



BIOECO-UP

FOOD PRESERVING

Preserving practices for a more sustainable food consumption



The bio-based economy can play a fundamental role in the production of healthy food and in shifting to healthier and more sustainable consumption patterns. It can strengthen local value chains, promoting the reuse and recycling of food resources. There are increasing changes toward sustainable consumer lifestyles, where consumers are better informed, willing to buy environmentally friendly products as well as to prepare them themselves. These changes create opportunities for the utilisation of household food residues and reduction of food waste.

Eco-friendly living starts locally, in our immediate environment, at home. Food consumption is one of the most essential elements of everyday life, so practices that can make it more sustainable and reduce food waste are of significant importance.

Preserving practices support the minimization of both food surplus and avoidable food waste, which is positioned as the most attractive option in the food waste hierarchy. Preserving allows individuals to take advantage of the following sustainability-friendly opportunities:

- 1 local food being in season, produced by themselves or bought at local markets;
- 2 raw food ingredients purchased in larger quantities when they are cheaper at retailers or on “pick it yourself” promotion days directly from farmers;
- 3 pre-packed boxes of vegetables and other food items, ordered online and delivered weekly throughout the whole year from local producers or “vegetable box communities”, meaning a group of producers offering different products that can be selected by consumers to be put in the vegetable box they order (in Hungary they are known as “basket communities”);
- 4 food rescue actions organised by supermarkets, where vegetables and fruits that are still edible but have minor defects are offered in a 3-4 kg unit package, at an extremely favourable price;
- 5 valorising certain types of food wastes, such as fruit peels.





Foods quickly deteriorate because of the natural spoiling process caused by microorganisms (bacteria and fungi such as mould, yeast). Preservation technologies can extend the life of foods by stopping this process. **Freezing** is the simplest way to store food for a longer time, however, it requires energy continuously. There are different ways such as **canning**, **pickling**, **drying/dehydrating**, **fermenting** to preserve food safely without refrigeration, to save energy and space for leftovers and other foods that can be preserved only by freezing.

CANNING PRESERVES

food in tightly sealed glass jars by a heat treatment. The boiling water bath method is the simplest way for canning: jars packed with food are placed in a hot water bath for a certain time where microorganisms are killed by the heat treatment. The later cooling forms a vacuum seal under the lid which prevents microbial recontamination. Foods with lower acidity may necessitate the use of the pressure canning method which operates at higher temperature up to 130 °C. It involves specialised and thus more expensive equipment, but it will also allow to can meat, fish, poultry, ready-to-eat soups and other meals with high water content. It is always useful to check a canning reference listing the correct canning time for each food.

PICKLING

is a special type of canning mostly suitable for high-acidity foods such as tomatoes, cucumbers or fruits. Pickling solutions are typically highly acidic from vinegar added, with a pH under 5, and often high in salt, preventing microorganisms from growing and enzymes from altering the food texture.

DRYING/DEHYDRATING

removes moisture from food to an insufficient extent for the growth of microorganisms. It is suitable for fruits, mushrooms, herbs and vegetables. At home food can be dried both indoors and outdoors. Air and solar dehydrating outside require an airy place with low humidity. Inside, a conventional oven or a food dehydrator machine can be used, or simple hanging in a warm, dry place can dry out foods and preserve them.

FERMENTATION

preserves food by involving anaerobic bacteria to convert the natural sugars in the food to lactic acid, thereby creating an acidic environment in which food-spoiling microorganisms are not able to grow. The raw ingredients are sliced or shredded, salted with non-iodised salt and packed into containers, then allowed to sit at room temperature until the fermentation process is complete which takes 2-3 weeks in general. Most traditional vegetable fermentation techniques rely on naturally occurring bacteria on the vegetables and in the environment. Fermentation can even boost the nutritional value of the preserved food because during the process food ingredients are broken down in a way that makes the nutrients more available for the human metabolism.



THE TABLE BELOW PRESENTS A COMPARISON BETWEEN THE THREE MOST COMMONLY USED PRESERVATION METHODS:

| Comparison point | CANNING | DRYING | FREEZING |
|---------------------|--|---|--|
| MAINTAINING QUALITY | <p>maintains the original quality and flavour of food</p> <p>natural ingredients are well retained, however, higher temperature in pressure canning is more likely to damage nutrients</p> | <p>can lead to a loss of some nutrients and natural ingredients</p> <p>causes changes in flavour and texture</p> | <p>preserves well the natural ingredients</p> <p>maintains also heat-sensitive vitamins and other nutrients</p> <p>might cause an undesirable change in texture and flavour when defrosted</p> |
| EXPIRY | <p>canned foods can maintain their quality and validity for a period of up to many years</p> | <p>dried foods can be stored for several months to even a couple of years</p> | <p>frozen foods can maintain their quality and validity for several months to a year</p> |
| CONVENIENCE | <p>the process is easy and accessible to everyone</p> <p>simple tools are needed</p> | <p>may require specific equipment such as an oven or a special drying device,</p> <p>usually takes more time in preparation and execution than the other two methods</p> <p>product requires little storage space because dried foods are compact</p> | <p>easy process</p> <p>requires a refrigerated storage space, which requires certain planning and organisation of storage and arrangement</p> |
| SAFETY | <p>serious food safety implications can occur if made inappropriately</p> <p>safe way if the health guidelines and standards required are followed</p> | <p>may allow some settling of pathogenic microbes if not dried properly</p> <p>a package of dried food can be opened again and again without damaging the contents</p> | <p>microorganisms are not killed but their growth is prevented by the low temperature, thus products have to be cooked in a short time after thawing</p> |
| SUSTAINABILITY | <p>saving energy and reducing food waste</p> | <p>saving energy and reducing food waste</p> | <p>less sustainable as it depends upon a source of non-renewable energy</p> |



PRESERVING CAN PROVIDE MANY BENEFITS TO INDIVIDUALS, FAMILIES, LOCAL COMMUNITIES AS WELL AS GLOBALLY:

PRESERVING QUALITY AND FRESHNESS

Products are secured from spoilage, given a longer shelf life while their flavour and nutritional value are preserved.

HEALTHY EATING

Canned food can increase fibre intake which is essential to reduce the risk of developing various conditions, including heart disease, diabetes and colon cancer, and to lower blood cholesterol level. Fermented foods contain probiotics that are highly important as they help in keeping the digestive and immune systems healthy.

SAVING MONEY

Homemade preserved food products are more economical compared to buying ready-made packaged products. It can be produced seasonally and preserved when cheap and fresh.

REDUCING WASTE AND PRESERVING NATURAL RESOURCES

People can fine-tune quantities and avoid food waste as well as reuse food parts that would become waste otherwise.

CONTROL OF INGREDIENTS

Home preservation provides individuals with the opportunity to have complete control over the ingredients used in the process. They can choose fresh and organic ingredients and adjust proportions and seasonings to personal taste. Adding preservatives or potentially harmful substances (artificial colourings, flavour enhancers etc.) can be avoided and healthy ingredients can be used.

CONVENIENCE

Pre-packaged healthy, custom-prepared meals can be easily made using preserved food with favourite ingredients, saving time and effort in preparation.

VERSATILITY

Dried fruits are an excellent snack or addition to a muesli, porridge or desserts. Dried herbs and vegetables can be rehydrated with water, and give an extra flavour boost to soups, stews, risottos and more. Dried berries and herbs make fantastic herbal tea.



Practical examples and useful tips for home scale preservation:



→ homemade vegetable stock using tops, bottoms, skins of onion, garlic, celery, carrot, potato; mushroom and parsley stems, etc.



→ downloading and using a seasonal food calendar that gives a useful guide on what raw foods are in season or likely to be available from storage locally



→ dried and grounded tomato peel: "tomato powder" for seasoning, vegetable spice rubs, colourant ingredient



→ "sauerkraut" (fermented cabbage) as a rich source of probiotics and vitamins



→ homemade chips from vegetable peels such as carrot and potato peel



→ air drying by hanging herbs like chamomile, mint, lemon balm etc.



→ special tips for preserving mushrooms



→ sun drying in the summertime

REFERENCES AND SOURCES:

Raj, D. et al. (2016), *Processing and value addition for home scale preservation*. *Commercial Horticulture*, 453-472. (https://www.researchgate.net/publication/344348283_Processing_and_Value_Addition_for_Home_Scale_Preservation)

Trigo, E. et al. (2023), *The Bioeconomy and Food Systems Transformation*. *Sustainability*, 15(7), 6101; <https://doi.org/10.3390/su15076101>

Papargyropoulou, E. et al. (2014), *The food waste hierarchy as a framework for the management of food surplus and food waste*. *Journal of Cleaner Production* 76, 106-115; <http://dx.doi.org/10.1016/j.jclepro.2014.04.020>

<https://stopfoodwaste.ie/resource/storage>

<https://www.sustainlife.org/food-preservation-a-big-step-toward-sustainability/>

<http://foodpreservingtips.com/what-is-home-canning-complete-guide-for-beginners/>

<https://www.umassmed.edu/nutrition/blog/blog-posts/2022/7/make-your-own-fermented-vegetables/>

<https://web.archive.org/web/20080313102803/http://www.mda.state.mn.us/food/business/factsheets/picklebill.htm>