AVIUM

School Of Industrial Design
bachelor project by Camilla Tarandi

LUND UNIVERSITY

Avium. *Camilla Tarandi*

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Degree Project for Bachelor of Fine Arts in Design, Main field of study Industrial Design, From Lund University School of Industrial Design, Department of Design Sciences

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ABSTRACT

The focus of this project has been to create a product that can make us feel closer to nature. Avium is an aroma diffuser in which you use local plants instead of essential oils. It uses the same kind of process that is used when producing essential oils but it releases the fumes directly into the room instead of condensing it. The idea is that instead of buying essential oils in the store you will go out in nature and pick flowers. By being a part of the entire process the user will learn more about the plants and their health benefits. Hopefully, this will give the user a greater understanding of the local plants.

SUMMARY IN SWEDISH

Fokus i projektet har varit att designa en produkt som kan få oss att känna oss närmare naturen. Avium är en aroma diffuser där man använder lokala plantor istället för eteriska oljor. Avium använder samma typ av process som används när man producerar eteriska oljor men istället för att kondensera ångorna, släpper den ut dem direkt i rummet. Idén är att man, istället för att köpa eteriska oljor, ska gå ut i naturen och plocka blommor. Genom att vara en del av processen kommer användaren att lära sig mer om växterna och deras hälsofrämjande egenskaper. Min förhoppning är att det kommer att ge användaren en större förståelse för lokala växter.

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INTRODUCTION

The project started as a reflection of my exchange semester in Vancouver, Canada. I went on hikes where I learned more about the indigenous people living in the area and their way of seeing nature.

"While the harvesting of wild foods is not new on the West Coast, the European concept of wild foods and wilderness certainly is. In fact, there is no word for wilderness in the Nuu-chah-nulth-language, the closest translation is waly-uu, which means home." Rainforest Education Society, district of Tofino

What I learned on these hikes made me reflect on the European way of seeing and treating nature. I realized that we have lost our connection to nature and at the same time a lot of the knowledge about our local plants has been forgotten. We spend so much time indoors or in urban areas that it has become the new normal. At the same time, more people feel depressed and stressed. By integrating nature more in our everyday life, I think that people would feel more in balance. In this project, I have searched for a way to help people get more connected with nature.

A STRESSFUL SOCIETY

Today, a lot of people are suffering from mental health issues. According to the Swedish public health authority, around every third woman and every fifth man in the age 16 - 29 in Sweden, have problems with their mental health. And about a fifth of the population says that they have been diagnosed with depression in their life.[1] The pressure to achieve at work as well as trying to maintain a rich social life in the free time gives no space for rest. Stress has been essential for our survival on the savannah when we got threatened. Even if we do not live on the savannah anymore our brains still work in the same way. It has not adapted to this way of living. And when we get stressed the body reacts as if you would have to run from a lion on the savannah. [2]

1 Folkhälsomyndigheten, Livsvillkor & levnadsvanor, Psykisk hälsa och suicidprevention, Statistik psykisk hälsa

2 Expressen, Överläkaren: Träna rätt för hjärnan och minska stressen, V. Petersson

HOW NATURE CAN HELP

As we are built for a life in nature, we should try to integrate it more in our everyday lives. Our brains are not adapted to the way we are living today. It is used to react to the dangers on the savannah. This is why a walk in nature can make us feel calmer. It reminds us of the habitat we were developed in. Our senses are more equipped to read the information you find in nature rather than in the city. So the brain will get more rested when you are out for a walk in the forest rather than in urban areas. Tests have shown that being in green spaces, even just in parks within the city, has a calming effect on the body. It is especially the aromas from the plants and the trees that help against stress.[3]

3 Reduction of physiological stress by urban green space in a multisensory virtual experiment, M. Hedblom, B.Gunnarsson, B. Iravani, I. Knez, M. Schaefer, P. Thorsson, J. Lundström

THE FRAGRANCE OF NATURE

That the natural aromas can help you feel calm, is something that I wanted to focus on in this project. There are already diffusers that spread aromas in the room. They do, however, seem detached from nature as many of them only use oils from the plants to spread the aroma. I wanted to find a way to bring nature more into this process so you feel a stronger connection to nature at the same time. You get more knowledge about the local plants as well as a more calm lifestyle.

BRIEF

Design an aroma diffuser that can help the user feel closer to nature as well as educating the user about the health properties of local plants and when in use, spread healthy fumes in the room using fresh plants.

RESEARCH

My main goal with the research was to find how the fragrance of plants can affect our feelings. This led me to look more into essential oils and their health properties.

ABOUT ESSENTIAL OILS

Looking into ways of integrating nature in our everyday life, I started to do research about essential oils. These oils can be extracted from different parts of the plants and can be described as a concentrated version of the plant. They get the fragrance and the health benefits from the plant they are extracted from. That is why people have been extracting essential oils for thousands of years to use as both perfume and medicine. Today they are commonly used in skincare products, perfume but also for aromatherapy. Many people use them in aroma diffusers which is a good and easy way of getting a higher air humidity as well as getting the good health benefits of the oils. The most common way to extract oils is through steam distillation. The plants would then be separated from the water and steamed to extract oil. Another way to extract the oil is through hydro-distillation where you place the plant parts in water and heat up. This requires more time, water and heat than steam distillation. You can also use a press to extract oils from, for example, lemon peel. [4]

4 Medical News Today, Everything you need to know about essential oils, J. Johnson

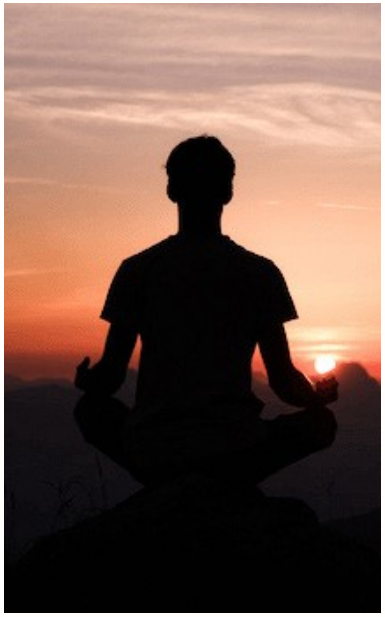
DISTILLATION PROCESS

The extraction process, that I have chosen to work within this project, is steam distillation as it is the method that is most suitable for extracting oils from flowers and smaller plants. Steam distillation is one of the oldest methods known to extract essential oils. This procedure consists of heating up water so that the fumes will rise to the plants where the steam vaporizes the lighter chemicals that are contained in the plant. The fumes will then go through a cooler that will condense the fumes. The liquid that comes out will consist of a small part of essential oils and a large part of a substance called hydrosol. Hydrosol is also known as floral water and is also used in the beauty industry. One of the most popular hydrosols in the market is rose water. This process takes a few hours and the exact time depends on the type of plant. [5]

5 The World of Aromatherapy, NAHA Women of Aromatherapy, Frog Ltd, 1996, s.16

SIMPLIFYED PROCESS

My idea was to make a more simplified process so the user would not need to spend hours and buy a lot of tools in order to extract the essential oils from local plants. I wanted to design a product that would vaporize the oils in the plants and let it out directly into the air instead of condensing it and separating the liquids. This can be seen in the illustration to the right. The fumes that would come out of this would be a mix of vaporized oils and water.

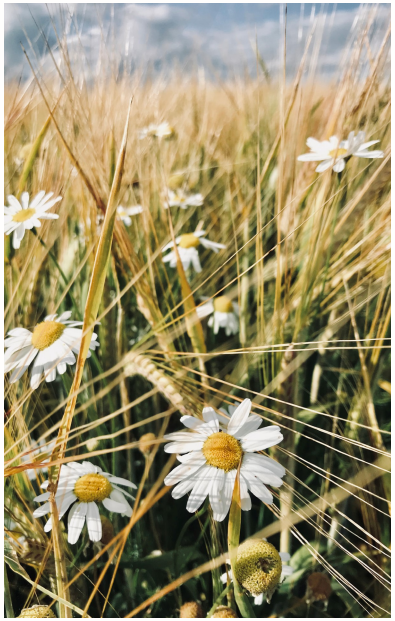


TRADITIONAL USE

Traditionally you buy essential oils that you dilute in water and heat up until the fumes spread in the room. My idea is that you will go out and pick medical plants and then heat them up in a similar way and then let the healthy fumes spread in the room. Instead of buying a bottle of oil, you will have to go out and pick the plants that you need. This would give you a greater knowledge of the properties of the plant. And it is also a connection to the way you historically produced the oils when people did not have ready-made oils they could use. The product is traditional in a modern way. Aromatherapy in the traditional way makes sense in the countries where you have the plants that you use for these oils. But when it is possible, you should use local resources instead of shipping traditional products across the globe. Something that seems unnecessary as we have so many great local medical plants with similar qualities here in Sweden. We are just not used to use them in this way. That is why a new product is needed in order for people to see these fantastic possibilities.

DESIGNING A FEELING

I wanted to design a device that would activate senses other than just smell. By using all our senses, chances are that you would feel things more strongly. By going out to pick plants you will get the sense of touch and also a visual image of the plant that you will not get from using oil. I think that this will enhance the experience and give the user a healthier lifestyle. Also, the physical activation and being surrounded by nature will have a calming effect. So instead of making a diffuser that would use essential oils that are shipped from other countries, I want people to go out and learn about our local plants and their health benefits. If you want to get calm you can for example pick lemon balm, chamomile, rose or lavender. And if you want more energy you can pick rosemary, thyme, basil or pine. The fumes from the plants together with a walk in the fresh air will help to gain more energy or to relax after a stressful day.



THE HEALTH PROPERTIES

We have many medical plants around us. Both wild and in our gardens. They have many different properties so there is definitely one for every need. Here are some examples of plants you can use in the device as well as some of their properties.

One of our most common medical plants is rose. It has been proven to reduce anxiety, depression, stress and pain. According to studies, rose oil stimulates the body to release dopamine which has a great impact on our well being and can help us feel happier and calmer. [6]

Rosemary is another common medical plant and the oil has properties such as helping mental focus and memory as well as being anti-inflammatory. [7]

6 Healthline, The Benefits of Rose Oil and How to Use It, R. Stanborough

7 BBC News, What does rosemary do to your brain?

Another great plant to use is chamomile. You would extract the oil from the flowers of the plant. The properties of the chamomile oil are anxiety relief, anti-inflammatory, pain relief and it's also good for your sleep. The best time to use chamomile is before you go to bed.[8]

The pine essential oil is extracted from the pine tree needles and it will create a strong woody aroma. The oil can be used to be uplifting and anti-inflammatory.[9]

8 Healthline, The 8 Proven Benefits of Chamomile Oil and How to Use It, J. Seladi-Schulman

9 Healthline, What You Need to Know About Pine Essential Oil, K. Cherney

Marjoram is another medicinal plant that has proven pharmacological properties and it has long been used as a treatment for a variety of diseases as alternative medicine. It is the flowering stems that hold the medical properties. It is antioxidant, antiproliferative, antibacterial, hepatoprotective, antiulcer, cardioprotective, anticoagulant, anti-inflammatory, and antifungal. Majoram is mostly used to aid digestion. So it would be good to use it after dinner to help the body to digest.[10]

Lemon balm can help release pain and help with anxiety and depression.[11]

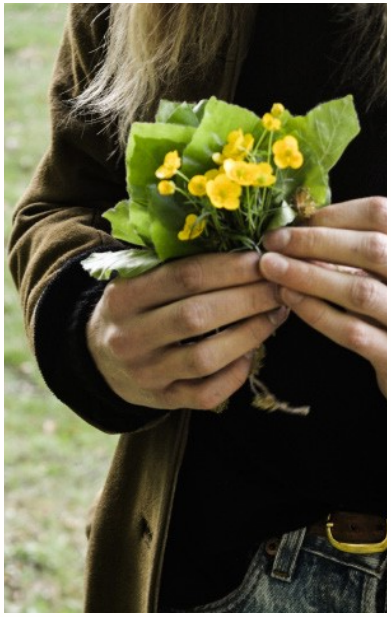
10 Sweet Marjoram, A Review of Ethnopharmacology, Phytochemistry, and Biological Activities, F. Bina and R. Rahimi

11 Healthline, 10 Benefits of Lemon Balm and How to Use It, E. Cronkleton

HARVEST OF FLOWERS

To harvest flowers might seem like an easy task. What many people do not know is that there is an entire science behind the flower harvest. You want to harvest the flowers during a time when there are as much essential oils as possible in the flower. The harvest time differs depending on the plant but you can sense it yourself because it should be done when the flower is the most fragrant. To be able to extract the highest amount of oil, you have to know a bit about the plant. Perhaps you have noticed that the flowers smell varies in intensity during the day. Some flowers are fragrant at night and others during the day. The reason why the flower fragrance will be less intense during a part of the day is that the oil is going back into the stem. This mechanism can keep the plant protected from dehydration during hot days. During the night when the temperature cools, the oils will get back to the flowers and make them more fragrant.[12] Honeysuckle is an example of one of our local flowers that are fragrant during the night. This fact makes it important to be alert on the plant's behavior when you pick them. You have to go out and smell the flowers to determine when it is the best time to pick them. It is meditative and forces you to be present in the moment.

12 Ylang ylang - the "flower of flowers", G. Young



TARGET GROUP

In my project, I have tried to affect the use of aromatherapy in Swedish everyday life. There is a strong tradition around aromatherapy which makes it hard for me to reach out to users that already have established their way of using aromatherapy. But I can design an alternative solution for how the different steps and the rituals could be done in a more Scandinavian way. I would then reach out to Swedes that are interested in natural healthcare, something that attracts more and more people. As people are getting more stressed, we are reaching out to find different solutions to get a more balanced and healthy everyday life. My main focus has been people in the age 16 -29 as this group is the one that is most stressed.

ON THE MARKET

There are a lot of different diffusers already on the market, however, I could not find one that uses fresh plants to spread aromatic fumes in the room. But something that is commonly used is dried lavender or other flower petals that you keep in small bags to give an aromatic smell to for example clothes. It is not seen as a diffuser though as they do not create any mist. But it does however spread a small part of essential oils to the cloths. But with a diffuser, it would be spread more effectively to the entire room. Another common product that spreads essential oils without being an actual diffuser, is cedar blocks. You can use fresh cedarwood to get rid of insects that otherwise could damage your clothes. It is the essential oil in cedar that repels many of the moths that would otherwise destroy the clothes. The nice smell is just a bonus.

DIFFUSERS

There are many diffusers on the market varying in design and prize. The cheapest ones costs around 150 kr but the more advanced ones can cost up to 2500 kr. The more expensive ones usually include other functions like light or speakers.

There are diffusers that use water to spread the aromas in the room. They also require electricity to work. Ultrasonic diffusers use a high-frequency vibrating diaphragm that is made from either ceramic or metal and produces a fine mist that is spread in the room. This vibrating diaphragm sits on the surface of the water where it churns the water at a high frequency to create small droplets that are then blown into the air using a fan. An ultrasonic humidifier can create a cool or warm mist. An evaporating humidifier uses an absorbing material that is dipped into the water. A fan then blows through the material creating a mist in the room. These diffusers can be found in a lot of different shapes and materials. The most common ones have an outer shell made out of plastic. They often also have some kind of light function.[13]

13 The spruce, Ultrasonic vs Evaporative Portable Humidifiers Comparison Guide, M. Mifflin

Something that is common on the market is reed diffusers that use long sticks to spread the aroma in the room. The sticks absorb the scented oils and release the fragrance to the room. Unfortunately, most of the oils that are used in these types of diffusers are synthetic. These oils do not have the good health benefits that the essential oils have and could actually harm your health by causing allergic reactions

Then there are candle diffusers. These usually have a small bowl at the top. This part will be filled up with a diluted mixture consisting of water and essential oil. Then a candle will be placed underneath this bowl and condense the liquid. This is the type of diffuser that I wanted to continue to develop as it does not require any electricity.

IDEATION

I wanted the product to fit into a modern Scandinavian home. So I wanted the design to be very light and be made in natural and clean materials. It should be pleasant to look at so that you can have it in the room even when it is not in use. The feelings that I want to show in the mood board is calmness and lightness.

TESTING

I tested the concept by placing a bowl of water and a separated part with plant parts over a candle to see if a candle would produce enough heat to work as intended. This also worked well and after a while, I could see steam coming from my test bowl. And the smell of lavender, which I used as a test plant, spread a wonderful fragrance in the room.

FRAGRANCE TEST

TESTING CONCEPT

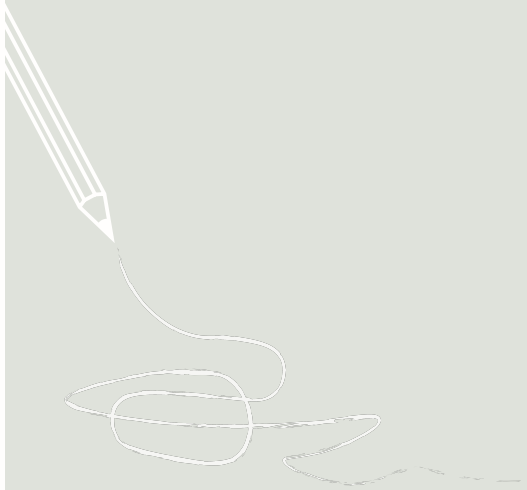
FRAGRANCE TEST

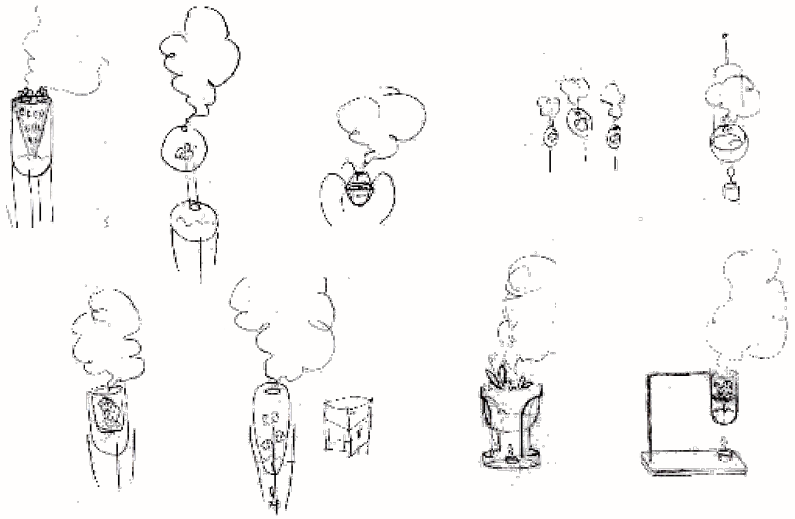
I also tested how the smell changed when flowers were steamed to see if it was a reasonable amount of time you had to wait before sensing the flowers. And you could actually sense the aromas already after five minutes. The intensity of the smell was depending on the type of plant that was used. For roses, the smell got intense after about ten minutes and lasted for about half an hour. It had a really pleasant aroma. Like roses during a hot and humid summer day. But after this half-hour, the fragrance, as well as the appearance changed. It smelled less of rose and more like green plants, like cut and steamed grass or leaves. This started happening at the same time as the flowers started to lose shape and color. The green smell got more intense with time and after about one hour the grass and leaf smell takes over entirely. Something I realized when I did this test, was that it would be nice to show this whole process the plants go through when you extract the essential oil. And perhaps you can appreciate the delicate drops more than if you buy them in a store.

For lavender, the aromas were more instant. And it did not change as drastically as the rose aroma. It had a more constant lavender smell. The same thing happened with thyme. It just created this relaxing aroma that made you think of a spa.

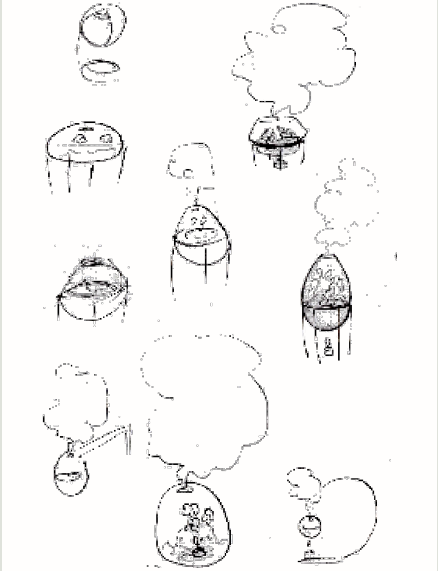
FIRST SKETCHES

Knowing the different parts of the process, I needed the device to have certain properties. It had to have a heat source as well as being made out of material that could stand the heat. It also had to have a place to keep water that would be placed in a way that would enable the heat source to reach it. There also had to be a part to keep plants that would enable the steam to boil them before going out into the room. And of course, also holes to let the fumes out. With this in mind, I created theses first sketches.





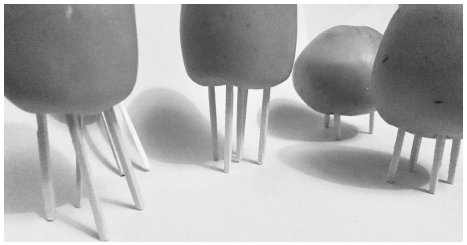
I started to work towards a drop-shaped device as it is good to have the shape a bit closed so the steam would not just go out directly but stay inside long enough for it to heat up the plants. I started exploring different variations of this shape and tried to find one that would look light.



The next step was to explore the size more. The device would have to be big enough to contain a good amount of plant parts but small enough for the user to not find it bulky. To get a better understanding about the shape and volume the device would have, I had to turn these sketches in to physical mockups.

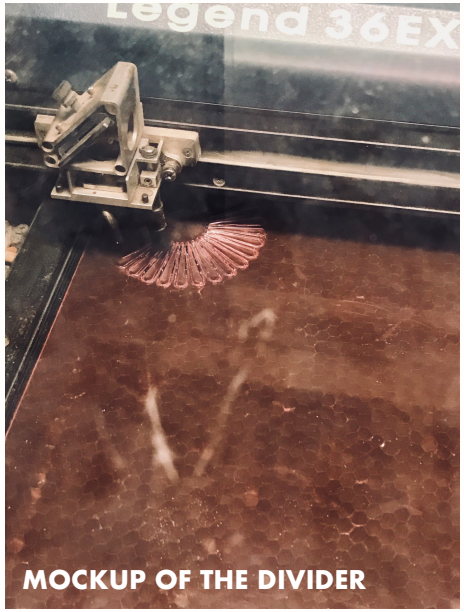
MOCKUP

To be able to decide the size and shape of the product I made mockups. I then made user tests where people got to hold foam models in different sizes and give comments. Both on the shape, if it would be something that they would want to have in their home, and if it was nice to pick up.

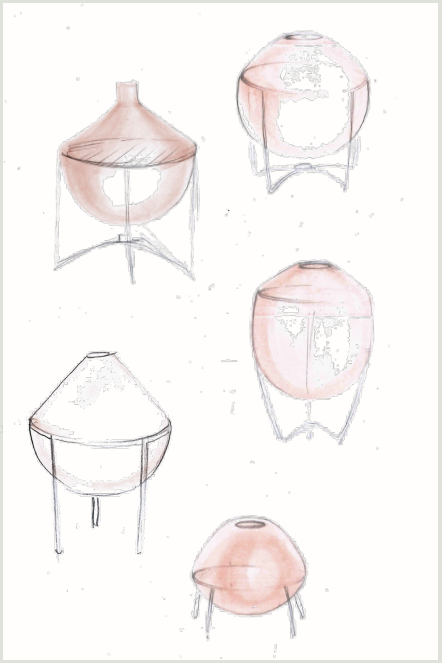


THE PERFECT SIZE

TESTING ORGANIC SHAPES

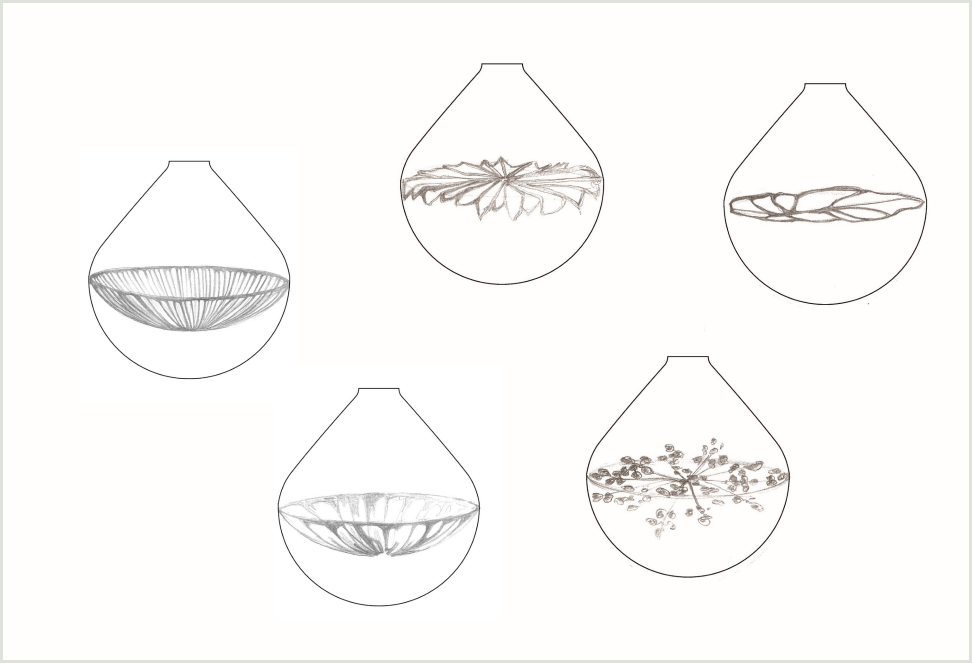


MOCKUP OF THE DIVIDER



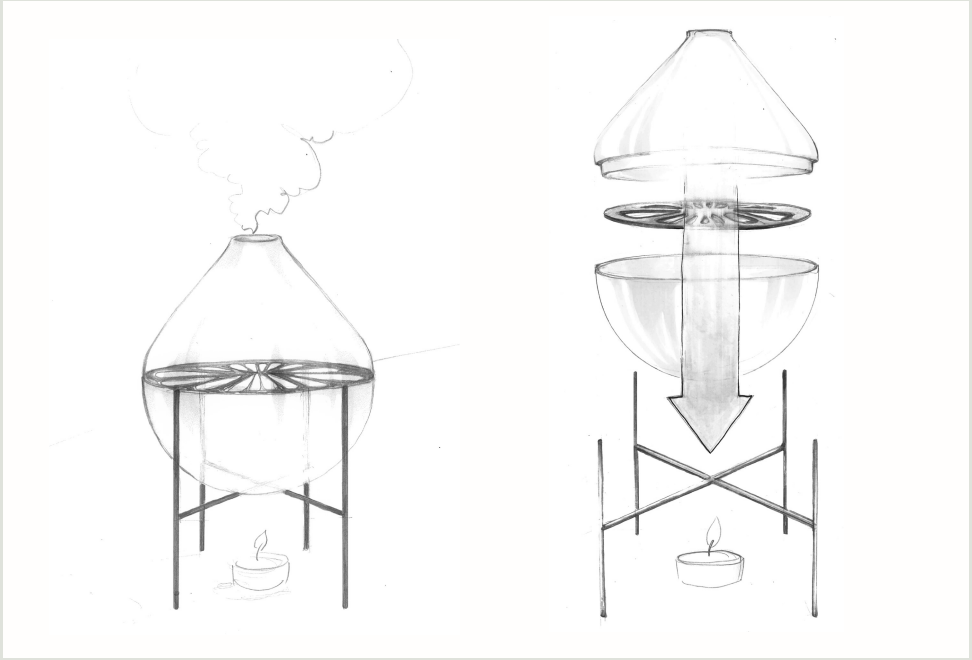
SKETCH THE SHAPE

After some quick mockups to check size and shape, I decided to go more towards a drop-like shape with a construction underneath that would hold the heat source.



FINAL SKETCH

I chose to go through with this design as it would be easy for the user to assemble it as it only consists of five parts. I also decided to go with a minimalistic design for the divider as the plants should be the main focus. The candle is also detached from the device to make it more multifunctional. Then you could also use the device as a vase when not in use.



BRASS

MATERIALS

I chose to use glass as the main material in my device. The reason is that I wanted to make it possible to see the entire process from plant to fume. You will be able to see the transition the plant goes through. The glass will also get covered by condensing so the plants will not be visible at the end of the process when the plants are not as aesthetically appealing as they were in the beginning.

I had a few possible ideas of materials to use for the structure and the divider. Either to have it all in glass or in metal. I also had an idea of using a Himalayan salt rock as a divider as it can help to cleanse the air. But as it is not anything that you can source locally I decided to not continue with that idea. Another idea that would seem more fitting would be to use local pinewood as you can use it to make essential oils. The oils from the wood would then also be extracted during the distillation process. In the end, I decided to use metal because I wanted the focus to be on the plants that you pick yourself and also to have a material that would give some contrast to the glass.

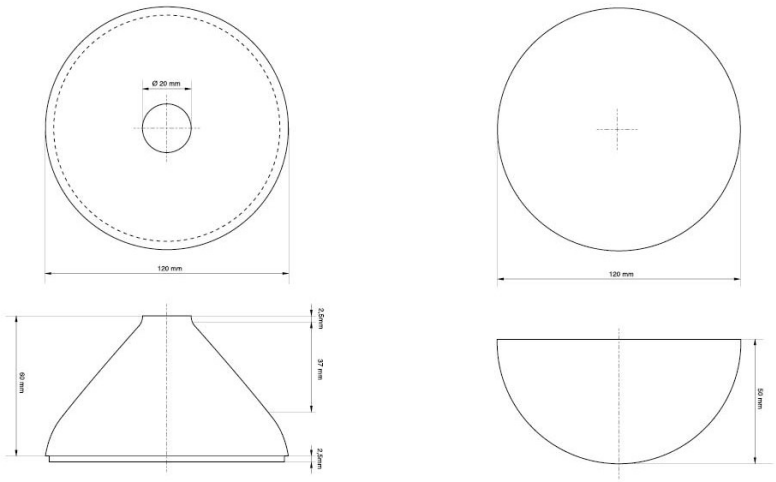
FINAL DESIGN

The final design is an aroma diffuser in which you use local plants instead of essential oils. It uses the same kind of process that is used when producing essential oils but it releases the fumes directly into the room instead of condensing it. The idea is that instead of buying essential oils in the store you will go out in nature and pick flowers. By being a part of the entire process the user will learn more about the plants and their health benefits. Hopefully, this will give the user a greater understanding of the local plants.

PROTOTYPE

To be able to create a prototype in glass I reached out to local glass producers and got in touch with Lars Andersson at Kosta Glascenter. He could also guide me through the process of how to create a product in glass. In order to get my two pieces of glass to fit together, I would have to make glass molds. To make a durable mold I was told to use a fresh piece of alder wood as this would create the most durable mold. Unfortunately, I was unable to get one at that time so after consulting with Lars I used pieces of ash wood instead. This would make the mold hold for about 50 pieces at least. And that was more than enough for this prototype as I would not mass produce it.

The molds were made using the CNC-mill and consisted of three pieces. A two-piece mold and a single-piece mold. I attached a hinge on the two-piece mold to make it easy to open and close during the glassblowing process. Air holes were also added in the bottom of the molds so the air would not get trapped when the hot glass mass was blown into it. This could otherwise result in deformation of the glass. It was also important that the wooden molds would lie in water during the night and be carried, wrapped in plastic to ensure that they would not get dry on the way. Otherwise, the molds would burn when adding glass mass.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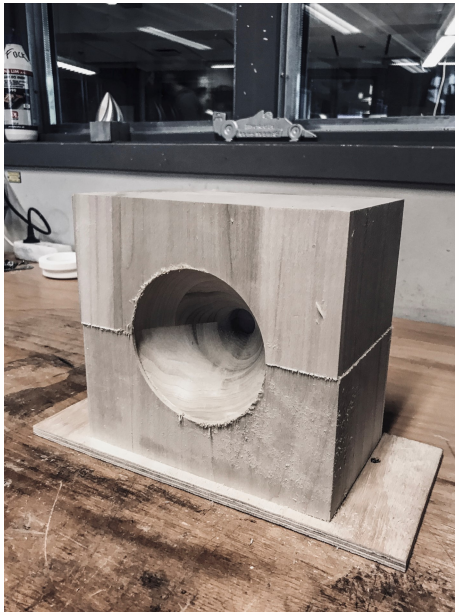
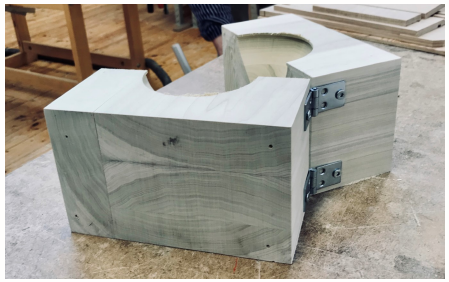
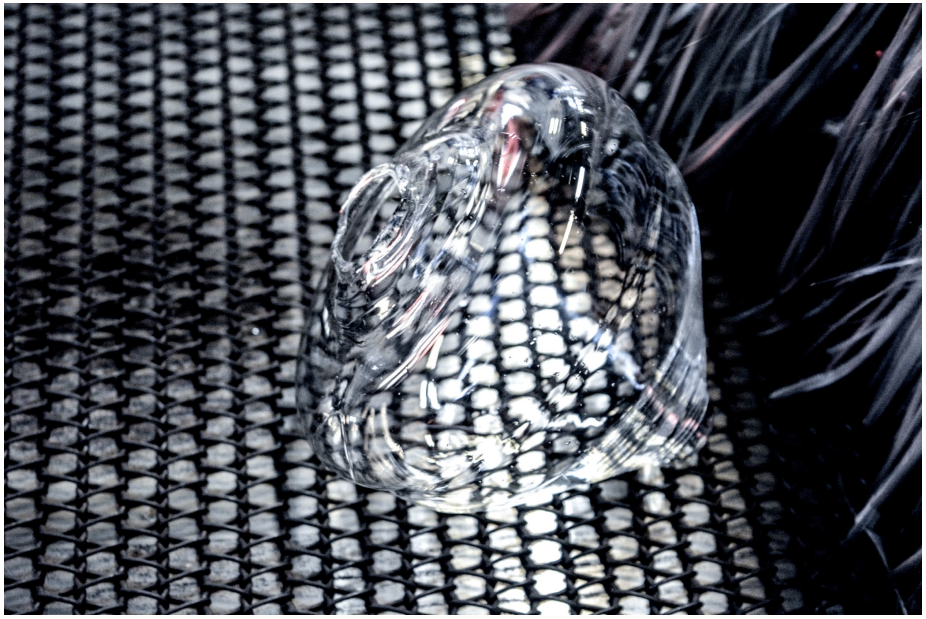




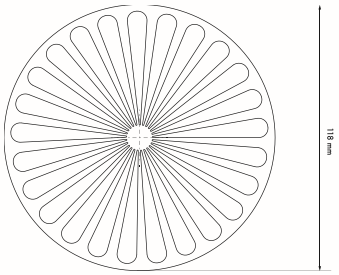
GLASS PRODUCTION

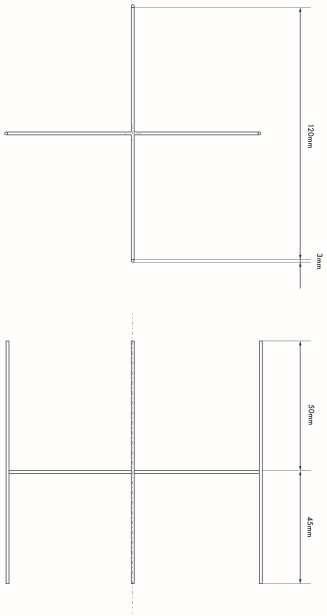
I arrived at Kosta Glascenter where I met up with Lars who prepared my molds by setting them on fire with glass mass. By doing that you prevent the glass from getting discolored. During the glassblowing process, I assisted Lars by getting tools and throwing water on the hot molds. And after the glass pieces went through a cooling machine I could take my pieces down to Kosta Boda's glass workshop. Here I got help to cut and sand the pieces after my preferences. Unfortunately, Lars had made the glass too thin which resulted in many shattered pieces. And the hole in the top was a lot harder to do than anticipated which also led to a lot of broken glass. When I went home after this day, I only had one very thin prototype in my bag. I did not feel that it would work to use in the final prototype as it would be too fragile. After a conversation with Lars, he managed to create new pieces for me. The only downside was that I could not tell exactly how I wanted my pieces to be cut, so they did not turn out exactly as in my technical drawings. But the pieces did fit together which meant that I could try out the concept. And I also had a 3D-model that I could render to show the shape of the final design more precisely.



LEGS AND DIVIDER

The brass construction was made with 3 mm brass bars that I soldered together with tin solder. This meant that the soldered part would get a different color than the rest of the constructions. To make it in a different way was not possible with the tools that I had. If produced for the market this part would be produced in a different way.



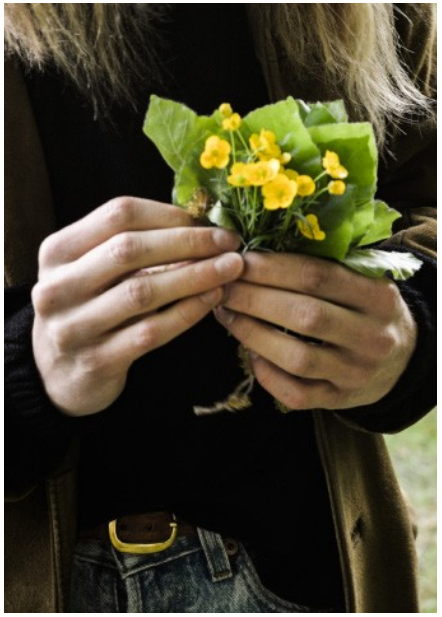


MASS PRODUCTION

Working in glass can be a bit tricky. From the start, I didn't know that it was hard to make two handblown pieces to fit together. That only about 10 % would actually fit together. So if I would have produced the pieces for the market I would have had them made as laboratory glass instead to make the pieces more precise and at the same time, more resistant to heat. But that would also make the product more expensive to produce.

FINAL RESULT

The final product is a diffuser that can help us find balance in our everyday lives and bring us closer to nature by teaching us about the properties of our local plants. Avium is something more than just a product, it is a ritual. The user will hopefully get more present and start going on more walks in nature and get a better understanding of how the body reacts to certain plants. Avium allows nature to take a greater part in our life. We are more equipped for a life in nature, and it is time that we start to acknowledge that.



ANALYSIS

During this process, I understood that nature is even more important for our wellbeing that I knew from the start. The result being, not just any product but a device that would encourage physical activation, give out healthy fumes as well as giving the user a better connection to nature. This product would be a good start to a healthier lifestyle. By making flower picking and distillation into a daily ritual the user would get healthier habits and would hopefully a less stressful lifestyle.

DISCUSSION

One concern that I had during the process was that I don't want to do anything that could harm the natural balance. As there are protected plants and areas in our nature, the user has to be aware of these to not damage our ecosystem. One solution could be to create a thorough guide of which plants that are okay to use and how to behave in nature.

FUTURE DEVELOPMENTS

The next step for me would be to properly try out this device, with glass that can handle heat more than the ones created for the prototype. I would also like to test how effective the diffuser would be to spread essential oils in the room in order to compare the result to the diffusers that use essential oil. I would also consider changing the construction holding the glass to make sure that the soldered part will not be right above the heat source.

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