



MEMBER OF
BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

www.azti.es

**Do you think that sustainability in
the food industry is not profitable?
YOU DON'T KNOW ABOUT UPCYCLING**

Transform the biomass you would normally throw
away into food-grade ingredients and foods.

Advantages of Upcycling

Healthier ingredients and food products are obtained from biomass which would normally be thrown away

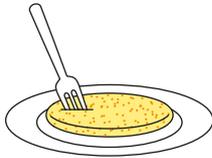


Greater profitability



Better for the environment

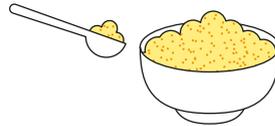
Examples of upcycled food design



Meat products with modified texture for the elderly



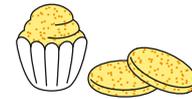
Special diets



Purees and sauces with fibre instead of fat: a filling sensation with fewer calories



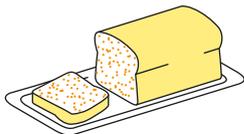
Better for health



Gluten-free, fibre-enriched muffins and biscuits



Better for health



Alternative proteins for sponge cakes, with no added milk or egg



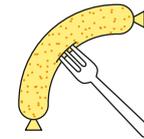
Special diets



Orange juice as a source of fibre



Better for health



Alternative proteins for sausages with less meat



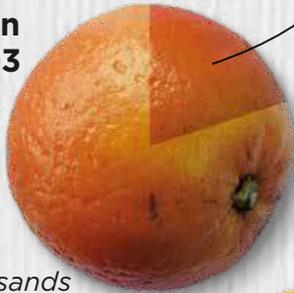
Better for the environment

Upcycling example: orange peel

Orange production

Spain is the country that produces the most oranges in the European Union.

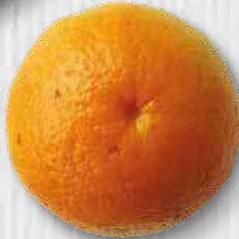
Spain
3,503



20%
is used
for juice

Thousands
of tons per
year (2021)

Italy
1,956



Turkey
1,742



Portugal
320



Greece
851



Cyprus
20



Albania
13



France
8



Juice manufacture



The peel, which is very rich in fibre, is thrown away. **At AZTI, we have shown it can be used for human consumption.**

Waste destination

+ value



Human food
(upcycling)



Better for
the environment



Animal
food



Non-food use
(e.g. compost)



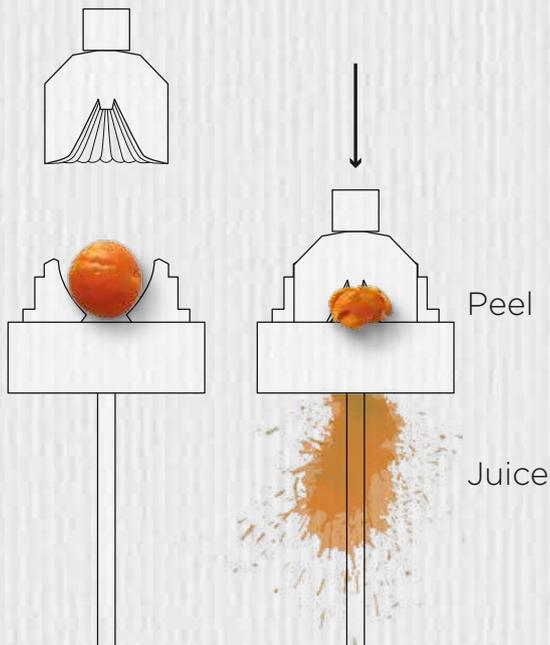
Waste

- value

Sources:
Eurostat, EU Citrus
Annual Report.

1 Orange juice

Oranges are squeezed mechanically to obtain the juice.

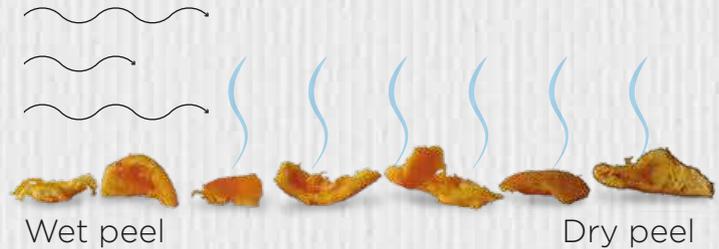


2 Drying the peel

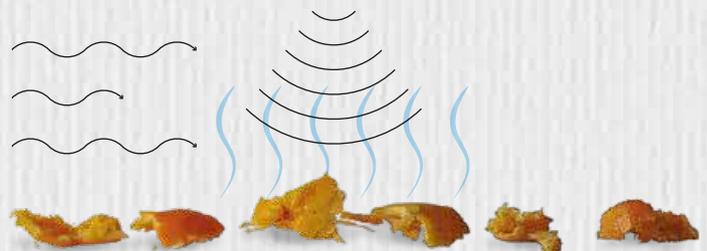
Moisture is efficiently removed so the biomass does not deteriorate.

2 drying techniques:

Hot air



Hot air + microwave

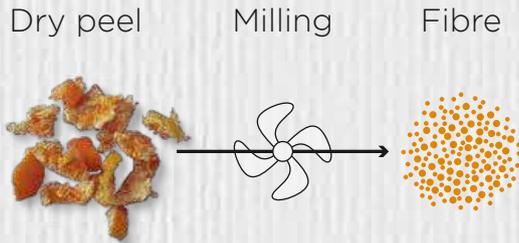


This technology developed by **AZTI** is more time-efficient and creates a fibre with higher water retention capacity



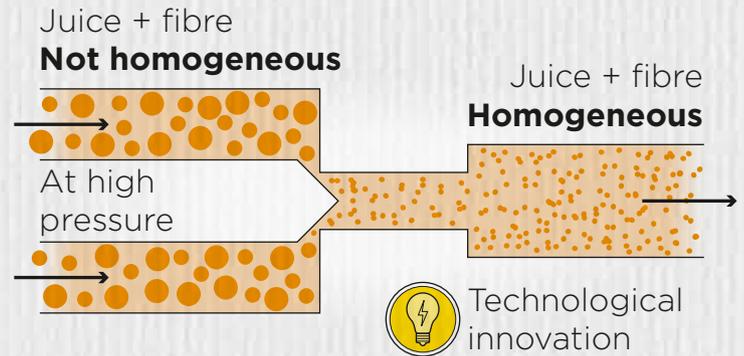
3 Milling

An easy-to-handle powdered fibre with a citrus aroma is obtained.



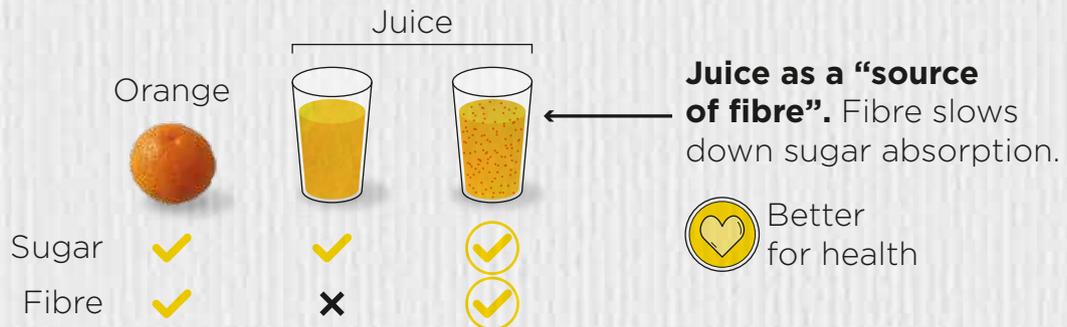
4 Adding the fibre

A juice with fibre is obtained via ultra high pressure homogenisation (UHPH).



ORANGE JUICE WITH FIBRE

Once the fibre is added, the nutritional properties of the juice are similar to oranges.



Are you ready to join the Upcycling movement?

Let us transform your biomass into high
value-added ingredients and foods.

CONTACT US

www.azti.es / consultas@azti.es



MEMBER OF
BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

Parque Tecnológico de Bizkaia
Astondo Bidea, Edificio 609
E-48160 Derio - BIZKAIA (Spain)