.

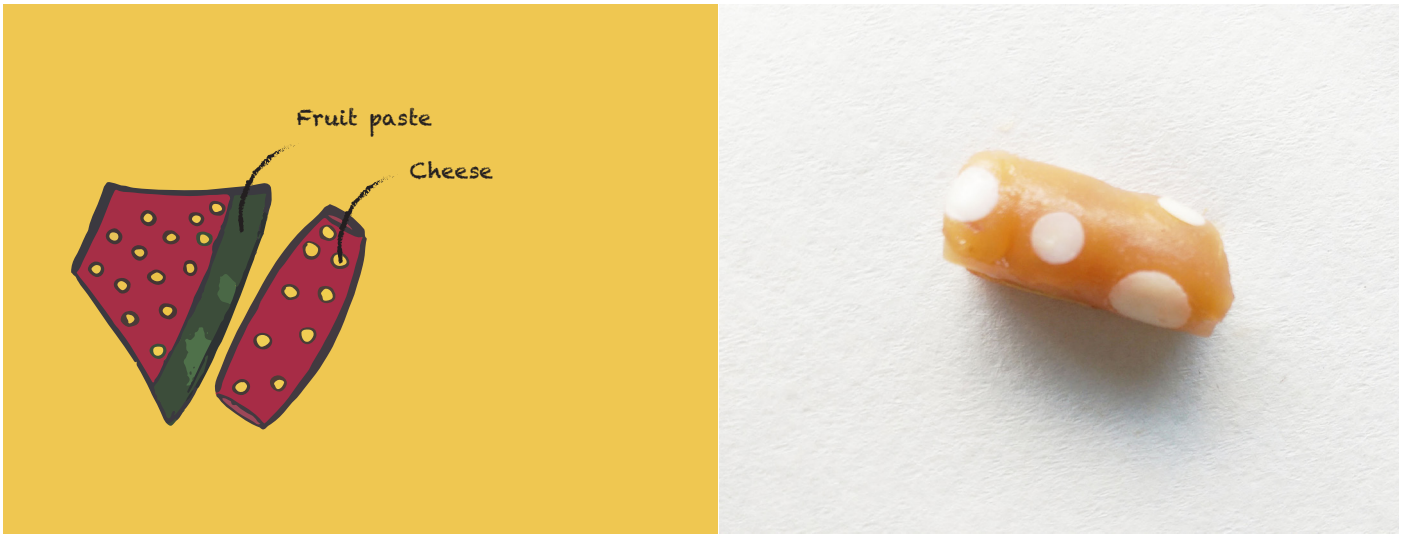

Figure 118. Sketch and model of sheep cheese fruit paste lolly. Original, 2017.

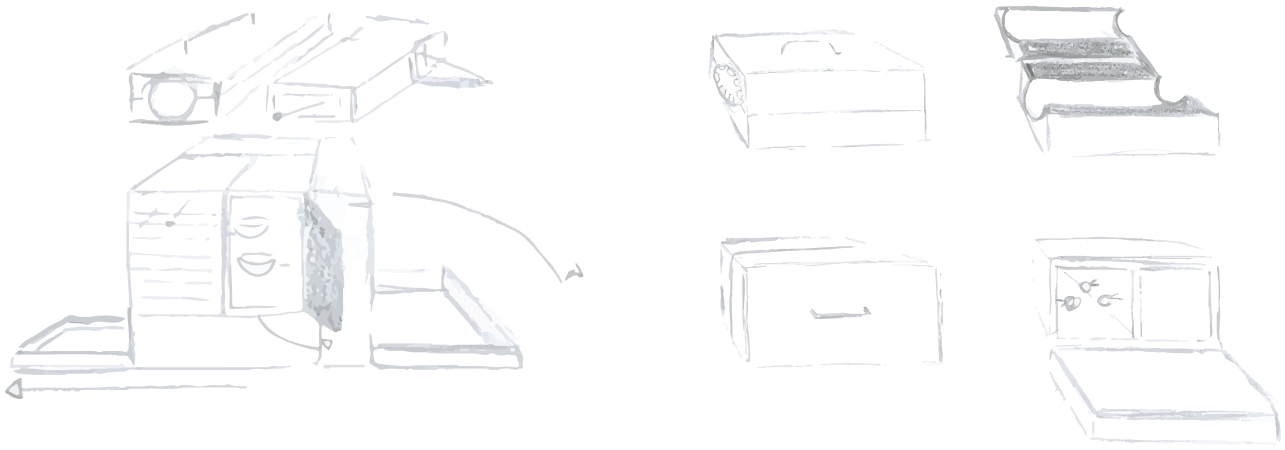

Figure 119. Sketch of sheep cheese cabinet. Original, 2017.

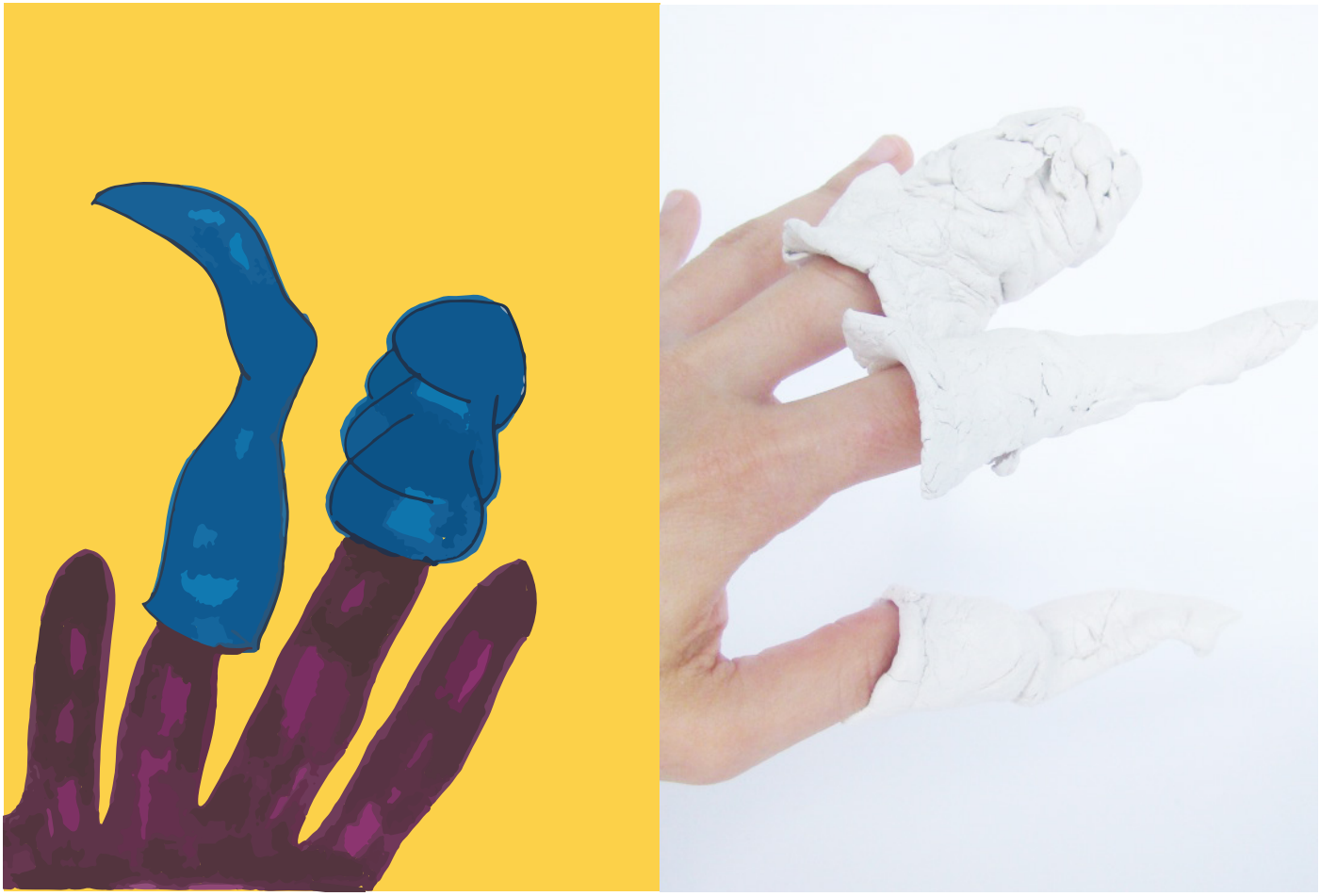

Figure 120. Sketch and model of sheep cheese fingers. Original, 2017.

Appendix 2. Form exploration

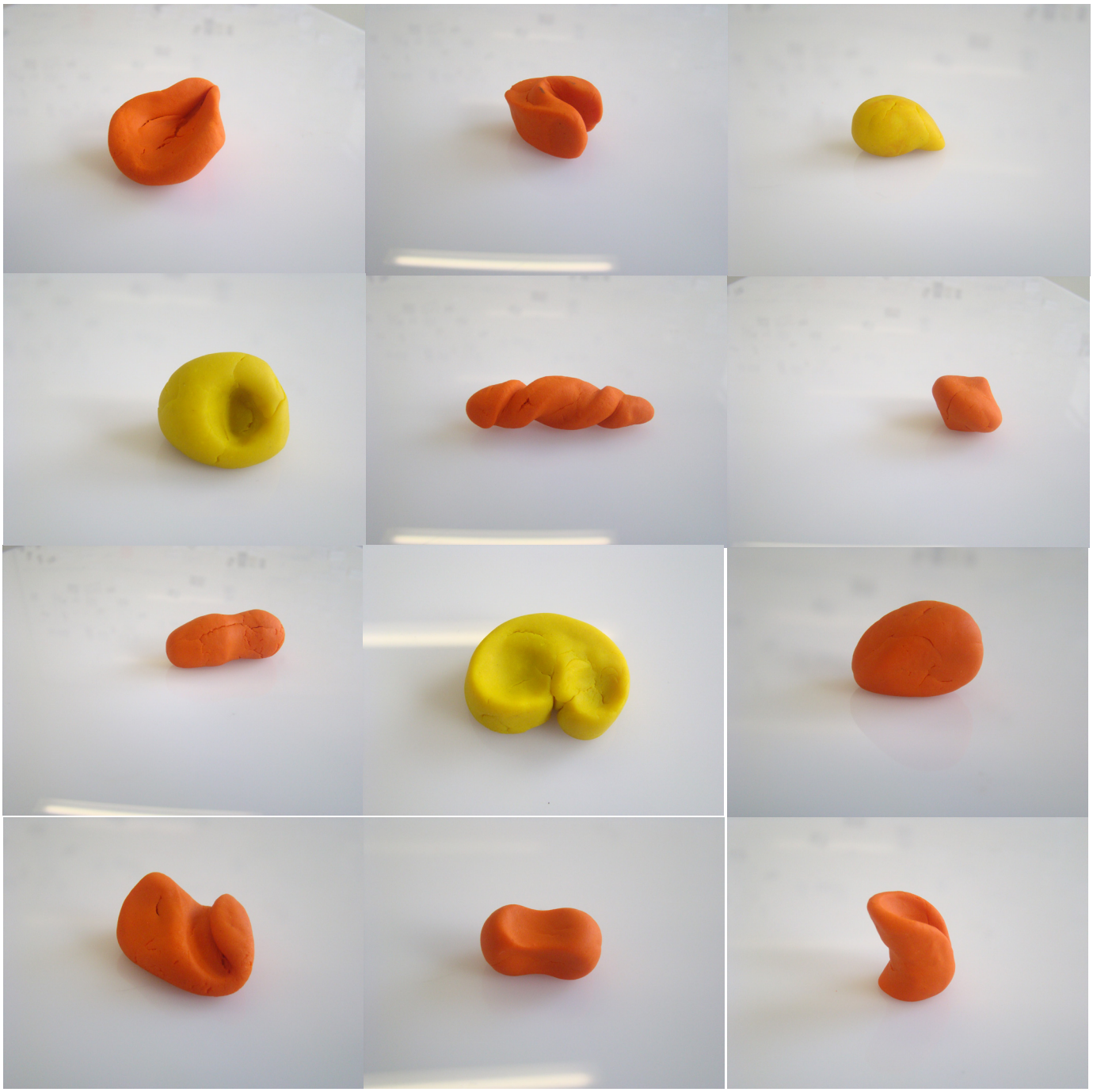

Figure 121. Complete cheese form exploration using clay. Part 1. Original, 2017.

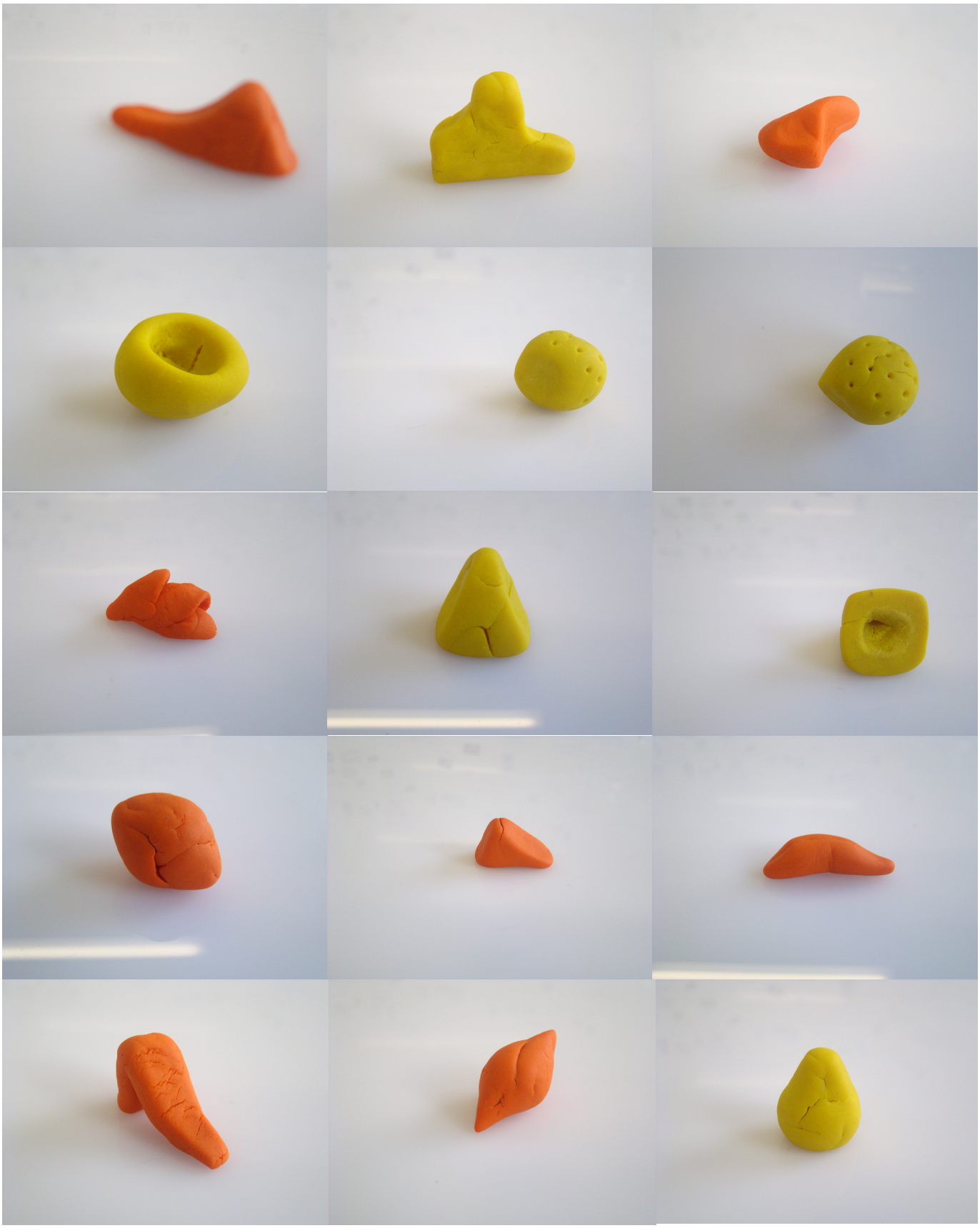

Figure 122. Complete cheese form exploration using clay. Part 2. Original, 2017.

Figure 123. Rock shapes and textures. Unknown.

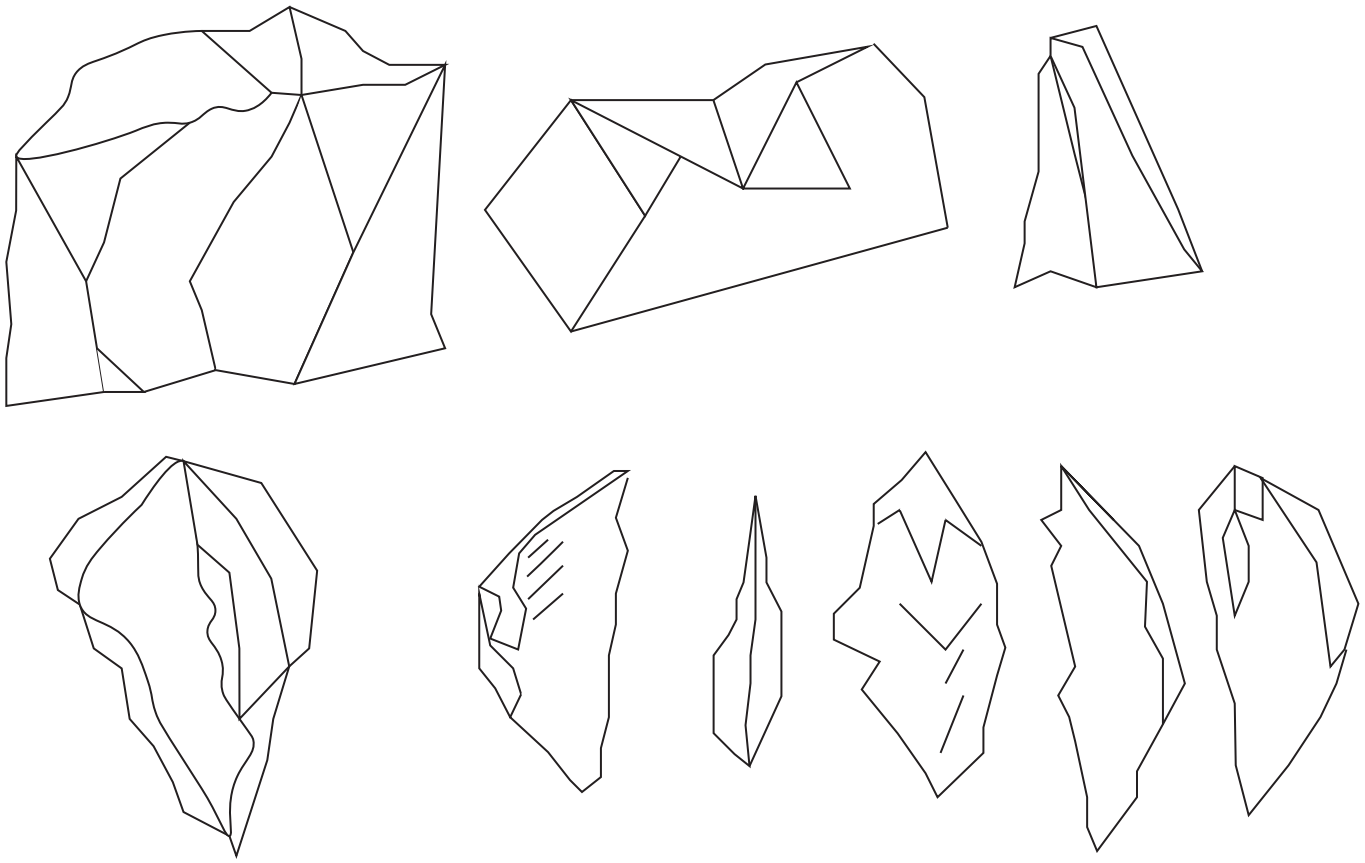

Figure 124. Rock shape sketches. Original, 2017.

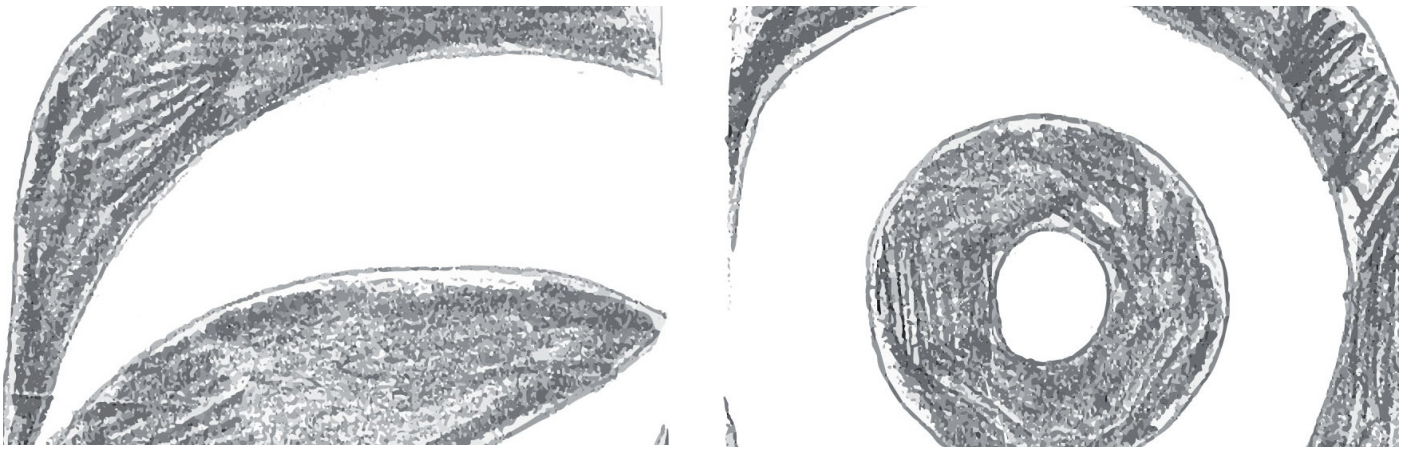

Figure 125. Rock layers sketches. Original, 2017.

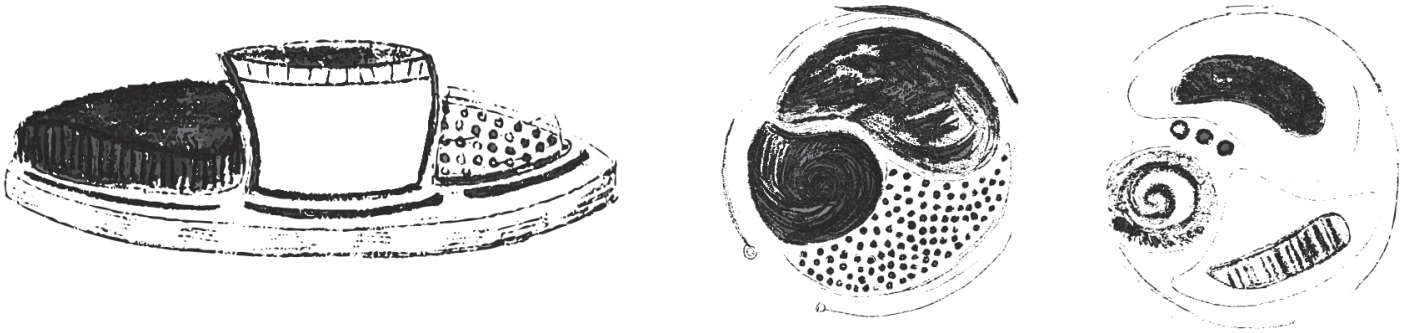

Figure 126. Cheese product composition sketch. Original, 2017.

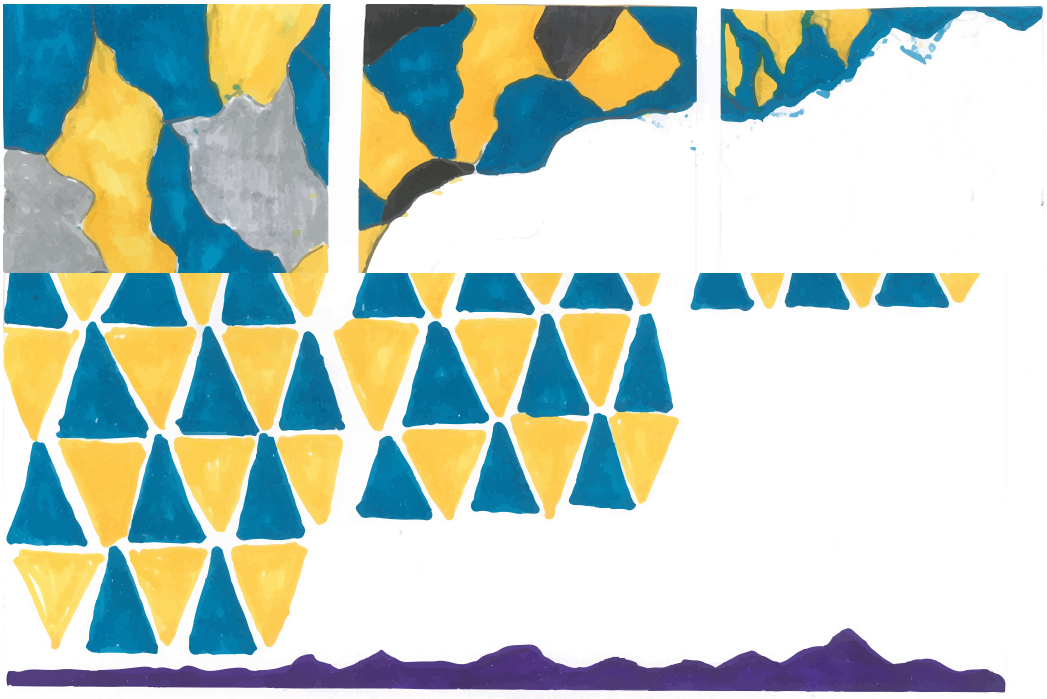

Figure 127. Rock layers sketches. Original, 2017.

Figure 128. Rock shape and layers sketches. Original, 2017.

Appendix 3. Product concept 4

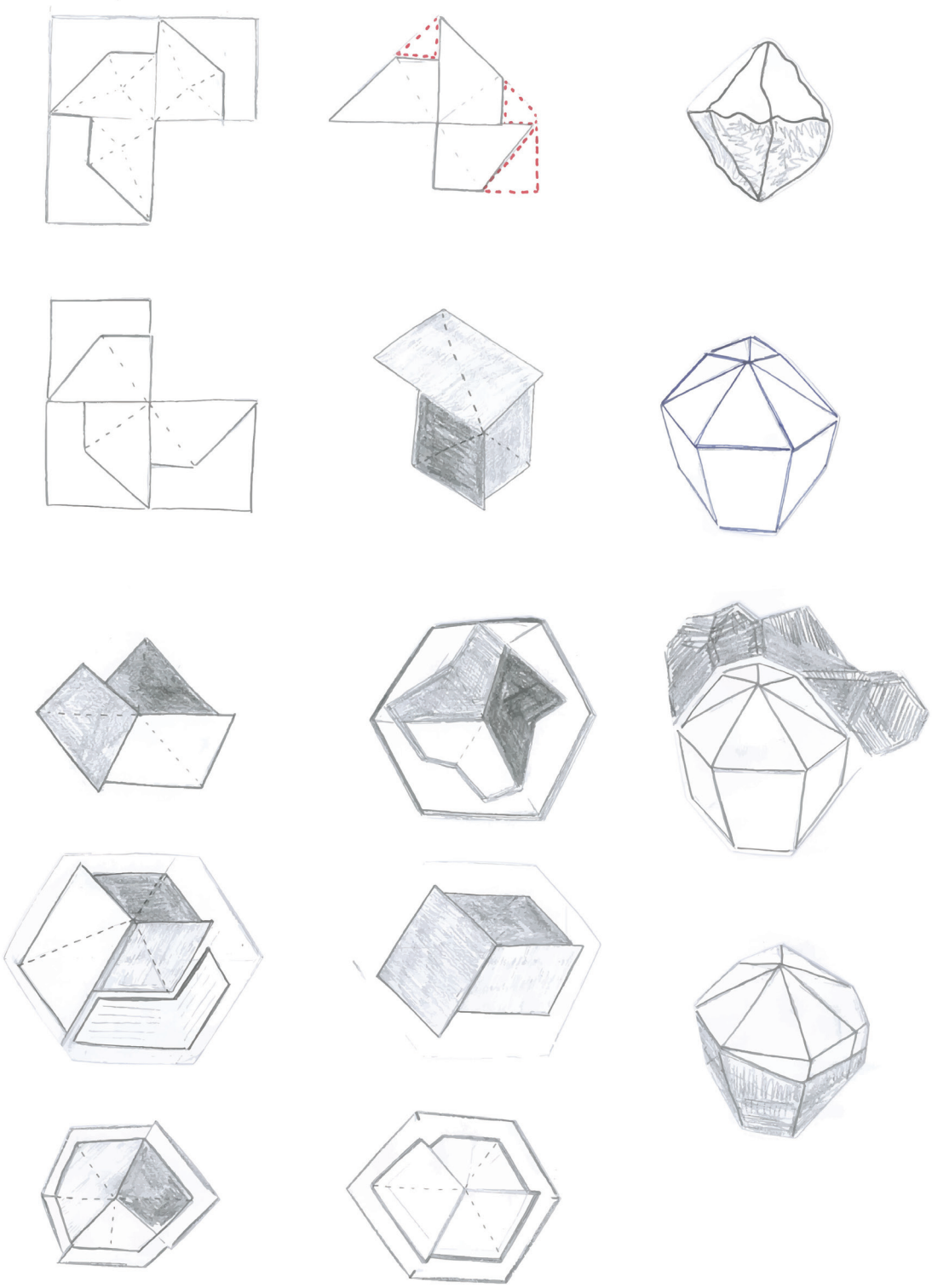

Figure 129. Sketches for product concept 4. Part 1. Original, 2017.

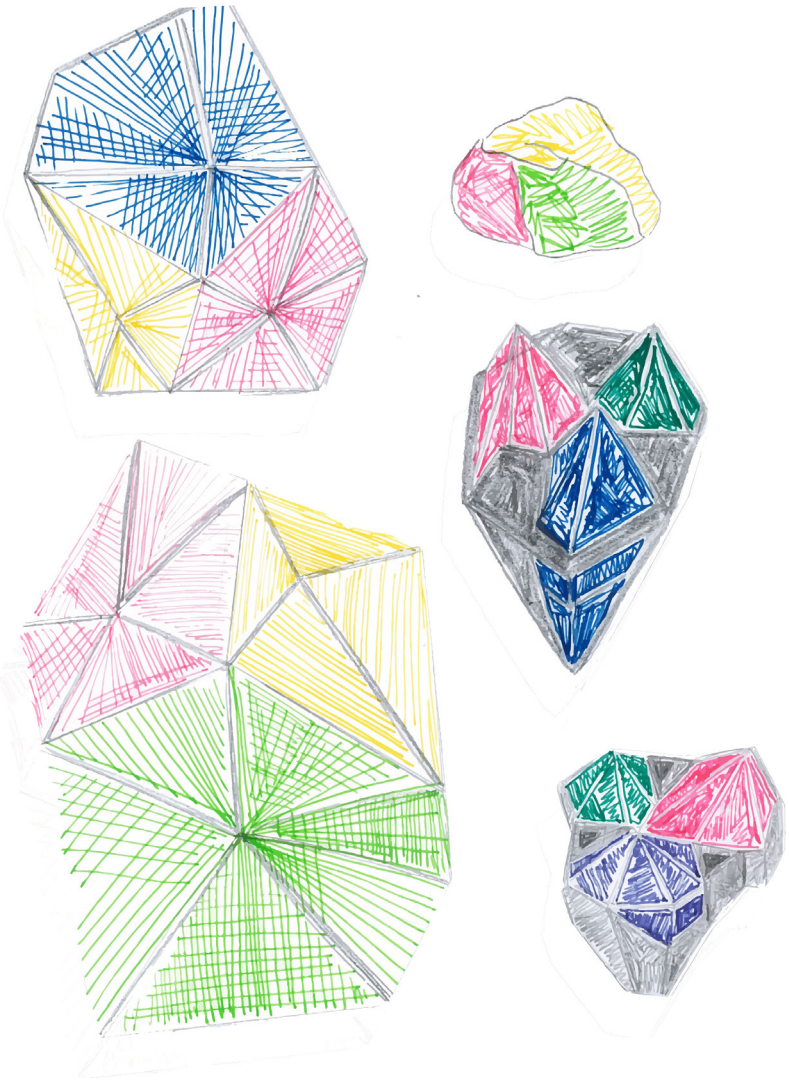

Figure 130. Sketches for product concept 4. Part 2. Original, 2017.

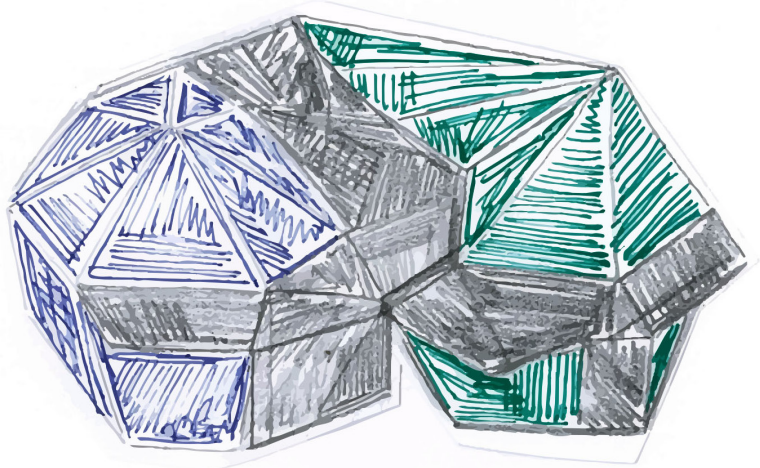

Figure 131. Sketches for product concept 4. Part 1. Original, 2017.

Appendix 4. Product concept 5

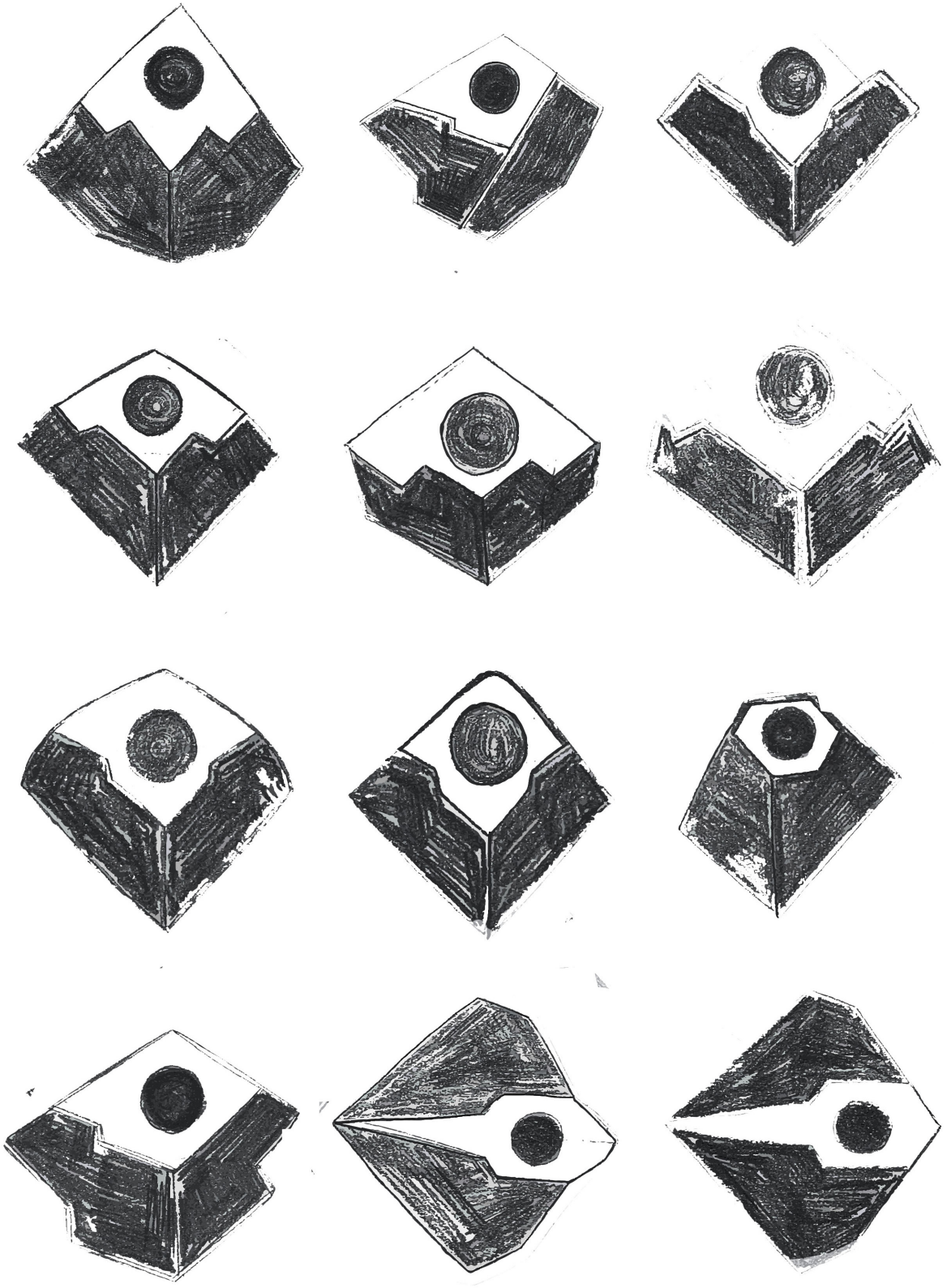

Figure 132. Sketches for product concept 5. Top view. Part 1. Original, 2017.

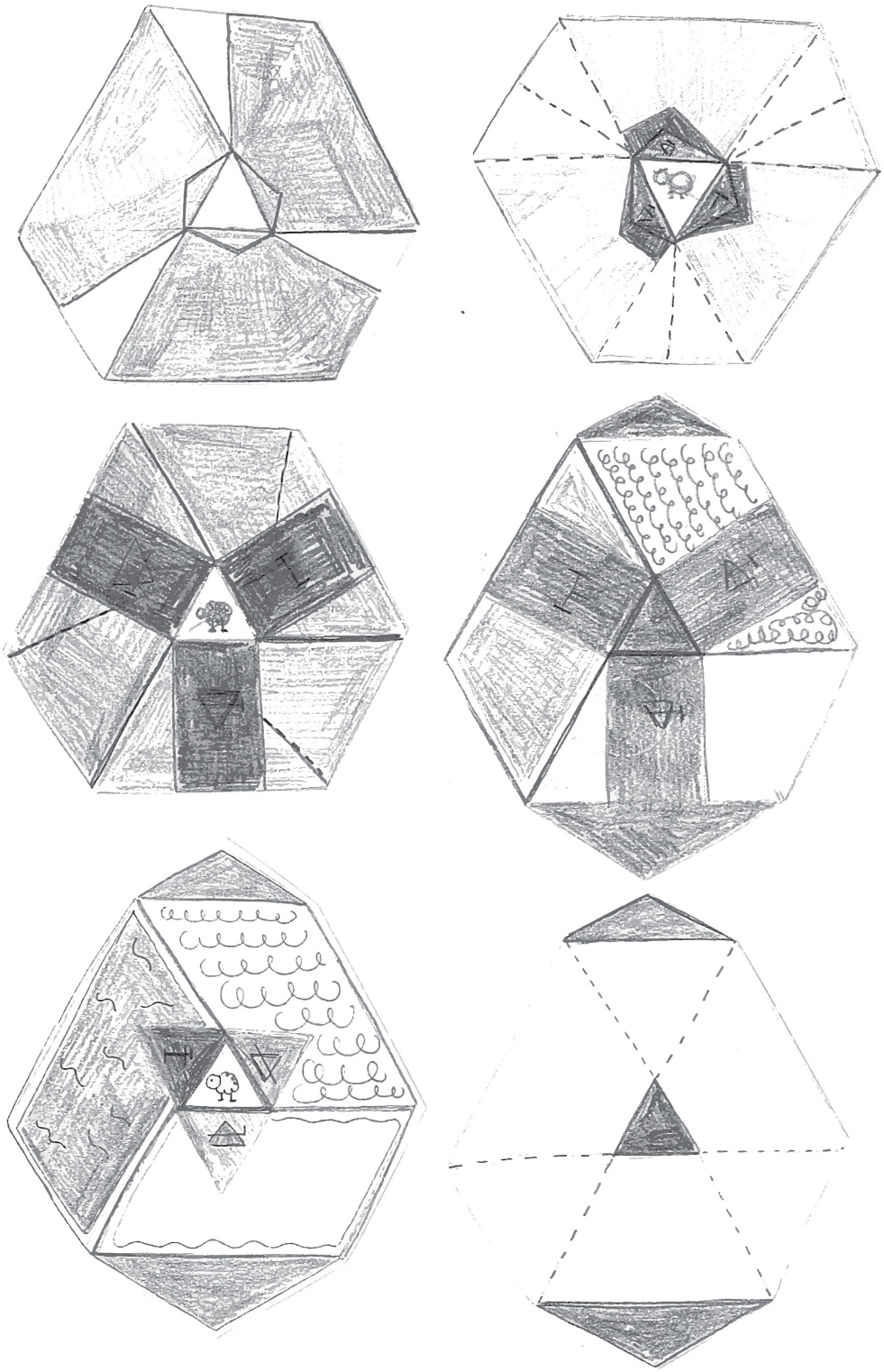

Figure 133. Sketches for product concept 5. Top view. Part 2. Original, 2017.

Appendix 5. Concept evaluation

	Concept 1	Concept 2	Concept 3	Concept 4	Concept 5
It provokes people to try sheep cheese.	3 It has an interesting form in comparison with existent cheese products.	1 It is a set of boxes which is the most common packaging solution for any food product.	5 It has an interesting form and gives an opportunity for display in different ways.	5 It has an interesting form and gives an opportunity for display in different ways.	5 It has an interesting form and stimulates curiosity.
It presents more than one sheep's cheese style.	5 Three different cheese styles are presented.	5 Three different cheese styles are presented.	5 Three different cheese styles are presented.	5 Three different cheese styles are presented.	5 Three different cheese styles are presented.
It provides tiny bites of cheese.	3 It provides tiny bites, but they are not proportional	5 It provides tiny proportional bites	3 The portions provided are not tiny enough.	4 Three pieces of cheese provided are tiny portions, but so tiny that each cheese cannot be produced separately, just cut from a big block, losing the qualities of the rind.	5 It provides tiny proportional bites, big enough to be produced separately.
It informs about different sheep's cheese intensities.	2 Spheres' size is meant to be an indicator of intensity, nevertheless is confusing.	4 Intensity can be communicated by colour and patterns in packaging.	4 Intensity can be communicated by colour and patterns in packaging.	4 Intensity can be communicated by colour and patterns in packaging.	5 Intensity can be communicated by cheese rind and packaging.
It provides a rich opportunity to interact.	2 There's no opportunity for the consumer to explore and understand the object. There are no interesting actions in between opening the packaging and eating.	4 The way to open the packaging provides a certain level of interaction. Different actions need to be realized to consume the product.	5 The packaging and the different substances contained provide a rich opportunity to interact by discovering.	2 There's no opportunity for the consumer to explore and understand the object. There are no interesting actions in between opening the packaging and eating.	5 It provides an interesting opportunity to interact from the encountering by understanding how to open the packaging, discovering each individual component and rearranging if desired. Also provides a rich sensorial stimulation due the cheeses are completely exposed to the consumer.
It informs about the connection between sheep cheese and New Zealand.	1 This can be hardly informed using this design, not even using information printed in packaging because space is reduced.	3 Can be communicated through packaging and information.	3 Can be communicated through packaging and information.	5 Can be communicated through packaging and possibly by applying colouring and pattering over the rind.	5 Can be communicated through packaging and possibly by applying colouring and pattering over the rind.
It can be easily massive produced.	2 It is possible, but complex because of the cheese shape.	3 It is possible, but difficult.	5 It is possible.	5 It is possible.	5 It is possible.
Total points	18	25	30	30	35
% of fulfilled requirements	51	71	86	86	100

Appendix 6. Product color refinement.

Figure 134. Felling I would like to communicate through colour. Original, 2017.

Figure 135. Looking for yellow colour tone Original, 2017.

Figure 136. Looking for purple colour tone. Original, 2017.

Figure 137. Matching box, foil and rind colours. Original, 2017.

Figure 138. Matching box, foil, rind and paper shell colours. Original, 2017.

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Human Ethics Notification - 4000018040

humanethics@massey.ac.nz <humanethics@massey.ac.nz> 27 de junio de 2017, 23:54
Para: A.Lindsay@massey.ac.nz, Pilar.Fallas.Rodriguez.1@uni.massey.ac.nz, M.N.Siljee@massey.ac.nz
Cc: M.E.Thomas@massey.ac.nz

HoU Review Group

Ethics Notification Number: 4000018040
Title: Cooking and tasting workshop: Assembling food ingredients to build a plate.

Thank you for your notification which you have assessed as Low Risk.

Your project has been recorded in our system which is reported in the Annual Report of the Massey University Human Ethics Committee.

The low risk notification for this project is valid for a maximum of three years.

If situations subsequently occur which cause you to reconsider your ethical analysis, please log on to http://rims.massey.ac.nz and register the changes in order that they be assessed as safe to proceed.

Please note that travel undertaken by students must be approved by the supervisor and the relevant Pro Vice-Chancellor and be in accordance with the Policy and Procedures for Course-Related Student Travel Overseas. In addition, the supervisor must advise the University's Insurance Officer.

A reminder to include the following statement on all public documents:

"This project has been evaluated by peer review and judged to be low risk. Consequently it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research.
If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Dr Brian Finch, Director (Research Ethics), email humanethics@massey.ac.nz. "

Please note that if a sponsoring organisation, funding authority or a journal in which you wish to publish require evidence of committee approval (with an approval number), you will have to complete the application form again answering yes to the publication question to provide more information to go before one of the University's Human Ethics Committees. You should also note that such an approval can only be provided prior to the commencement of the research.

You are reminded that staff researchers and supervisors are fully responsible for ensuring that the information in the low risk notification has met the requirements and guidelines for submission of a low risk notification.

If you wish to print an official copy of this letter, please login to the RIMS system, and under the Reporting section, View Reports you will find a link to run the LR Report.

Yours sincerely

Dr Brian Finch
Chair, Human Ethics Chairs' Committee and
Director (Research Ethics)

Appendix 8. Participant consent forms