



atelier du fruit
Innovons Naturellement

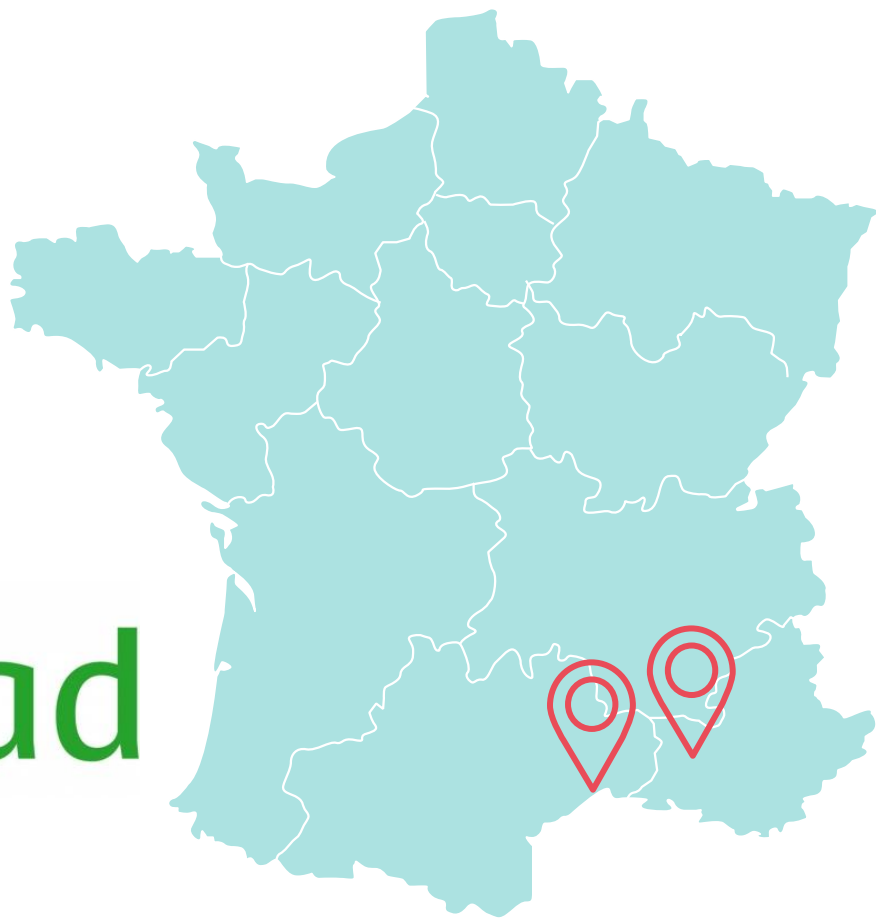
**FERMENTATION AS A SLOW-TECH WAY OF ADDING VALUE TO
POST-HARVEST FRUIT AND VEGETABLES**

Valorial
OSONS L'ALIMENT PLUS INTELLIGENT





WITHIN ACADEMIC CENTRES OF EXCELLENCE



INRAE



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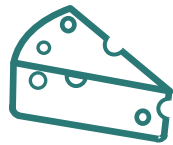
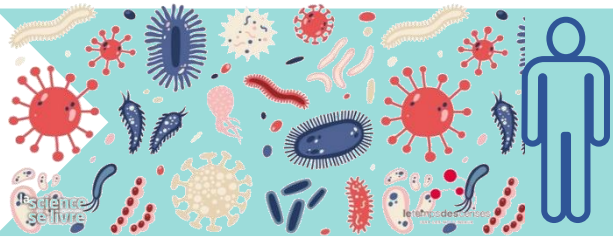
AN ANCESTRAL METHOD

First
civilisation

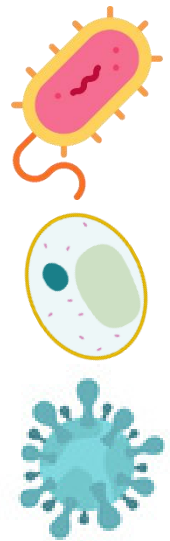
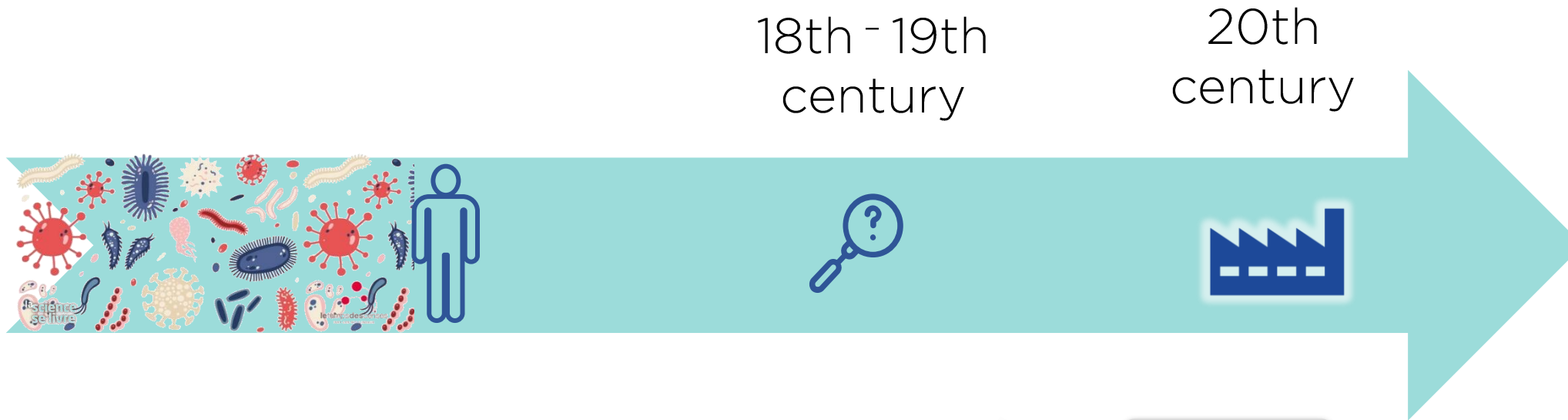


AN ANCESTRAL METHOD

First
civilisation



AN ANCESTRAL METHOD



Bacteria

Yeast

Molds

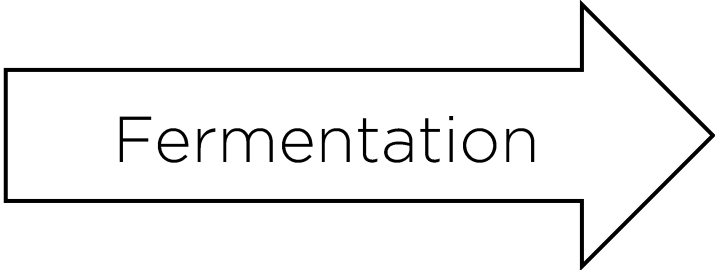


FERMENTATION

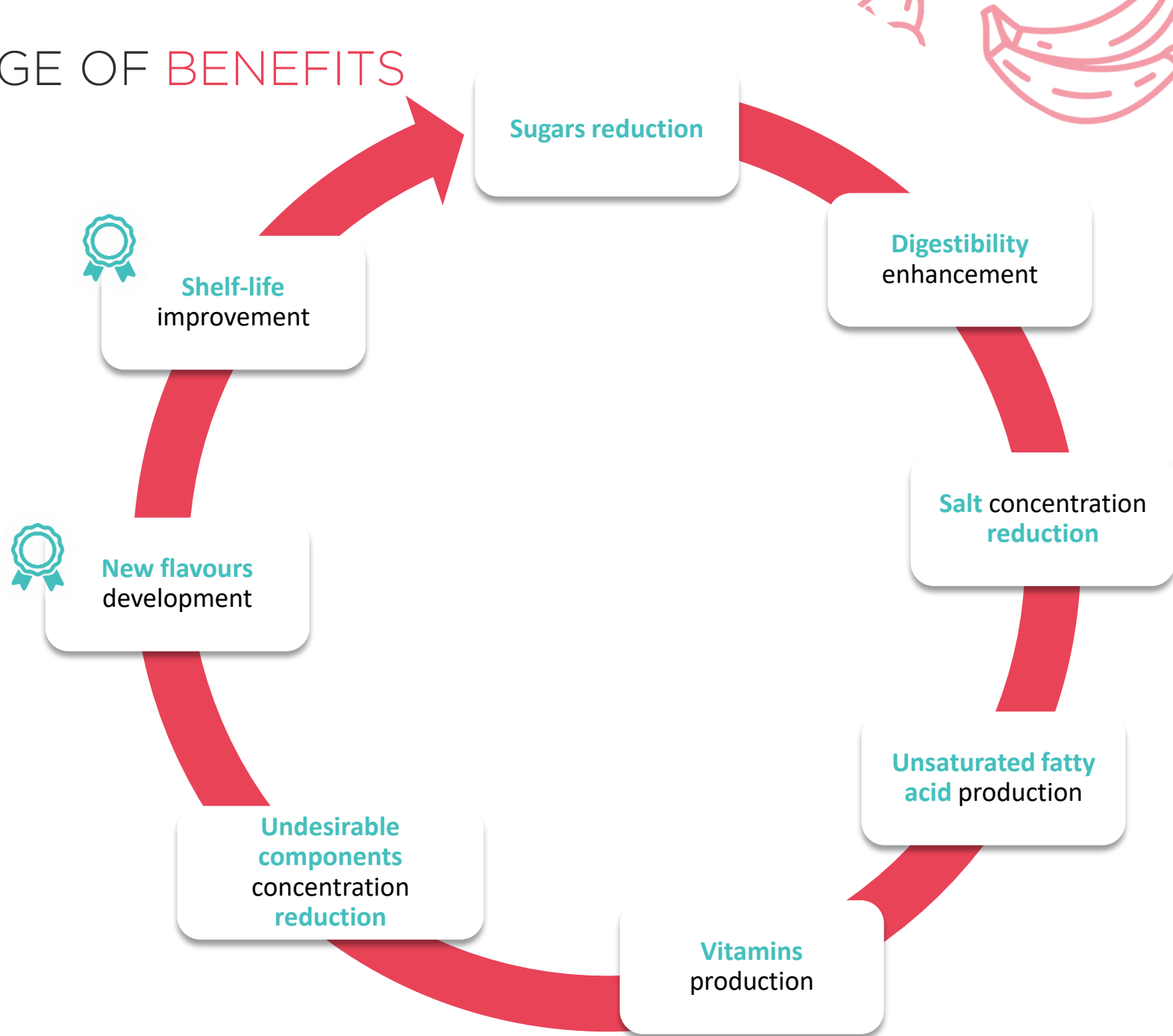
Sugars,
nitrogen,
water

Metabolic
compounds
of interest

A WIDE RANGE OF BENEFITS

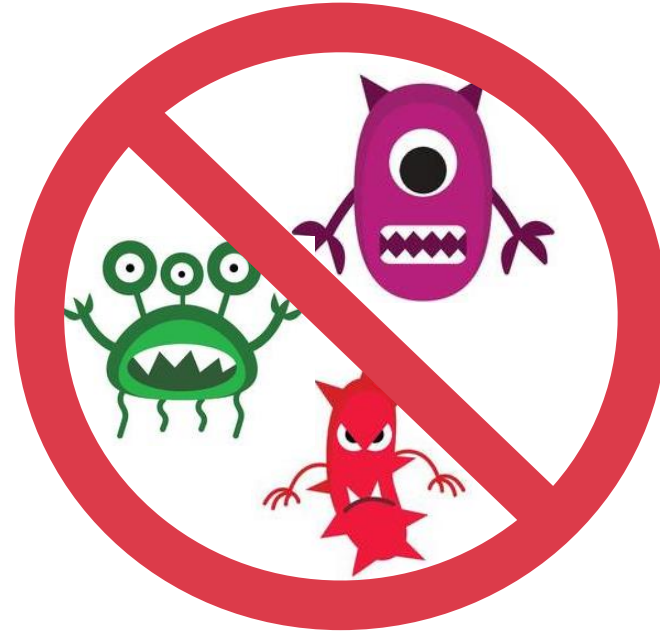


A WIDE RANGE OF BENEFITS



SHELF-LIFE IMPROVEMENT

- Health

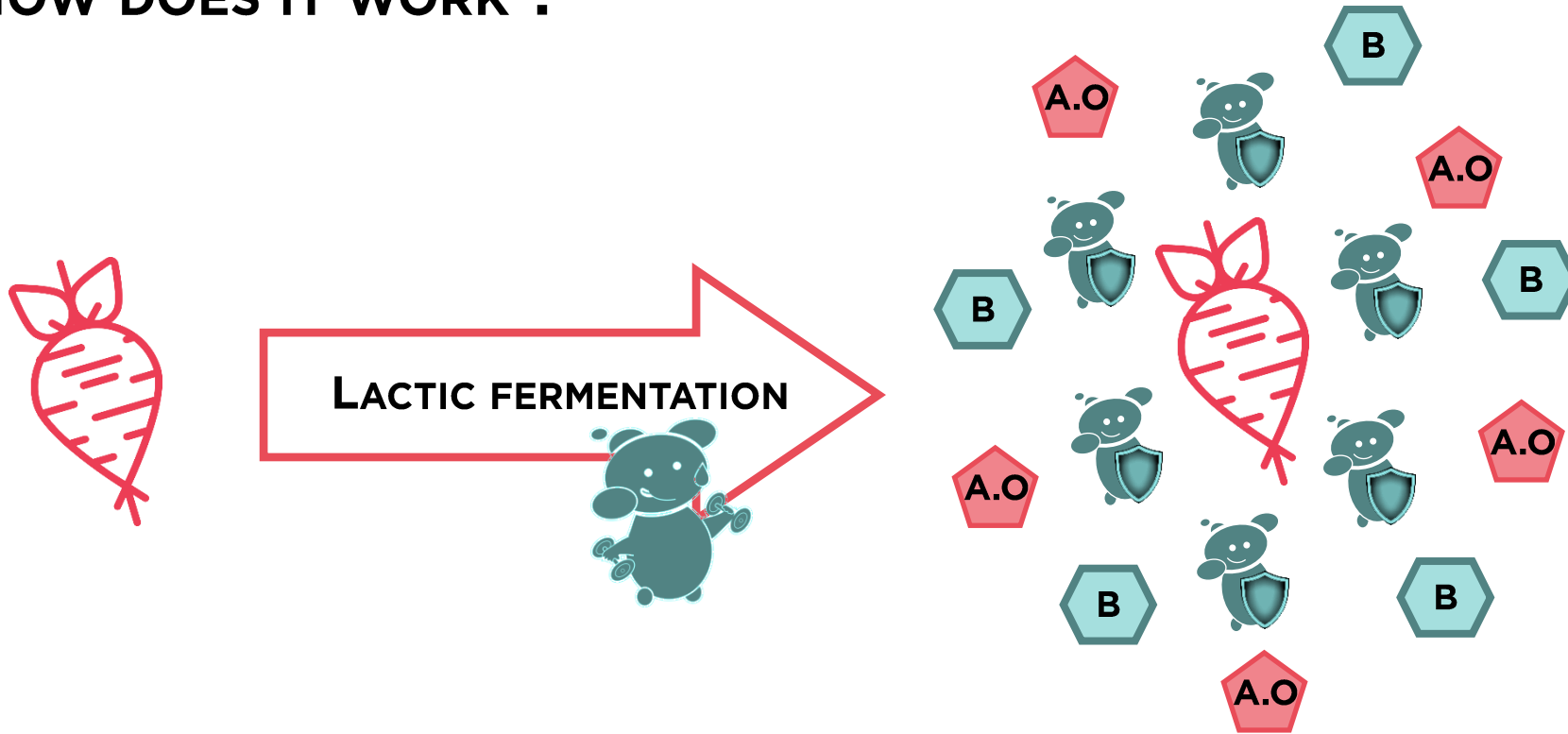


- Organoleptic



SHELF-LIFE IMPROVEMENT

HOW DOES IT WORK ?



PH LOWERING (< 4,5)

➤ No pathogen risk



Biocompetition



Bacteriocins



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SHELF-LIFE IMPROVEMENT

APPLICATIONS & DEVELOPMENTS

- **« ANCESTRAL » USE OF THE LACTIC FERMENTATION**

- Pickled vegetables (with brine)



- BUT :

- STRONG TASTES
 - SPOILAGE FLORA RISKS (YEASTS, MOLDS)



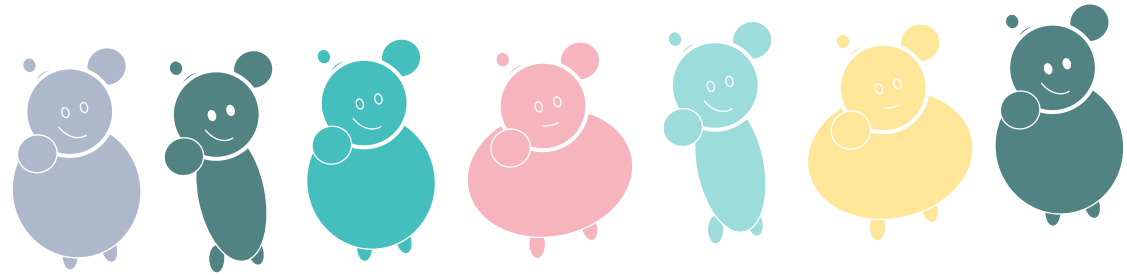
- **BENEFETIS OF CONTROLLING FERMENTATION**

SHELF-LIFE IMPROVEMENT

APPLICATIONS & DEVELOPMENTS

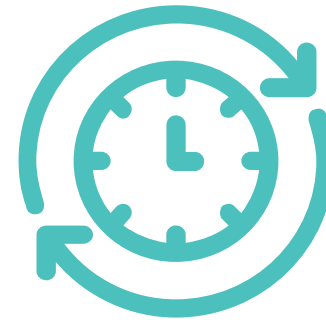
- **FERMENTATION MANAGEMENT**

- LACTIC ACID BACTERIA CHOICE



- ANTIMICROBIAL COMPOUND PRODUCTION CAPACITY

- TEXTURE PRESERVATION



- FRESH TASTE PRESERVATION

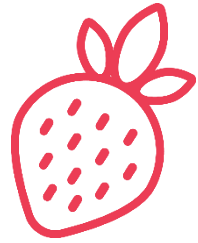
SHELF-LIFE IMPROVEMENT

BENEFITS ?

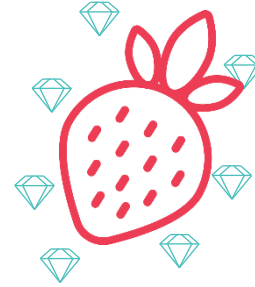
- NATURAL
- TIME SAVING (FRESH BATCH)
- LOSSES LOWERING
- DIFFERENT METHODS :
 - FERMENTATION OF THE PRODUCT TO BE PRESERVED OR ADDITION OF AN ALREADY FERMENTED MATRIX



TASTE MODULATION



FERMENTATION



- Indigenous aromas enhancement
- New/original tastes
- Replacement of exogenous flavors
- Plant-based alternatives
- Texture



« BUTTERY »
« HONEY - SPICY »
« UMAMI »
« LEMON AROMAS »
« CANDY TASTE »





SPONTANEOUS Fermentation

- Indigenous flora
- Not repeatable, not standardised
- Long-term fermentation

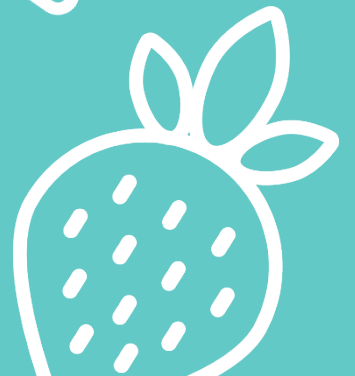


CONTROLLED Fermentation

- Specific microorganisms
- Repeatable, standardised
- Lowered fermentation duration



FERMENTATION PROCESS TIPS

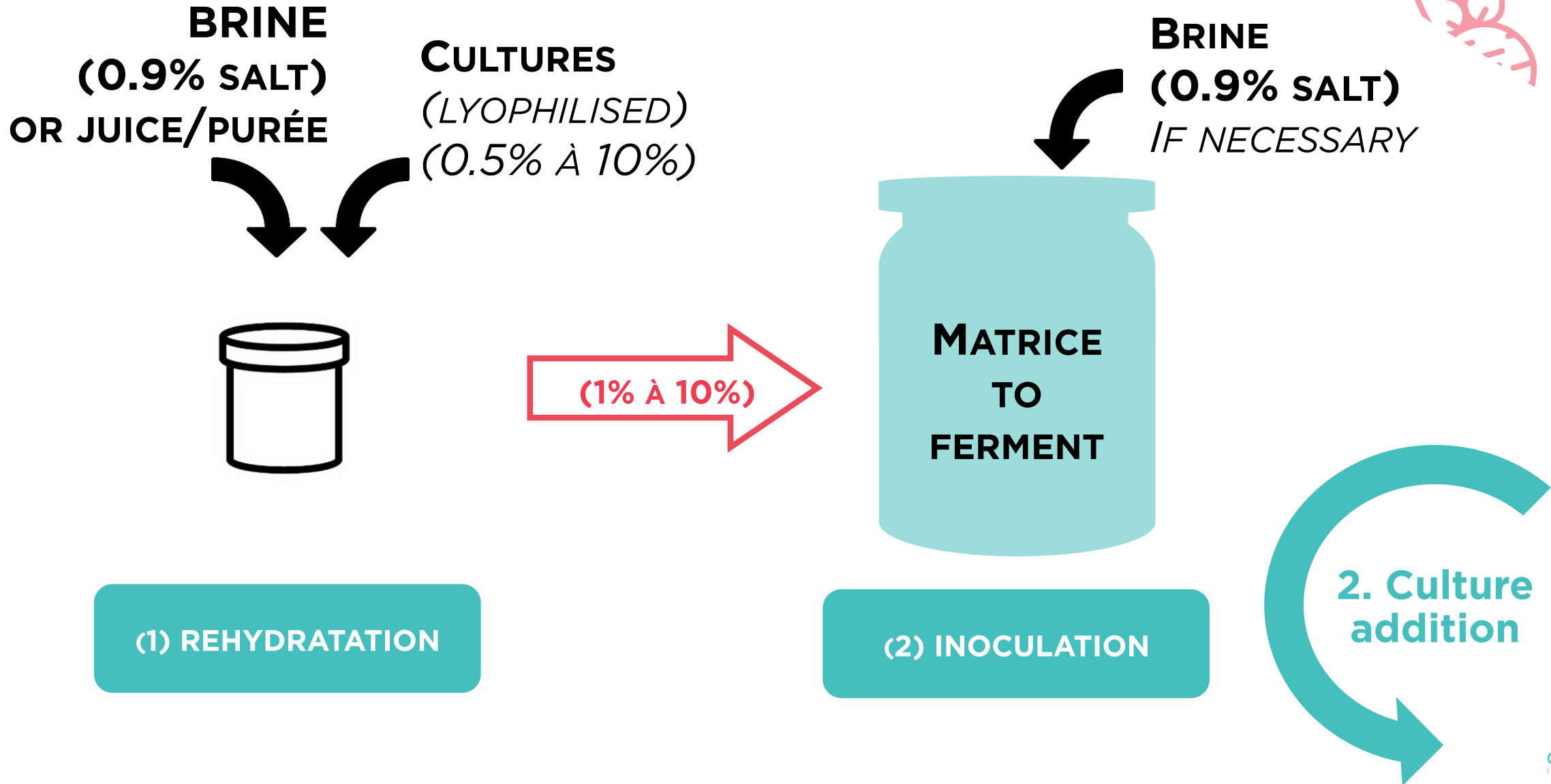


FERMENTATION PROCESS STEPS

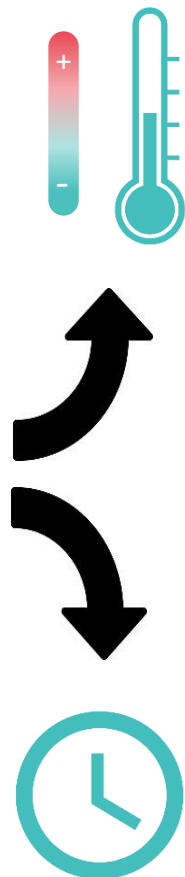
A CLEAN ENVIRONMENT



FERMENTATION PROCESS STEPS



FERMENTATION PROCESS STEPS



TEMPERATURE

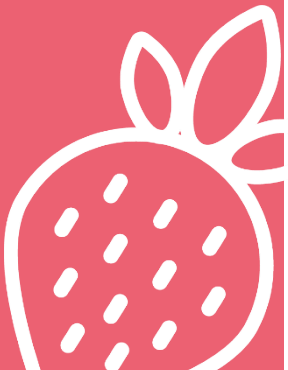
(25°C À 40°C IN FUNCTION OF CULTURES)

DURATION

(FROM 8H TO 72H OR MORE)



**SOME
APPLICATION
IDEAS**



SOME APPLICATION IDEAS

BIOPRESERVATION

Make the most of your vegetables, keep them **fresh longer** and **avoid losses**



LACTIC FERMENTATION

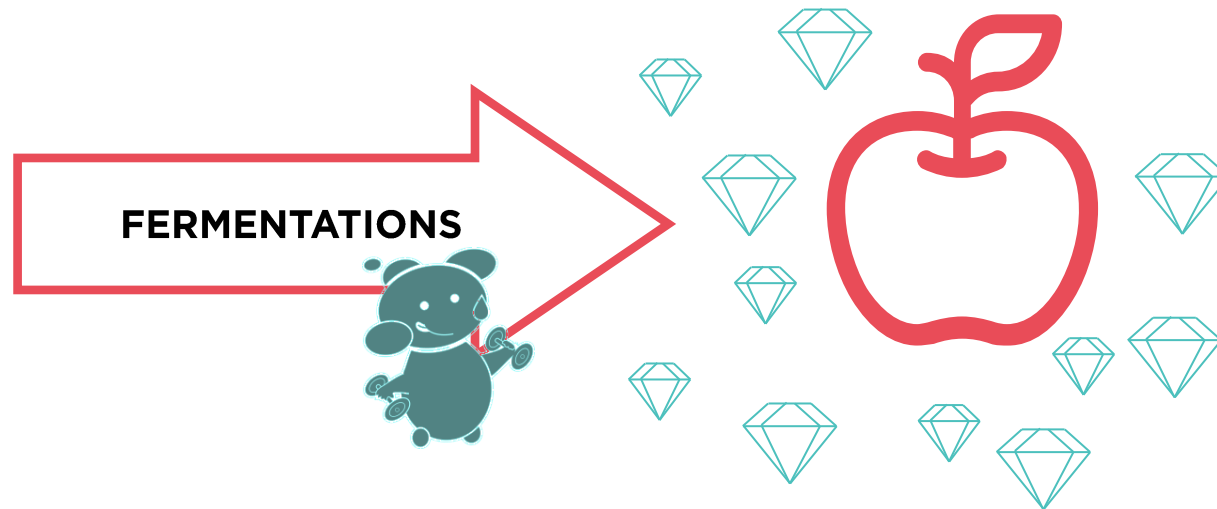
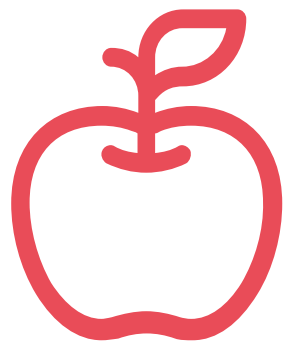


- Room temperature storage
- Several months
- Safe

SOME APPLICATION IDEAS

NEW TASTES

Add a **unique organoleptic signature** to your products in complete **safety**



- Freshness
- Grindy
- Cooked
- Etc...

DOUBLE VALORIZATION

Recycle your **organic waste**!



FERMENTATION
« BOKASHI »



- Compost alternative
- Less odor
- Soil regeneration
- Fully integrated into short supply chains

SOME EXAMPLE OF OUR ACHIEVEMENTS

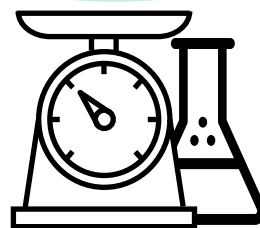
READY-TO-EAT

- Fermented **buckwheat patties**: fresh taste, texture, preservation
- Fermented **fruit and vegetable juices** rich in **prebiotics** and **probiotics**
- **Plant-based yogurts**, naturally flavor modulated through fermentation, nutritionally balanced
- Fermented **tomato purée**, taste of « bolognese » sauce type
- Fermented **apple purée**, with indulgent notes
- **Reduced-sugar fruit juice** (up to 30%)
- Crispier **canned vegetables**



TO CREATE RECIPES

- **Fruit purée with buttery/dairy notes**, ideal for plant-based yogurts, 0% yogurts fruit preparations, pastries,...
- **Fermented ingredients** enabling a 4-day extension in the shelf life of raw fruit purées and juices, without impacting taste
- **Reduced-sugar concentrated fruit juices or purées**, up to 50% reduction, for biscuits, confectionery, breakfast cereals
- **Texture and preservation enhancement of freshly cut vegetables** for ready-to-eat salads



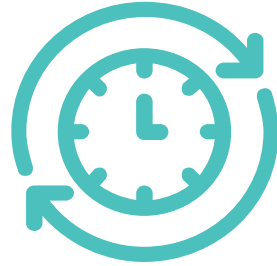
TO VALORISE

- **Lacto-fermentation of food biowaste** (hotels/restaurants, individuals) to stabilize & **reduce collection frequency**
- **Lacto-fermented solution for agronomic valorization** of agri-food industry biowaste



OUR MAIN CHALLENGES

- **Fit with food process timing**



- **Allow robustness and repetability of results**



FERMENTATION : A WIDE RANGE OF APPLICATIONS



Specific know-how



Need ?



Plant based matrice ?

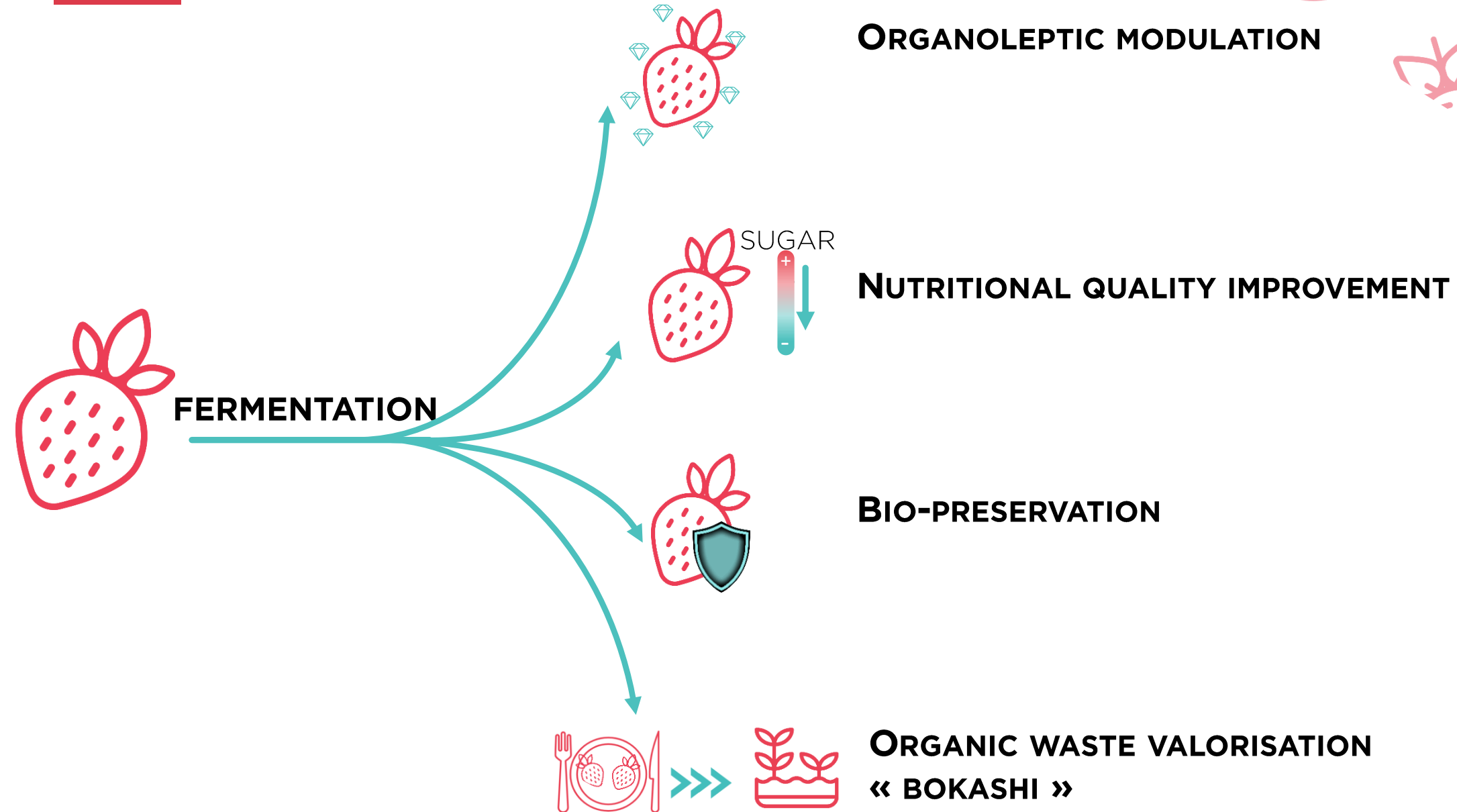


Microorganism ?

OPTIMAL COMBINATION ?

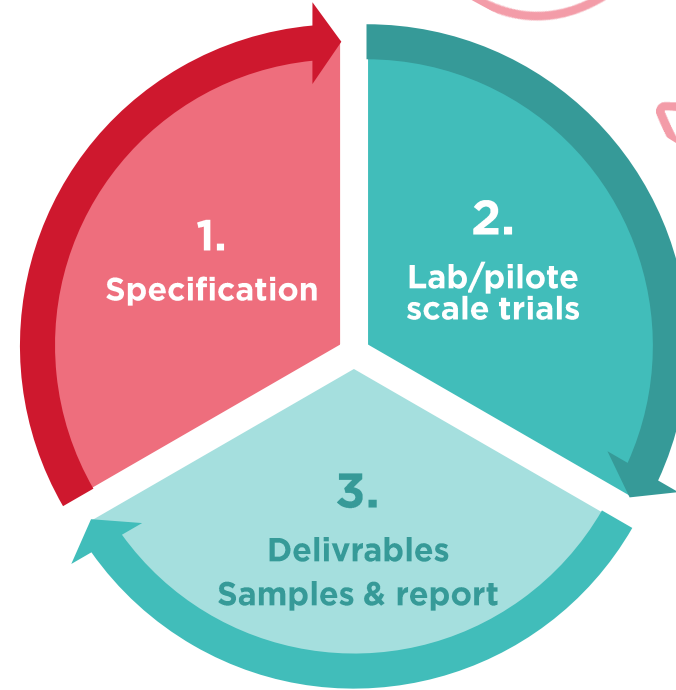


OUR EXPERTISE



OUR OFFER

R&D Services



Fermentation workshops



THANK YOU FOR YOUR ATTENTION !



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