ACONCAGUA VISION

Anexo III PP 01 R00

ENVIRONMENTAL MANAGEMENT MANUAL

LET'S GO WITH GOOD ENVIRONMENTAL PRACTICES!

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Our Environmental Management Manual is intended to inform you about the guidelines, procedures and good practices that we must carry out for the conservation and sustainable management of the environment where we operate, promoting the development of sustainable tourism.

You will find explanations of each type of waste, its classification, management and treatment. We also present various strategies and guidelines for safety and hygiene in the different areas where we carry out our activities. We unify criteria regarding waste management at all stages: **generation, collection, transportation and final disposal**, in accordance with current environmental legislation and good environmental and hygiene practices.

We want to raise awareness about the importance of changing our consumption habits and encourage waste reduction. To this end, we have implemented specific initiatives that promote a more responsible and sustainable behavior. In addition, we are continuously working to deepen the concept of sustainable tourism, which promotes long-term, ecologically responsible, economically viable and socially just tourism development.

ACONCAGUA VISION

CONTENT

01.

INTRODUCTION

TARGET

To inform and raise awareness among our staff, suppliers and clients about the guidelines, procedures and good practices that we must carry out for the conservation and sustainable management of the environment where we operate, promoting the development of sustainable tourism.

CHALLENGE

Our challenge is to promote efficient management of the waste generated by our activity through education and responsible practice of its classification, treatment and recycling.

OUR POLICY

Our policy is based on the following principles:

1. Promote the correct management of all waste.

Through environmental education, reducing its generation and promoting the most appropriate practices for its management.

2. Prioritize management options.

Starting with prevention, reuse, recycling and treatment and, as a last resort, disposal.

3. Assign responsibilities to all the agents involved.

In our service chain in relation to waste. Every waste generator is responsible, as a waste generator, for its correct separation at source, collection, transportation and final disposal. We assume the responsibility of advising, training, controlling and ensuring compliance with the waste management procedure for our staff and clients.

4. Provide sufficient infrastructure.

To ensure that waste is managed properly and, as far as possible, close to its place of generation.

To promote good practices in line with our waste reduction policy, we conduct an induction at the beginning of each season, committing all our employees to implement the practices detailed in the manual.

ENVIRONMENTAL DICTIONARY

Some definitions will be detailed below to align the vocabulary with respect to waste management:

disposal / *To discard.*

material generated as a product of different human activities and that is thrown away because it cannot be treated for recovery or transformation.

waste / *Noun.*

material or substance generated as a product of human activity that can be recovered and reused.

recyclable waste / *From lat. residuum recyclable.*

material that, once used, can be transformed into new products or materials.

integrated waste management system /

set of coordinated measures to ensure the integrated, safe and responsible management of all waste generated by our activity.

organic waste / *From Latin residuum organicum*

biological waste from uncooked food leftovers and from pruning and maintenance of green spaces.

affluent / *Of influx and -nte; lat. affluens, -entis.*

residual water entering the treatment system.

effluent/ *From effluir and -nte.*

residual water coming out of the treatment system.

infiltration / *From in-[1] and filter.*

water ingress through the soil surface into the soil.

percolation / *From lat. percolāre.*

flow of water within the soil, through its porous regions.

aerobic process /

process that requires oxygen to carry out.

anaerobic process /

process that occurs in the absence of oxygen.

facultative process /

process that can occur with or without oxygen.

02.

RECYCLABLE WASTE MANAGEMENT

RECYCLABLE WASTE

Of the total waste we generate, approximately 50% can be composted and 25% recycled. For this to happen, our waste separation is essential. This will give value to the dry recyclable fraction, promoting its reincorporation as a resource within the production process and generating savings in both raw materials and energy resources. All this allows us to close the circular economy circuit.

Recyclable waste includes:

CLASSIFICATION

To classify the different types of recyclable waste, we will use garbage cans with specific colored labels to differentiate them:

Plastics and Metals → Yellow

Plastic bottles (except bottles that were used for fuels), containers, totes, bags, packaging, cans and metals.

Oil bottles can also be incorporated along with plastics.

**Nitrile or kitchen gloves used for cleaning toilets should be disposed of in the general trash.*

In order to guarantee a better transfer of waste, taking into account the care of the mules, metals and plastics will be packaged separately. To optimize this mechanism, kitchen managers should separate cans from plastics at source, i.e. the company's internal classification will be into metals and plastics separately. Metals will be placed in crates and plastics in plastic bins.

Paper and Cardboard → Brown

Paper, cardboard, newspapers, magazines, brochures, etc.

**Always clean.*

Glass → Blue

All glass, wine bottles, glasses, goblets, jars.

**Always clean.*

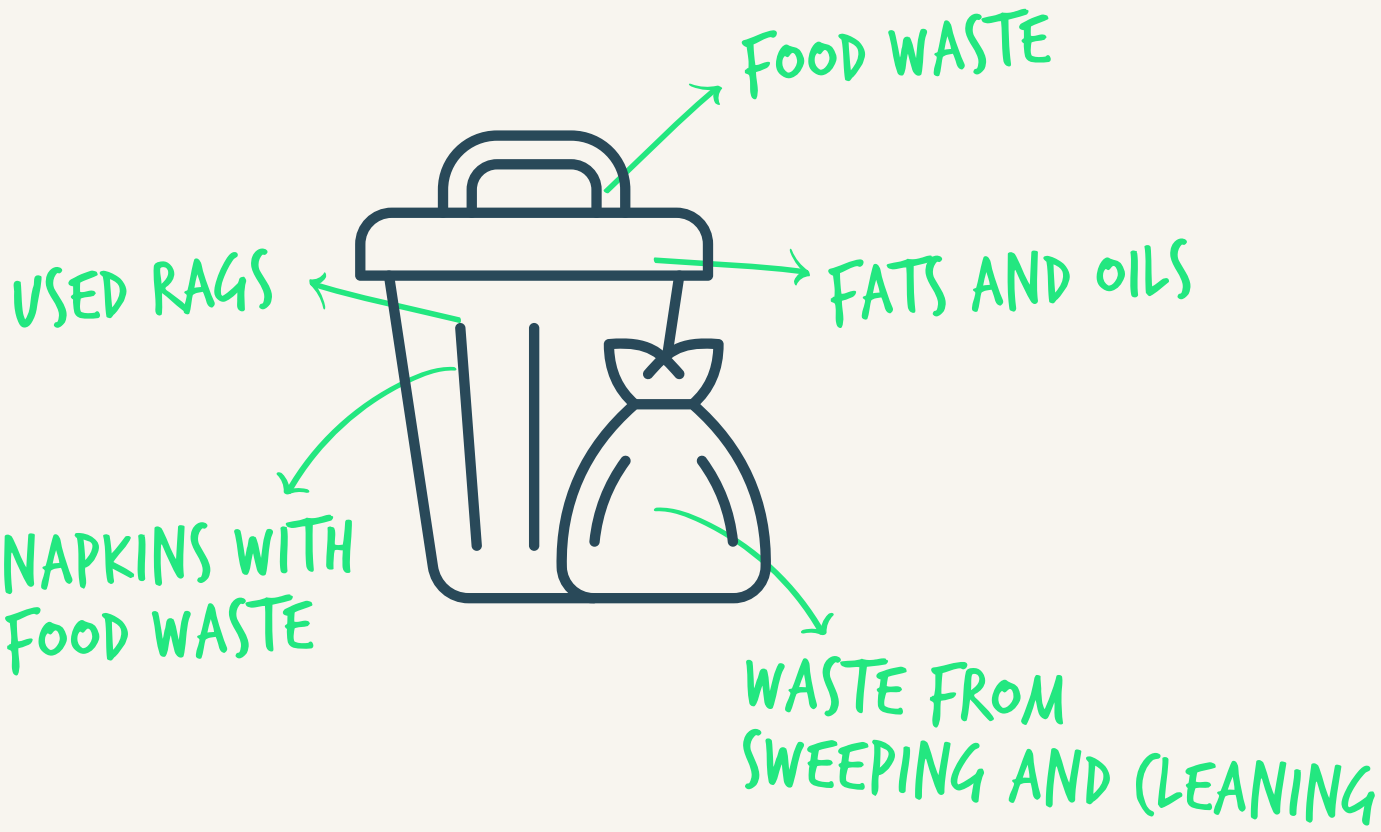
03.

NON-RECYCLABLE WASTE MANAGEMENT

NON-RECYCLABLE WASTE

In this manual we refer to non-recyclable waste as any material that cannot be composted or recycled and therefore cannot be treated for recovery or transformation and is sent to the landfill as a final disposal site.

Non-recyclable waste includes:



NON-RECYCLABLE TOILET WASTE

Garbage generated in the toilet will be considered non-recyclable waste.

These include:

USED TOILET PAPER AND USED WET WIPES

Waste generated from feminine hygiene (tampons, sanitary napkins) is considered pathological waste, so it is not disposed of in the general waste garbage can.

CLASSIFICATION

Non-recyclable waste will be disposed of in a black labeled “Trash” garbage can.

Non-recyclable waste from the restroom will be disposed of in a general waste garbage can located in the restroom.

Feminine hygiene products, which are considered pathological waste, will be disposed of in a red-labeled trash can.

- **General Garbage → Black**

  All material that cannot be composted or recycled.Cigarette butts should be deposited in a can with its corresponding “cigarette butt” indication. The cigarette butts are then discarded in “general garbage”, as there is no treatment for cigarette butts at present.

04.

ORGANIC WASTE MANAGEMENT

ORGANIC WASTE

Organic waste is waste of biological origin that is susceptible to biological transformation.

Organic waste should be discarded in a green container.

Organic Waste → Green

In this manual we will describe composting as the biological treatment modality.

What is composting? Why do we do it?

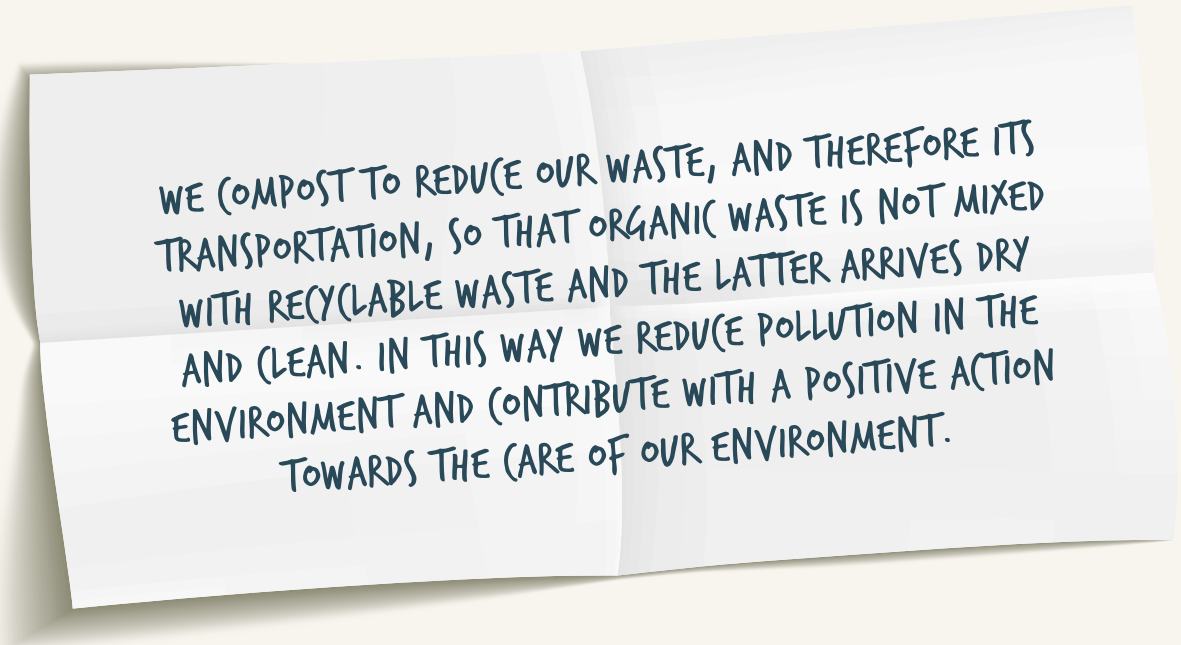
Composting is the natural and controlled process by which a biological transformation of plant remains occurs under aerobic conditions *(in the presence of oxygen)* obtaining compost as the final result.

Composting reduces the volume and mass of the waste, transforming it into usable material, which acts as a soil structure conditioner, helps to reduce erosion and collaborates in the absorption of water and nutrients by plants.

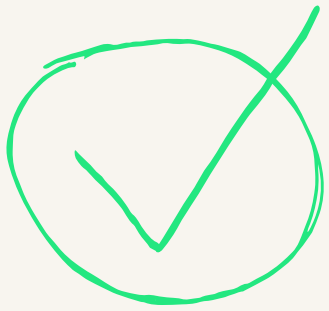
This process is carried out by micro and macro decomposing organisms such as bacteria, fungi, insects and earthworms present in plant remains, soil and environment.

Our main role is to maintain naturally favorable environmental conditions for the life of all these wonderful decomposing organisms.

Composting can be done on the ground or in compost bins. Here we recommend using compost bins for better control of the process.



COMPOSTABLE ORGANIC WASTE



Wet wastes

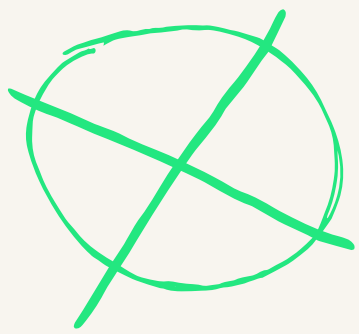
- Vegetable and fruit peels and scraps.
- Yerba mate, coffee, paper filters, tea bags *(only the bag, not the paper on top because it contains ink, which can be toxic for composting).*
- Citrus, yes or no? Citrus peels usually take longer to decompose because they have naturally bactericidal substances. To avoid such inconveniences, they can be added moderately, chopped and mixed with other waste.

Here, for practical purposes, they will be incorporated together with the rest of the organic waste.

Dry waste

- Shells of walnuts, almonds and other nuts.
- Dried leaves.
- Eggshells *(this is the only animal waste that is composted).*
- Ashes, yes or no? Ash results from the transformation of wood by the action of fire, so it is already “decomposed”. Ash is alkaline, so it could alter the process. It could be added but in small quantities.

ORGANIC WASTE THAT CANNOT BE COMPOSTED



- Leftover cooked food, dairy products, bones, leftover meat, fish bones, grease, oil.
- Dairy products.
- Bones, leftover meat, fish bones.
- Grease, oil.
- Cloths and napkins that have been used for cleaning (as they contain disinfectant chemicals that are not suitable for composting).
- Used napkins and paper with food residue and/or oils.
- Toilet paper, swabs, wipes, tampons and any item used for body hygiene.
- Cigarette butts.

START OF COMPOSTING

First of all, the bottom of the compost bin should be covered with material that allows aeration and does not become compacted. You can use remains of dry vegetation that may be in the place, dry soil with small pebbles, sawdust.

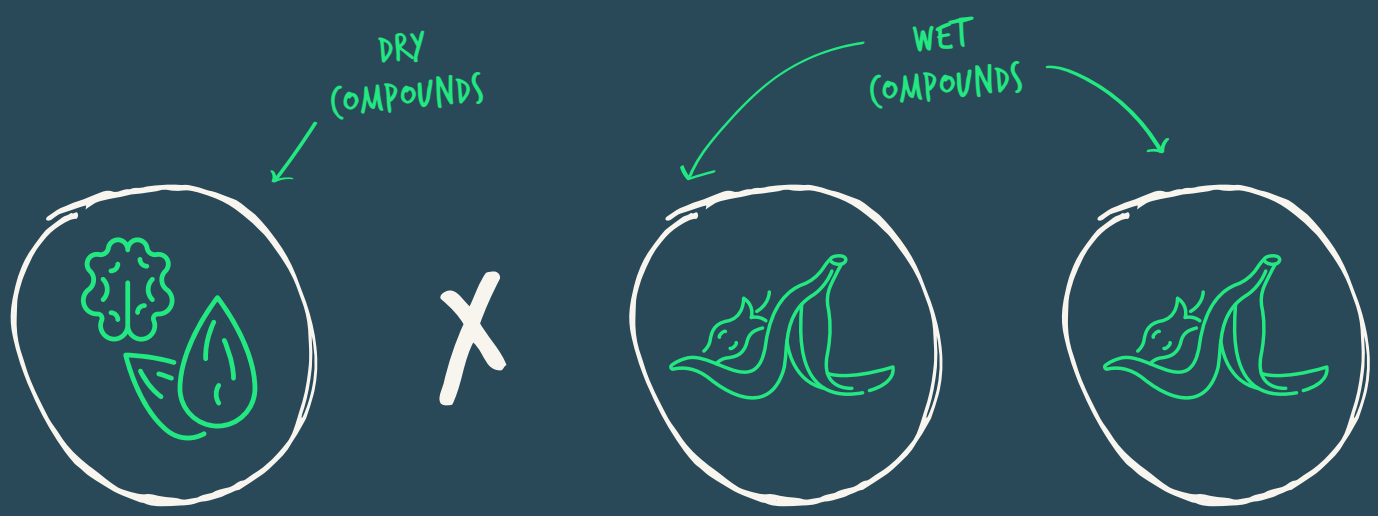
It is important to add soil from the site to provide decomposing microorganisms already present in the soil. It is added only at the beginning of the composting process. This bed should be of approximately 15 to 20 cm. Its function will be the aeration and entry of microorganisms to the composting process.

COMPOSTING CARE
THE 3 A's

- ✓ FOOD (/ N
- ✓ AIR
- ✓ WATER

FOOD C-N

Composting should be done with both wet and dry materials. Because of this it will be necessary to add sawdust when the material is very wet. Dry materials provide carbon (C) and wet materials provide nitrogen (N). These are necessary elements for composting organisms to grow, develop and reproduce. The proper C/N ratio is 1/2. That is 1 part dry compounds (carbon) to 2 parts wet compounds (nitrogen).



As far as possible and when the season allows, it is recommended to shred or cut the organic waste as small as possible. The smaller the pieces that we incorporate to the composter, the less space they will occupy, the easier it will be to stir the mixture and we will achieve a larger surface so that the microorganisms can act and the decomposition will be faster.

Whenever new material is added to the composter it will be necessary to turn it over to integrate all the material.

WATER H_2O

To control the humidity it is necessary to observe that the material has a humid aspect, but without releasing liquid. To do this it is necessary to monitor the state of the material at different points of the composter. It is common that the sides are dry due to the contact with the air, and the central part presents more humidity. The solution to this will be to turn the material to homogenize the proportion of humidity. If the material is dry throughout the pile, it will be necessary to provide external water. Otherwise, if it contains too much moisture, putrefaction of the organic residues will occur.

AIR O_2

The necessary element here is oxygen, which is present in the air. Good oxygenation through daily turning is key to the development of the organisms present in the compost and thus effectively decompose the organic matter. They need oxygen to live. Otherwise they die and colonize other microorganisms that live in less oxygen but generate bad odors.

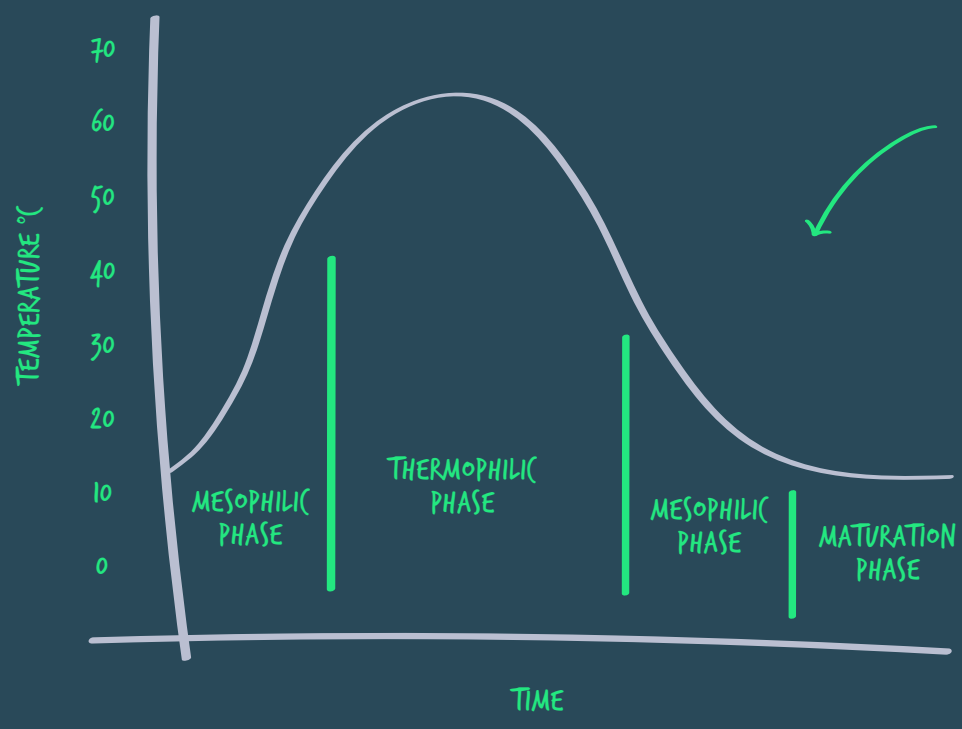
Another important factor to consider is temperature. Decomposer organisms also like to be warm. For this reason, the compost bin should be protected from sudden changes in external temperature and wind by keeping its lid closed and in a sheltered place protected from the wind. Composting must go through several temperature phases:

Mesophilic phase | The process begins with an initial mesophilic stage (20 to 25°C) where microorganisms that develop at these temperatures are active. This stage is relatively short (1 to 3 days), if the aeration and structural conditions are adequate.

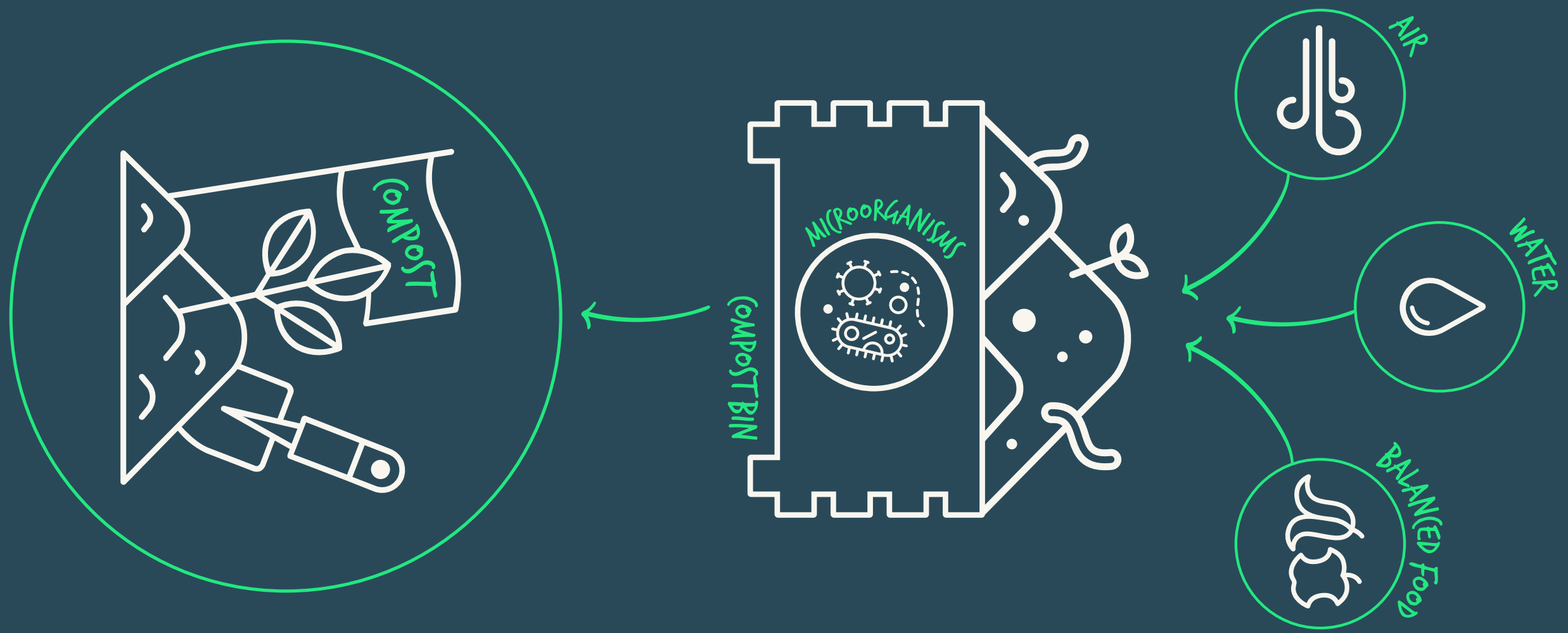
Thermophilic phase | At this stage the temperature is in the range of 45 to 75°C. Mesophilic microorganisms are replaced by thermophiles. In this stage, mesophilic pathogens, fungi, spores and most of the undesirable compounds or organisms are eliminated. ***This phase is critical for the sanitization of the material.***

Second mesophilic phase | This phase begins with a drop in temperature to below 40°C. Mesophilic microorganisms develop again, using the most biodegradation-resistant materials.

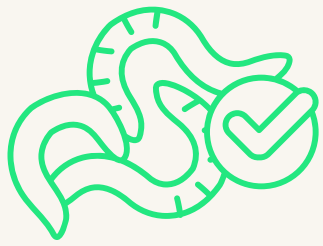
Maturation phase | Here the temperature drops to values close to ambient.



Proceso de compostaje



WORMS



Can we add worms to the process?

Of course we do! But we have to take into account some considerations.

Worms are excellent organisms that transform organic matter through their digestive system. For this, it is necessary that they can “eat” the organic matter, so it must be very well shredded or have undergone a partial composting process.

Another consideration is that earthworms work at temperatures below 35°C and they like humidity very much (between 70 to 90%). Therefore, it is necessary to maintain these conditions in the process.

Because of this, it is recommended to first start the composting process prior to the addition of the worms. They can be incorporated after the thermophilic stage has occurred, i.e. after the compost pile has reached its maximum temperature period.

COMPOSTER

All organic waste generated in the different camps will be composted at the Puente de Inca camp through the use of compost bins.

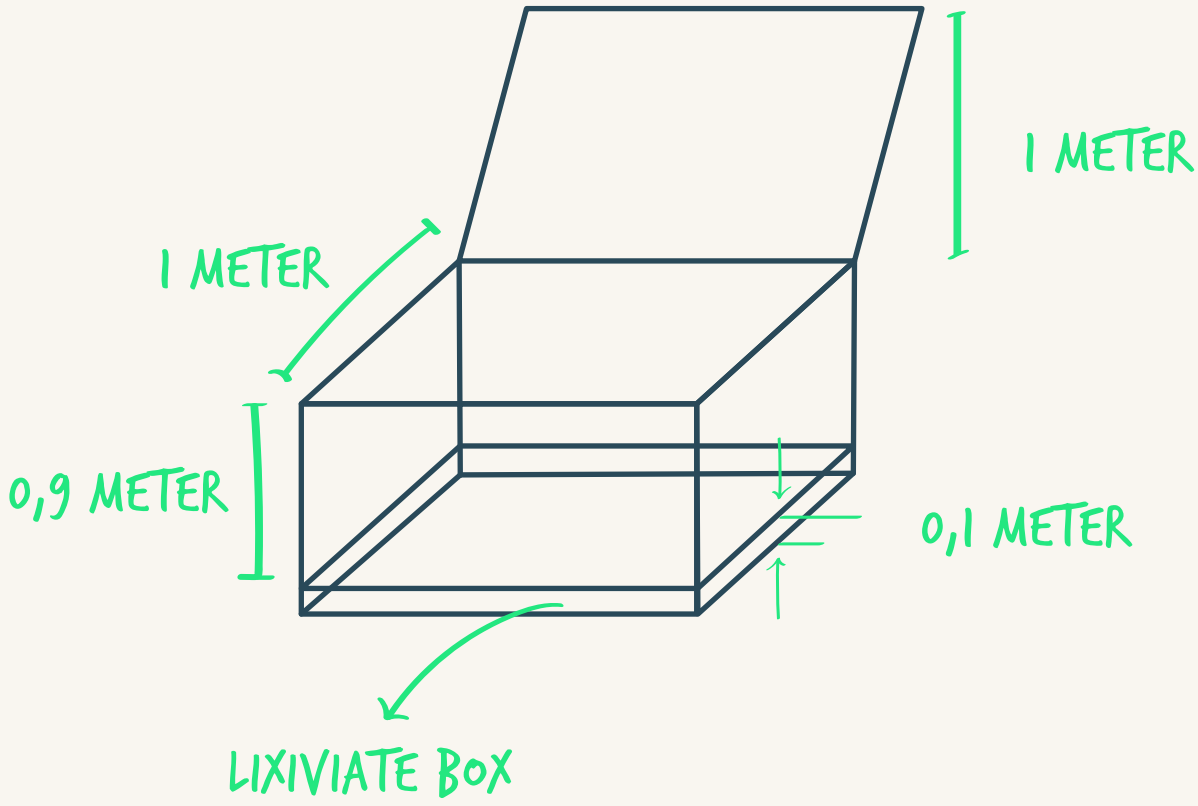
The process will be monitored throughout the season.

REALIZATION OF THE COMPOSTER

Dimensions.

It is proposed to make several composters given the volume of generation in order to compost in phases, achieve the activation of composting in a shorter time and consequently the reduction of volume. Each composter should have a volumetric capacity of at least 1 m3 to guarantee the process.

A schematic image is shown below.



Adequate location.

It should be a place slightly removed from the camp and from the area where the mules arrive. If possible, we will look for a sheltered place to avoid sudden variations in temperature and humidity.

What to do in case of problems?

Problems	Possible Causes	Solutions
Material very dry, no volume reduction.	A lot of dry material or dryness in the environment.	Irrigate with water.
There is no decomposition, the compost is “cold”.	Lack of humidity or poor insulation of the composter	Add more wet waste or water. Better insulate the composter.
Presence of whitish to brown larvae about 1 to 3 cm long.	***We are coming along well!*** It is the larva of the “black soldier fly”. It only feeds in its larval stage.	Do not perform any action.
Presence of very small white worms.	Excess humidity.	Turn more frequently to incorporate air and reduce humidity. Incorporate dry material.

Problems	Possible Causes	Solutions
Presence of mosquitoes or flies.	Excess humidity.	Turn more frequently to incorporate air and reduce humidity. Incorporate dry material.
White filaments.	Presence of fungi ***is a good sign!***	Do not perform any action.
Presence of ants.	Low humidity.	Stir and water. Add wet matter.
Rotten smell.	Lack of oxygen. Excess moisture. Anaerobic process.	Add dry material and stir. If there is no recovery, stop adding wet material for a couple of days and allow to dry.

COMPOSTING AT PUENTE DEL INCA

How do we operate composting at Puente del Inca?

The organic waste will arrive packed in crates in plastic bins from the different camps. The organic material will be poured into the corresponding composter in an orderly fashion, trying to fill one composter first and then fill the next and so on. Here we must not forget to add soil and sawdust to the bottom of the bin at the beginning of its use, before dumping the waste.

The *rest of the cardboard* in the bins may be damp, so it will be necessary to dry them in the sun in a safe place and then shred them and incorporate them into the composters.

We must remember that the material will arrive with a low humidity load due to its drying in the camps, so it will be necessary to provide water through irrigation every time it is poured into the composters.

Finally, we must always take care of the “3A's” mentioned above.

If we add earthworms, we must remember that we can incorporate them after the compost pile has reached several days of high temperatures.

What do we do with the compost that is generated during the season and when the season ends?

A considerable volume will be generated throughout the season, therefore it is proposed to make several composters, each one indicative of different stages to ensure the composting process in a faster way.

The material that we consider “mature”, that is to say that the original material can no longer be appreciated (the remains of fruits and vegetables are not observed) and we have a component visually similar in color to the soil and without odor, we can deposit it in a pit on the ground.

This action will be carried out this season with the objective of, first of all, improving the management of the composting process in the composters, once we achieve its monitoring and develop a correct management obtaining a quality compost, other actions can be carried out with the final destination of the product of our composting.

DRYING OF ORGANIC WASTE

In the base and intermediate camps the organic waste will be subjected to a drying process in situ, taking advantage of the resources offered by the site, in this case a very good solar radiation and low humidity. This is with the purpose of being able to transport this waste with less weight and therefore volume, as well as to remove all the waste from the camp, leaving as little trace as possible. At Puente de Inca the waste will be shredded, rehydrated and composted.

Drying process.

1. First of all, it is necessary to **delimit the area** where this process will be carried out, in order to avoid the entrance of the little foxes that are usually present in the camps, or any other animal or person outside the staff.

2. A site should be chosen where it receives **solar radiation** most of the day, preferably in a northerly direction in the southern hemisphere.

3. We must take into account the **exposure to wind.** This should be a site where the crates do not suffer strong winds, as this will cause the organic waste to blow away, which we must avoid in order not to disperse the contamination.

4. Organic waste generated in the camp should be **dumped into the drawers**, which should be previously covered with cardboard to retain any leachate that may be generated. It is recommended that the bins be placed at an incline, in order to guarantee leachate runoff.

5. The organic waste that is introduced into the bin should be distributed as homogeneously as possible so that it **receives solar radiation uniformly.**

6. Once or twice a day the staff in charge should turn over the organic waste with a shovel or similar tool, in order to ensure that the material is evenly exposed to radiation. At the same time, with this action we are helping to remove moisture from the waste.

7. After a few days, when it is observed that **the organic material is “dry” or partially dry** to the eye and touch, and there is no presence of leachates, it is time to pack it.

8. **Each drawer where the drying process took place is packed with cardboard,** and then covered with a plastic wrapper to finally tie it correctly and securely, guaranteeing good packaging of the organic waste.

ORGANIC HIGH ALTITUDE WASTE

This waste will arrive from the high altitude camps in biodegradable bags. For its management we can carry out 2 actions:

- One option is to send the biodegradable bags with the organic waste inside into the drawers or drums that will go to Puente de Inca.
- Another option is to empty the biodegradable bag into a drying box, to expose the waste to this treatment. The “empty” biodegradable bag is then sent together with the organic waste to Puente de Inca.

ORGANIC WASTE IN THE STOREHOUSE

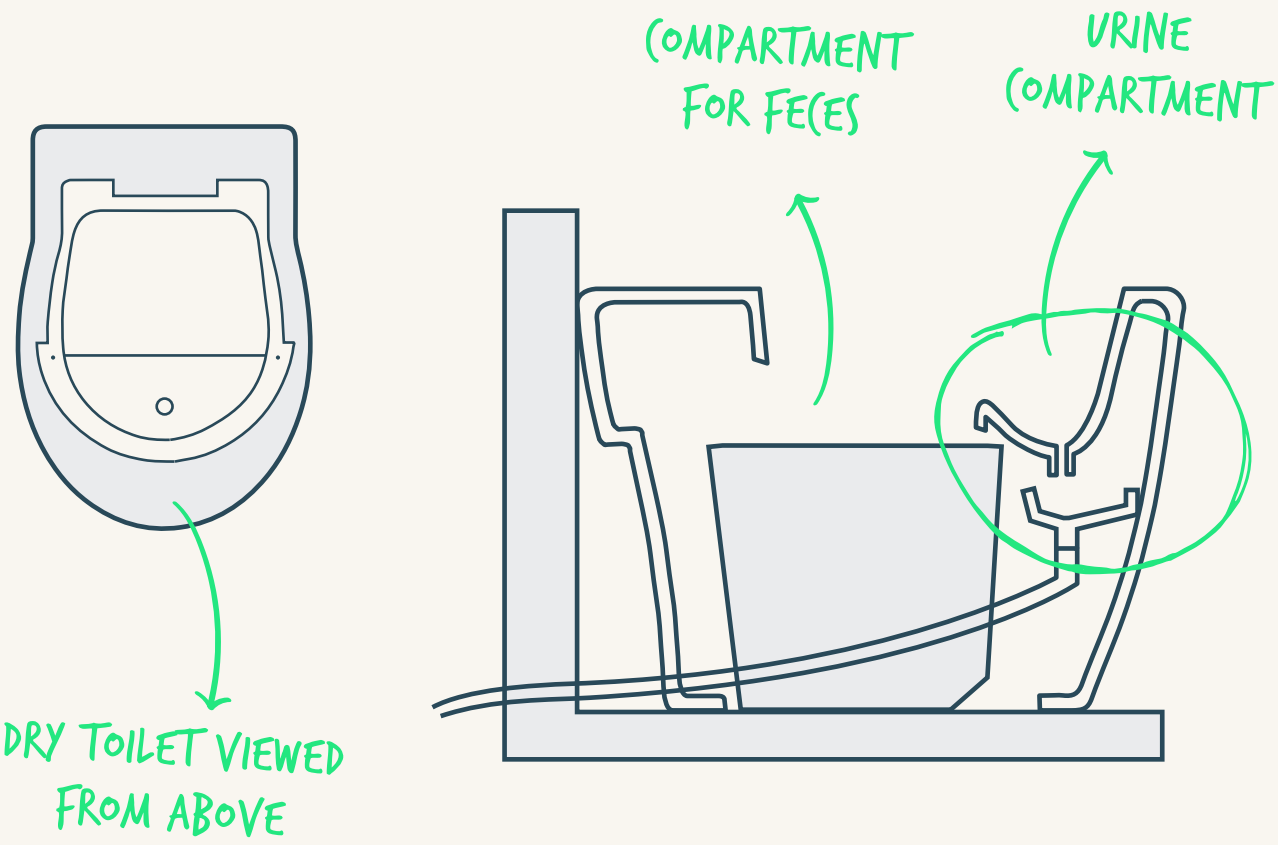
The organic waste generated in the shed (Mendoza) will be dumped into a composter. Once filled, its contents will be deposited in a blue drum to be sent to a final site for composting.

05.

HUMAN WASTE MANAGEMENT

HUMAN WASTE

Some of the excretions that we generate as a product of our metabolism are feces and urine. For their management and treatment we use the dry toilet system with separation in the toilet bowl, without the use of water. For this purpose, the toilet has two compartments, in the front part is the receptacle for urine, and the rear part is intended for the excreta of feces.



For its treatment, the urine will be infiltrated into the soil previously diluted and the feces will be contained in biodegradable bags that will be placed in the receptacle of the toilet destined for that purpose. Once the receptacle is full, the bags will be removed from the toilet and sent to a site reserved for composting.

In particular, for the treatment of feces, 2 types of treatment should be carried out:

First treatment

It is the one that occurs under the toilet during the collection period. The primary treatment has several objectives:

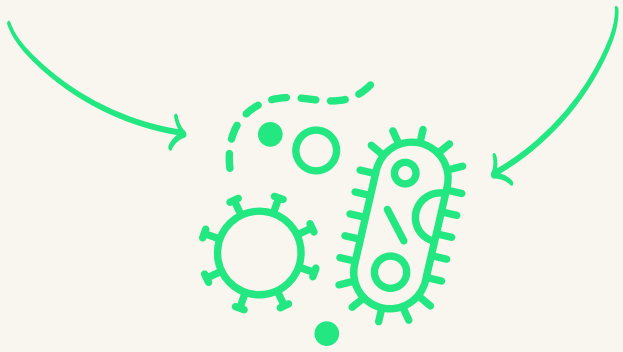
- Reduce the risk of odors;
- To reduce the risk of the presence of flies;
- Reduce the hygienic risk, that is, reduce the number of potential pathogens in the feces.

The treatment consists of adding sawdust after each defecation so that the fresh surface of the feces is never exposed. In this way we are able to increase the dry matter content which reduces the risk of odors and flies.

Secondary treatment

Occurs when the collection period under the toilet has ended. The main objective of the treatment is to transform the stool mixture to a state where it is odorless, visually pleasing (no possible traces of feces or toilet paper can be recognized in it) and removal of pathogenic microorganisms occurs.

The process we will describe here to ensure this treatment is composting and worm composting, which is responsible for decomposing the excrement to an oxidized humus-like end product, called **compost**, through the action of micro and macroorganisms.



MANAGEMENT OF DRY TOILET USE

Here it is important to highlight the correct separation of feces from urine. This is necessary to obtain a better control of the humidity of the solid excrement, as well as to avoid the presence of ammonia in it, which is toxic for some microorganisms involved in composting. In order to do this, the separation of the excrement is used as an alternative to the separation of the excrement, which can generate undesirable smells. This is done by taking advantage of the human anatomy, which excretes feces and urine separately. This collection requires a minimum of care on the part of the user to ensure a correct position when urinating or defecating.

After each defecation, it is necessary to add sawdust, as mentioned above, avoiding that it falls on the urine receptacle, since this can generate obstructions in these compartments.

Used toilet paper is disposed of in the trash can along with wet wipes, since the composition of the latter is not compostable. Feminine hygiene items or items used for feminine hygiene should be disposed of in the pathological waste garbage can.

Do not dispose of any items used for feminine hygiene, such as wipes, tampons, or toilet paper used for feminine hygiene in the feces receptacle. These items should be discarded in the pathological waste garbage can.

As for urine, after each discharge into its corresponding compartment of the toilet, it will be necessary to pour a little water, which should be available in the bathroom. This is to guarantee the dilution of the urine, otherwise it can generate obstructions in the pipe that leads to the infiltration site due to the presence of minerals in it.

Dry toilet cleaning management.

Personnel must have the following personal protective equipment to clean the toilets:

- Nitrile gloves or kitchen gloves for use in bathrooms only.
- Masks.
- Goggles, to avoid splashing any cleaning product in the eyes.
- Appropriate clothing, intended only for cleaning the restrooms. At the moment of washing, the clothes can be previously sprayed with quaternary ammonium.

The cleaning products that we can use to guarantee a correct disinfection are:

- **Ethyl alcohol 70% or more:** it is an effective disinfectant. It is recommended for use by spraying on bathroom surfaces.
- **Hydrogen peroxide (hydrogen peroxide):** a mild sanitizer that decomposes into water and oxygen. It can be used by spraying surfaces.

- **White vinegar:** it is an effective natural disinfectant due to its acidity. It can be diluted with water in a 1:1 ratio or used pure to clean toilet surfaces.
- **Quaternary ammonium:** it is an effective chemical disinfectant, but its use should be moderated since in excess it can affect the environment. It is recommended to spray it on toilet surfaces.

Always remember to read the dilution instructions and concentrations of each product, as this varies according to the manufacturer.

It is important to note that before disinfecting a surface it must first be cleaned. Cleaning with soap and water or detergent removes visible impurities such as dust, dirt, etc., and prepares the surface to achieve the desired effect when using the disinfectant product.

URINE MANAGEMENT

The urine will be directed from its compartment in the toilet to an infiltration ground by means of a pipe or tube.

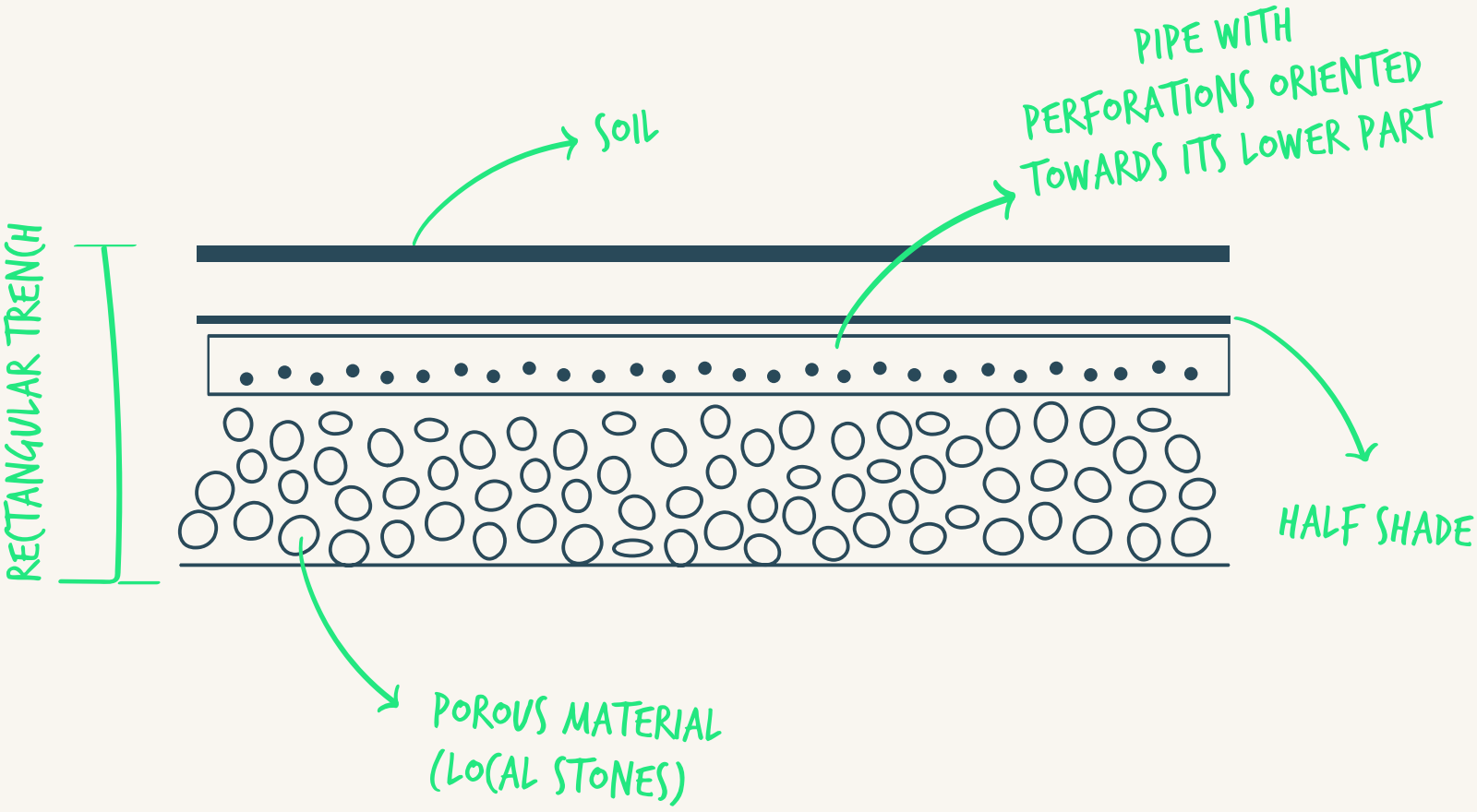
If possible, it is advisable to connect the urine pipe to the grey water pipe from the showers to ensure dilution, and then infiltration into the soil.

For the infiltration ground it will be necessary to make a rectangular-shaped trench in the ground. This consists of a pipe or a network of perforated pipes, placed in trenches filled with porous material (in this case stones from the site) covered with half-shade and soil.

Always make sure that the perforations of the pipes are located towards the lower part of them.

The porous material is used to maintain the structure of the trenches, provide aerobic treatment of the effluent and distribute the effluent into the soil. Treatment occurs by circulating the effluent through and over the porous media and percolating the liquid into the soil.

When choosing the location of the infiltration site, a high place should be chosen, free from the risk of waterlogging and away from water bodies.



The porous zone should be constructed with relatively small stone sizes, between 7 and 10 cm, since they provide a larger contact surface and fewer voids than large stones. A half-shade can be placed above the porous zone in order to allow evapotranspiration that will be obtained from the biological activity to be developed and the interaction of this stage with the sun's rays that could affect that area.

The length of the trenches is variable and always depends on the amount of effluent generated. In addition, a soil infiltration study must be carried out. Here, for practical purposes, a minimum length of 4 to 5 meters and a width of 0.6 to 1m is recommended.

The trench should have a minimum slope to ensure that the liquid flowing through the pipe can flow. The maximum inclination of the pipe should be:

0.0 +/- 0.5%.

It should be checked throughout the period of use if there is waterlogging or odor in the area. If this happens in the first case, it is because the terrain is small for the amount of influent it receives.

If smell is present, it is because the urine is not being diluted correctly.

TRANSPORTATION OF HUMAN FECES

The human feces and sawdust contained in the biodegradable bags will be deposited in the blue drums until a weight of approximately 20 kg per container is achieved. Before inserting the bags, a thin layer of sawdust will be added to the bottom of the container in order to contain any liquid leakage from the bags and facilitate their emptying at Puente de Inca.

Once the container is full, it must be properly packed for transportation. To do this, the lid of the container must be closed with wire and stretch-wrapped to prevent any leakage along the way.

THE STAFF IN CHARGE OF THESE LOGISTICS MUST PREVENT THE FULL CONTAINERS FROM REMAINING IN THE BASE CAMP FOR MORE THAN 3 DAYS. OTHERWISE, THEY MUST INFORM THE CAMP MANAGER TO NOTIFY THE APPROPRIATE PERSON AND REQUEST THEIR REMOVAL FROM THE CAMP AS A MATTER OF URGENCY.

MANAGEMENT OF HUMAN WASTE COMPOSTING.

At Puente de Inca, the containers from the base and high altitude camps will be received.

The contents of the containers must be incorporated into the composters the same day they are received, avoiding the permanence of feces inside them, as this increases smells and the proliferation of flies, as well as the anaerobic decomposition of the material.

Once the material has been incorporated, it is necessary to break the biodegradable bags with an instrument designed for this purpose.

This is necessary because the feces must come into contact with the oxygen present in the air so that the decomposing microorganisms can act in the composting process.

The material in the composters must be turned daily to ensure oxygenation.

As with organic waste composting, it is necessary to control the humidity and temperature parameters.

Composting must reach temperatures above 50°C (thermophilic stage) to ensure the elimination of pathogenic microorganisms.

Can we also add earthworms here?

Of course we do! Also, as in organic waste composting, we must do it once the material has passed through

the thermophilic stage, since earthworms do not survive at high temperatures.

To carry out the management of human feces, the staff in charge must have the following personal protective equipment:

- Gloves intended only for this management,
- Goggles for eyes protection.
- Suitable clothing, preferably overalls or clothing intended only for this purpose.
- Masks.

After handling human feces, the staff should change their work clothes and sanitize their hands with plenty of soap and water.

06.

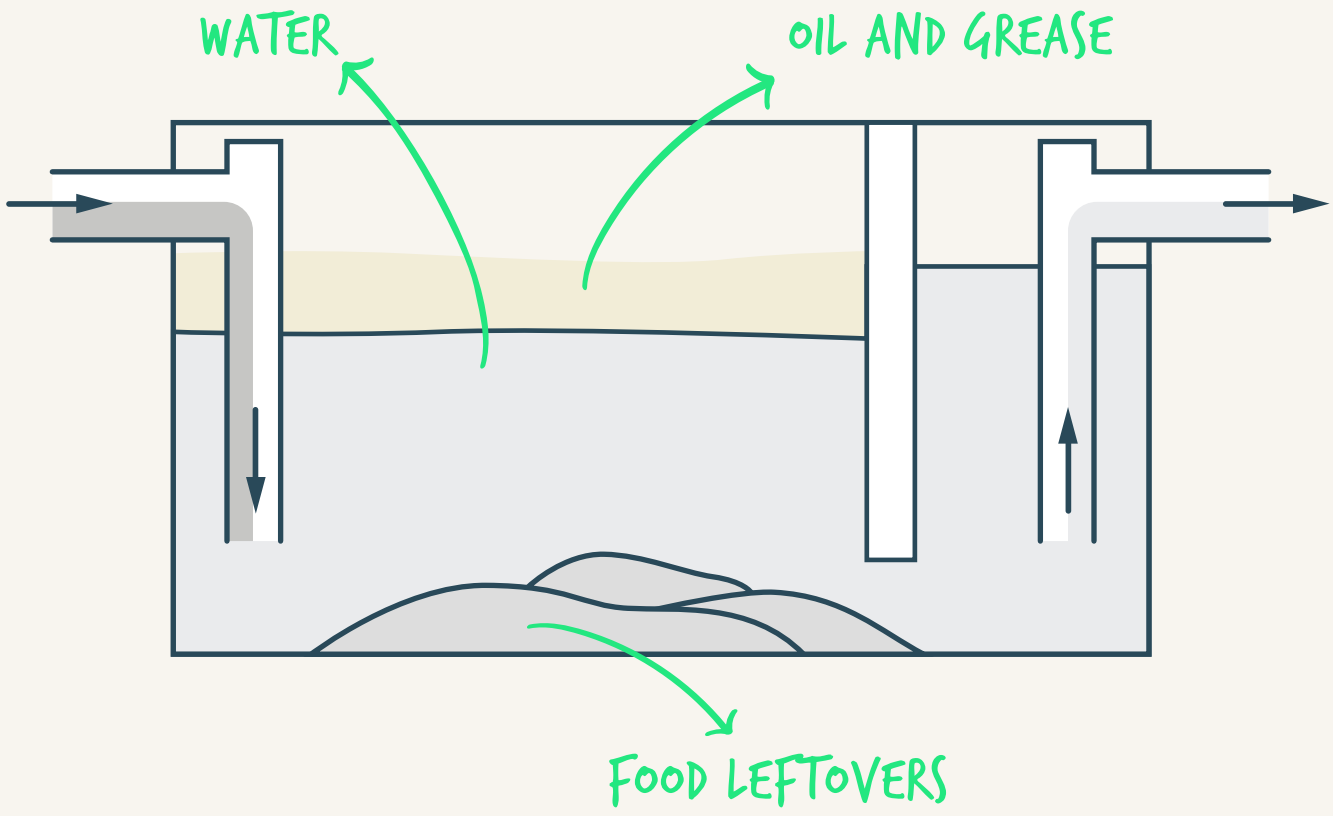
GRAY AND BLACK WATER MANAGEMENT

GRAY WATERS

Graywater is the water generated as a result of its use in cooking, showers, sinks and laundry. It is soapy water that can also contain grease. For its treatment we will use degreasing chambers and infiltration grounds.

Installation and dimensions of the degreasing chamber.

The purpose of the degreasing chamber is to separate the water from the grease and oils by density difference, with the grease remaining at the top and the food remains at the bottom. The gray water will follow its course to be infiltrated in the infiltration ground.



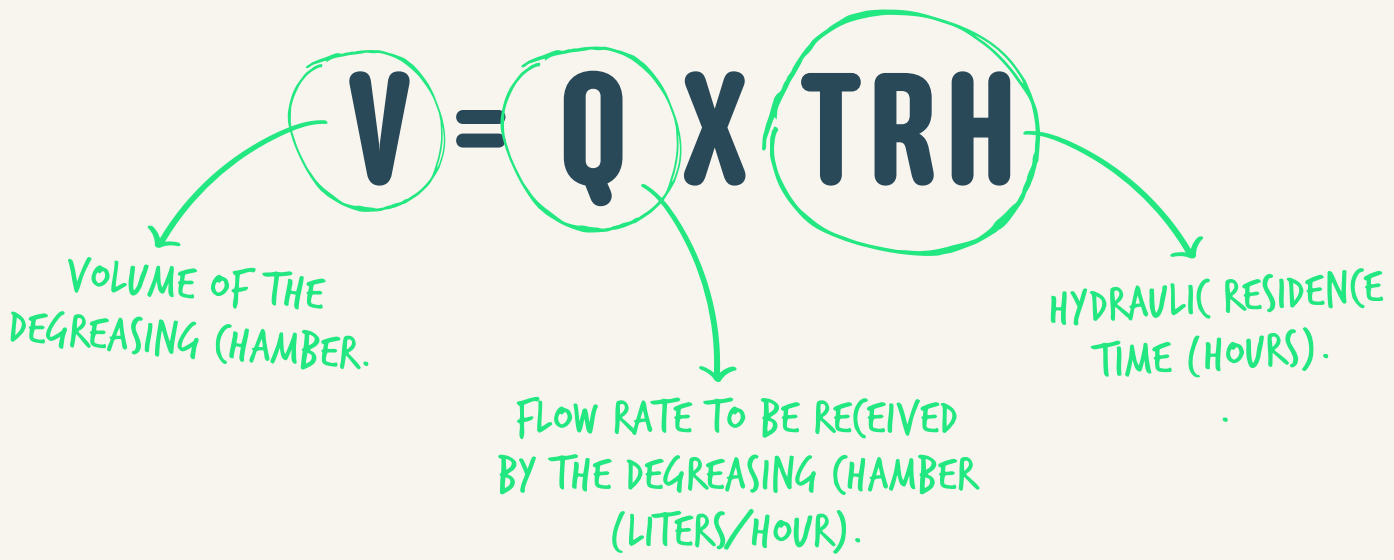
It is recommended that kitchen water be treated separately from shower water and water from washing hands and clothes.

Kitchen water contains a higher grease content and requires cleaning of the degreasing chamber more frequently than the chamber for the other waters mentioned.

It is necessary that the chamber contains a ventilation pipe. Its main function is to allow the gases generated during the grease and oil decomposition process to escape.

The retention time of gray water in a degreasing chamber should be at least 30 minutes to 2 hours. This varies according to several factors, such as the quality and nature of the effluent and the ambient temperature.

To calculate the volume that we will need of a degreasing chamber we must apply the following formula:

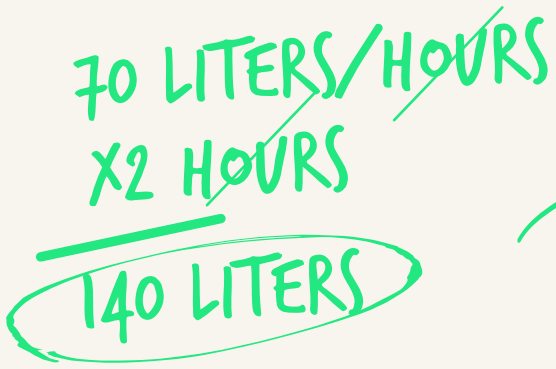


To size the chamber, the most unfavorable moment should always be considered, meaning the time of the day when the maximum flow will happen. This will depend on the number of people present in the camp.

We can estimate a generation of approximately 10 to 20 liters per person for the washing of the kitchen elements and 30 liters for the shower (these values are considered taking into account water savings for the staff and clients).

As an example we can consider 70 people in the camp. Considering this, when washing dishes after a dinner, we can generate 70 liters in 1 hour of washing, as a minimum. We consider an HRT of 2 hours to be conservative.

Volume = 70 liters/hours x 2hs = 140 liters



We would need a **140 liter** degreasing chamber.

The degreasing chamber must be installed at floor level. For this purpose it will be necessary to make a hole in the floor.

Infiltration soil

An infiltration area should be built adjacent to the defatting chamber for water infiltration. It should be built according to the description in the “urine management” content. In order to carry out its sizing, it is necessary to carry out a study of infiltration in the field. Here, for practical purposes, we will consider a dimension of about 5 to 6 m long by 0.6 to 1 m wide.

Cleaning and maintenance

In order to achieve a good operation of the degreasing chamber we must maintain its cleanliness. For this it is necessary to remove the greases that are deposited in the superficial region. In the case of the kitchen degreasing chamber, we must remove grease and food remains. In the chamber of the showers and sinks we will remove grease, hair and foam. It is necessary to use gloves for this purpose. **The extracted material should be deposited in a bag. This is discarded in the general garbage.**

The frequency of cleaning will depend on the volume of flow generated and the type of influent it receives. The kitchen degreasing chamber requires more frequent cleaning than the showers and wash basins, since it receives more grease and food debris. It is suggested that the staff responsible for this task carry out a periodic control of the chamber to determine the cleaning time it needs. It is recommended to check the chambers every 2 to 3 days at times of higher number of visitors in the camps.

Kitchen cleaning

It is necessary to use biodegradable elements for cleaning kitchen utensils. It is recommended to use biodegradable detergent or white soap.

For disinfection, use 70% alcohol instead of lavandin.

When washing the oven trays, it is recommended to let the grease cool and then remove it with the help of a spatula and discard it in the general garbage. This will prevent the grease from going into the degreasing chamber.

A solution of baking soda and water is recommended for cleaning dishcloths and cleaning pads. This helps to remove unpleasant odors. To do this, dissolve 1 to 2 tablespoons of baking soda in a bowl of warm water for about 30 minutes and then rub them gently before rinsing.

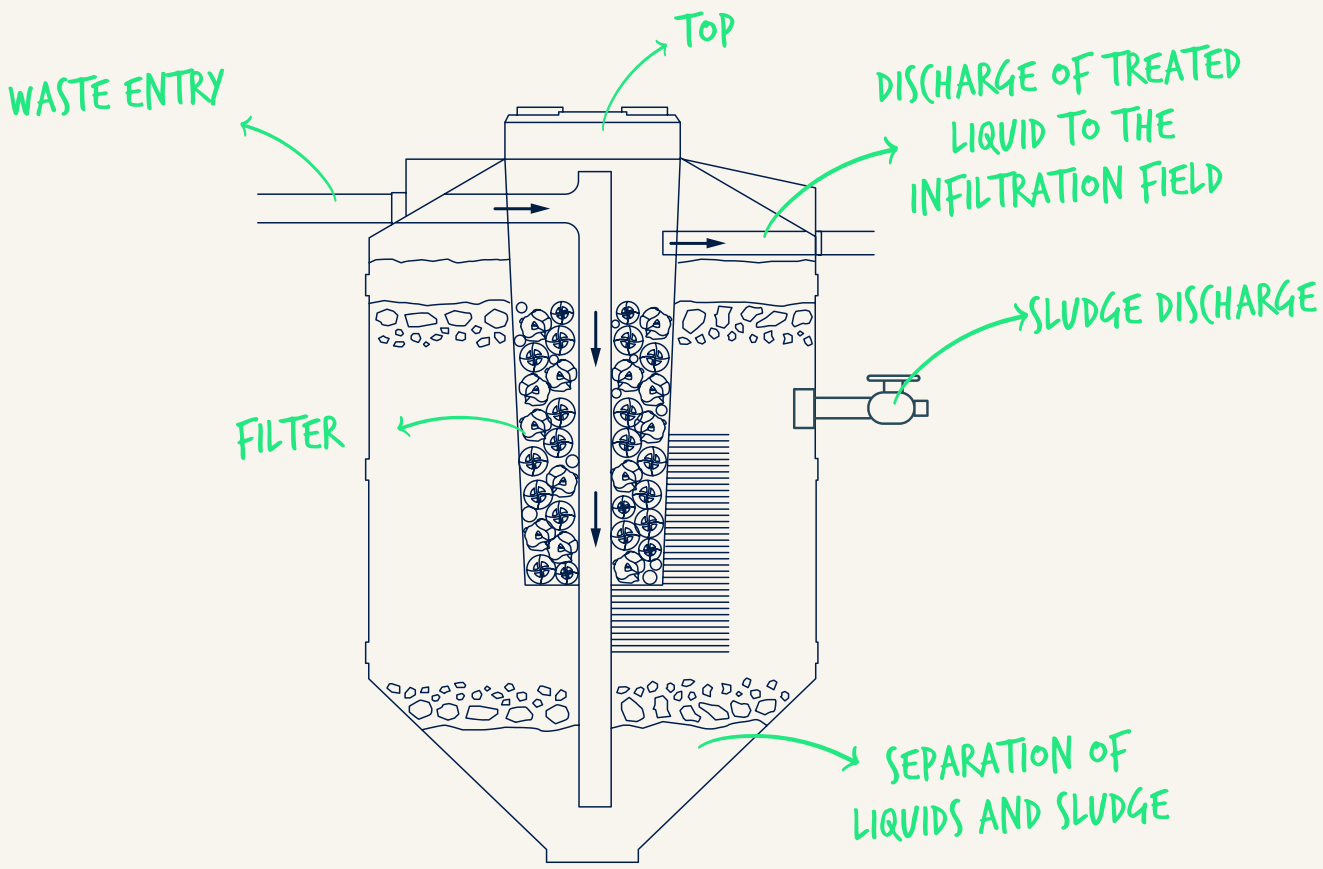
Quaternary ammonium should not be used to disinfect the kitchen area, as it is toxic to food.

BLACK WATER

These are the waters that carry feces and urine, coming from the toilet. For their treatment, septic tanks and/or biodigesters are used, followed by an infiltration area.

This treatment technology occurs through hydraulic transport, meaning that the toilet uses water to "flush" the feces and urine, turning them into wastewater. This wastewater is retained in a septic tank or biodigester, which serves the purpose of sedimentation of solids and biological treatment through an anaerobic and facultative process.

The difference between a septic tank and a biodigester is that the latter offers greater ease in the extraction of sludge compared to septic tanks, as it has a specific compartment in its structure that facilitates extraction.



Installation and dimensions

For the selection of the site for the biodigester and the infiltration area, a high location should be chosen, free from the risk of flooding and away from bodies of water.

To install the biodigester, it is necessary to follow the manufacturer's instructions. In most cases, the biodigester must be buried, with its lid level with the ground.

For sizing, it will be necessary to calculate the volumetric capacity of the biodigester considering the device that generates the wastewater. In our case, the volumetric capacity of the toilet tanks must be taken into account.

These can range from 6 to 18 liters per flush, depending on the toilet. It is estimated that a person uses the toilet approximately 4 to 8 times a day.

In a mountainous environment and considering that a person may vary the duration of their stay at a campsite, we can consider 5 times to be conservative.

As an example, we will use a value of 70 people at the campsite and a capacity of the toilet tanks of 6 liters, as well as a usage of 5 times a day.

For sizing, a minimum residence time of the effluent (black water) in the biodigester of 24 hours must be taken into account. Considering this, we would need a biodigester with a capacity of approximately 2,100 liters.

To calculate the sizing, we must always consider the highest flow volume that could be generated, so that treatment is guaranteed during peak generation times.

Maintenance and Cleaning

The biodigester will generate sludge as a result of the sedimentation of solid content from wastewater, which will settle at the bottom and will need to be removed. This should be done at the end of its use in the camps, either when the season ends or at the beginning of the next season.

To extract it, it is necessary to understand the characteristics of the biodigester and to use its operation manual. Some brands have sludge extraction valves, which facilitate this process.

The extracted sludge must be removed from the camp and sent to a safe final disposal site, such as a wastewater treatment plant in the nearest city.

Care should be taken not to extract the sludge in its entirety, as it contains a high concentration of microorganisms that are responsible for the treatment process of this sludge. If we extract it completely, the treatment process will be slower and will not be guaranteed.

Things to keep in mind:

- Do not throw rubbish down the toilet (paper, wet wipes or feminine hygiene items), as they can clog the pipes. In the event of clogged pipes, only a bioenzymatic additive should be used.
- **Do not flush chemicals** such as chlorine, quaternary ammonium or caustic soda into the system, as they interfere with the biological treatment that occurs inside the biodigester. If the biodigester receives grey water in addition to black water, it is necessary to install a degreasing chamber beforehand, as oils and grease interfere with the biological treatment inside the biodigester.
- To clean the toilets, only alcohol should be used or they should be cleaned with quaternary ammonium using a damp cloth, avoiding leaving any traces of the chemical inside the toilet.

Infiltration soil

The wastewater that is between the layer of mud and foam in the chamber or biodigester flows into the infiltration beds. This can be said to be the second stage of treatment, where the first occurred in the septic chamber or biodigester.

The construction of the bed will be carried out as described in the “Urine management” content. For its sizing, it is necessary to carry out an infiltration study on the bed. Here, for practical purposes, we will consider a dimension of about 5 to 6 m long by 0.6 to 1 m wide.

07.

HAZARDOUS WASTE MANAGEMENT

HAZARDOUS WASTE

According to National Law No. 24,051/1992 and its Decree No. 831/193, any waste that may cause harm, directly or indirectly, to living beings or contaminate the soil, water, atmosphere or the environment in general is considered hazardous waste.

BATTERIES AND CELLS

According to National Law No. 24,051/1992 and its Decree No. 831/193, batteries are considered hazardous waste. In Mendoza, the law adhering to the national law is Law No. 5,917/1992 and its Decree No. 2,625/1999. In turn, batteries are considered, according to MAyDS Resolution No. 522/2016, as special waste of universal generation (REGU). This resolution establishes the objectives, definitions and guidelines for the development of a national strategy for the sustainable management of REGU.

The different stages of REGU management are prevention, reuse, recovery of materials, recovery of energy, treatment and final disposal.

The dangerousness of batteries is given by the toxicity and concentration of their components and their release into the environment. Each type of battery has at least two metals present in two different chemical forms. The release of these metals into the environment, their interaction with it and the concentration in which they are found will determine, among other factors, their toxicological effects.

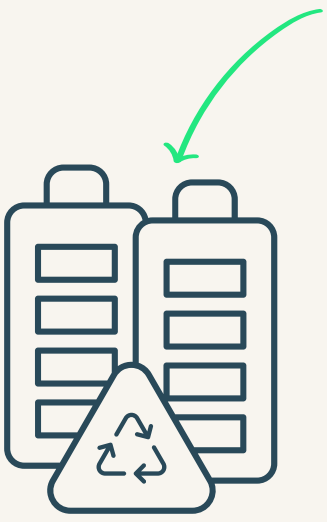
However, if incorporated into the framework of the circular economy, these elements acquire value by being recovered and reinserted into the production cycles. Due to this, we establish the following management of batteries:

Storage

Batteries must be disposed of safely. To do this, it is necessary to insulate their contacts (with insulating tape, for example) to prevent them from short-circuiting and generating sparks that could start a fire. Once this has been done, they must be placed in plastic containers with dry sawdust to prevent oxidation. Used batteries must not be disposed of in general waste.

Sending to collection points

These wastes must be taken to appropriate collection points for proper disposal and recycling. In Mendoza there are different points, which are safe places where used batteries are collected for later treatment and recycling.



We encourage the use of rechargeable batteries, which have several benefits. Firstly, it reduces the amount of disposable batteries generated and therefore reduces the environmental impact. In addition, rechargeable batteries are more economical in the long term, as they can be used multiple times before being recycled.

PATHOLOGICAL WASTE

Pathological waste[1] is considered hazardous waste according to national law No. 24,051. According to the provincial law of Mendoza No. 7168 on Pathogenic and Pharmaceutical Waste, it defines waste that has the capacity to directly or indirectly affect human, animal or plant health and/or cause contamination of soil, water or the atmosphere.

Considering both laws, we treat pathogenic waste differently. To do so, it must be discarded in a red container with its corresponding red bag.

Pathological waste → Red

As far as our generation is concerned, these are the wastes mentioned in item “e” of the national law, which are cotton, gauze, used bandages, ampoules, syringes, sharp or pointed objects, disposable materials, items impregnated with blood or other putrescible substances that are not sterilized.

Menstrual cup: its contents should be poured into the urine compartment of dry toilets and then plenty of water added. In toilets with hydraulic flushing, its contents should be thrown into the toilet.

[1]In this manual, the words pathogenic, pathogenic and pathogen are understood as synonyms.

08.

HIGH ALTITUDE CAMP WASTE MANAGEMENT

WASTE AT ALTITUDE

High altitude camps are those located at a higher altitude than base camps. Their logistics are different from the latter, so waste management is also different.

Waste classification will be more reduced than at base camps, since a smaller volume and type of waste is generated.

We will work with 3 classifications:

General Waste	Recyclable Waste	Organic Waste
Leftover food, dirty napkins and dirty food wrappers.	*Paper, cardboard, cans and plastics.*	*Yerba mate, tea bags, coffee, fruit peels.*

General and recyclable waste must be classified by each expedition, **with the assistance and commitment of the responsible guide**. It will be weighed and recorded and then sent to the base camp. Here the corresponding management will be carried out according to each type of waste.

Regarding organic waste, the company will provide a biodegradable bag to each expedition to guarantee its use only for this waste, which will be recorded by weight and sent to the base camp to be incorporated into the final management of organic waste, destined for Puente de Inca.

HUMAN FECES

The high altitude toilets have dry toilets, whose description, use and cleaning are described in the content *“05 Human Feces Management”.*

The management of their cleaning will be carried out by the person in charge of the high altitude camp. Each expedition must be instructed by the responsible guide to ensure their correct use.

It is recalled that each user must sanitize their hands after using the toilet.

To transport the feces, the full biodegradable bag(s) must be placed in a container that the porters will have (small bucket of cream or similar). First, a thin layer of sawdust must be added inside the container and then the bag must be disposed of. If necessary, sawdust must be added again and then the container must be covered. Transport must be ensured by adding stretch to the lid of the container and/or placing it in a bag.

The container must be handed over to the personnel in charge of receiving it at the base camp, who must empty the contents into the blue lockers intended for transporting human feces to Puente de Inca.

09.

WATER FOR CONSUMPTION

WATER FOR CONSUMPTION

It is important to take into account the water used for consumption in the camps. It must have properties suitable for consumption. To do so, the following considerations must be taken into account:

A water intake area must be used where there is no risk of contamination. The water intake must not be close to the place where the mules walk and/or rest, since there may be contamination due to their excretions (urine and feces).

If the water has sediment in suspension, it will be necessary to let it rest so that the solids decant. The decanting time will depend on the amount of solids present in the water. The greater the presence, the longer the rest time. If you notice a different taste in the water after decanting, it will be necessary to use a water filter, because the sediments are very fine and do not have enough weight to decant, so they remain in suspension.

If the water has an unpleasant smell and/or taste, its consumption must be stopped immediately. The cause of the change in water characteristics must be analyzed and, if necessary, the collection area must be modified.

If the water has a mineral taste, it is recommended to use a water filter.

If the water quality is suspected or symptoms of gastroenteritis occur among the staff, the water should be boiled for 3 minutes before consumption or made potable by adding bleach. To do this, add 2 drops of bleach per litre of water and let it sit for about 30 minutes.

It is recommended to always have a container with water inside the dome, which should be covered and store a considerable volume in order to prevent freezing and guarantee a water reserve in the morning. Water may remain inside the external pipes and freeze during the first hours of the day, blocking the flow of water to the taps or toilet.

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