

Department of Life Sciences
University of Modena and Reggio Emilia

Industrial PhD
in Agri-Food Sciences, Technologies
and Bio-Technologies
XXXIII Cycle

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Tutor: Dr. Maria Gullo

Annual Workshop November, 30th 2018

PhD Project



Development of INNOVATIVE
acetification **PROCESSES**

1

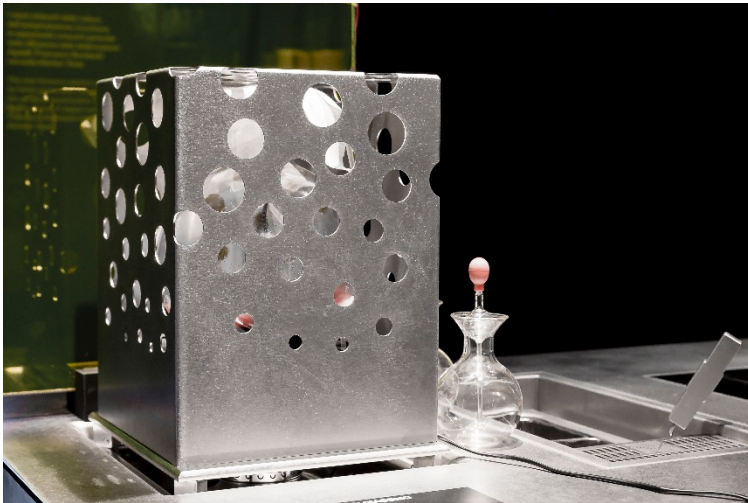
and

INNOVATIVE
vinegar **PRODUCTS**

2

1

PROCESS → KIT for HOME
and RESTAURANT
PRODCUTION of vinegars



1° year

2

PRODUCT → focusing on
UNCONVENTIONAL raw
materials as fermentative
substrate for acetic
fermentations



2° year

2° YEAR FOCUS

Design and development
a new **sustainable** and **healthy**
BEVERAGE/CONDIMENT



1

combining
cheese whey

Kefir

kombucha tea



2

3



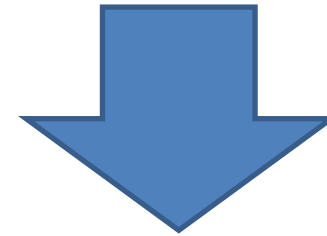
COMBINING SUSTANIBILITY WITH HEALTHY ATTRIBUTES



SUSTAINABILITY

Significant environmental impact
180/190 million of TON per year

Only 50% processed



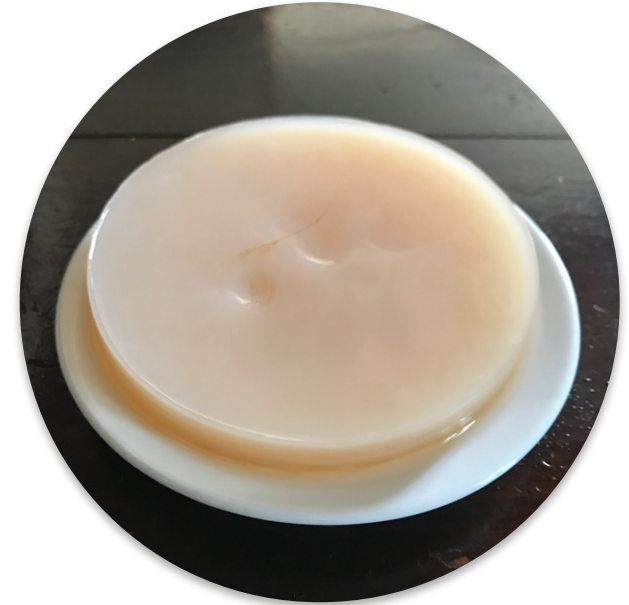
HEALTHY CHARATERISTICS

Not Alchoolic Functional Fermented
Beverage

RAW MATERIALS

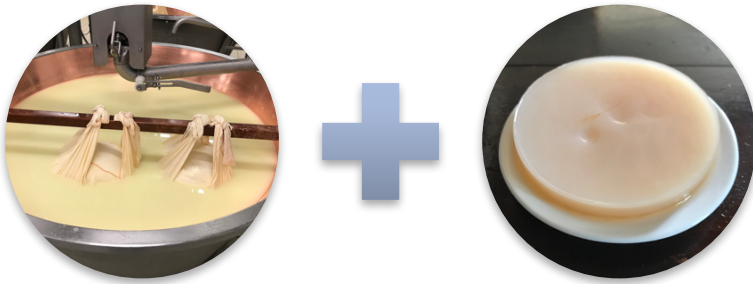


- Pick up from a local dairy immediately after the cheese production
- Refrigeration
- Microbiological analysis → low microbiological load



- Commercial Black Tea + starter + sacrose
- 20 days culture

TEST 1

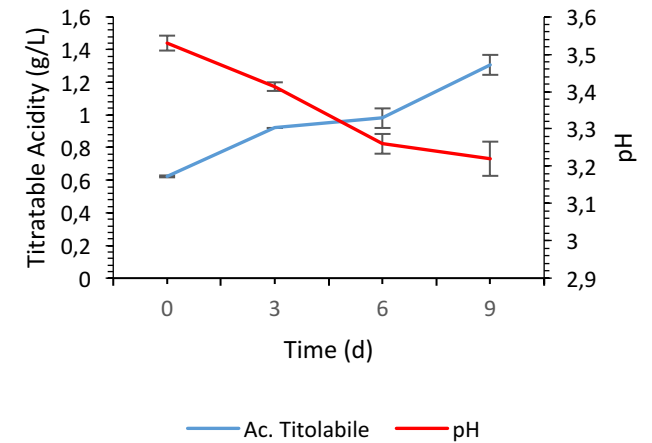


Trial 1

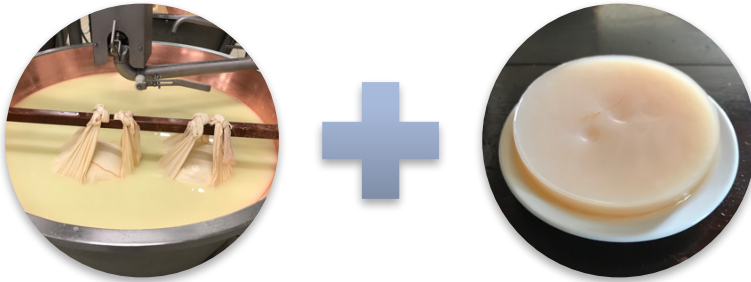
1 : 1
 15 days
 28 °C



TIME (days)	SAMPLE N°	pH	TITRATABLE ACIDITY (g/L)
0	1	3,51	0,62
	2	3,55	0,63
	3	3,53	0,62
3	1	3,42	0,92
	2	3,42	0,92
	3	3,40	0,92
6	1	3,28	0,92
	2	3,27	1,04
	3	3,23	0,98
9	1	3,23	1,24
	2	3,26	1,36
	3	3,17	1,32



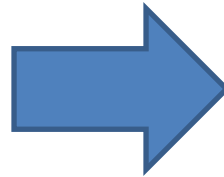
TEST 2



Trial 1

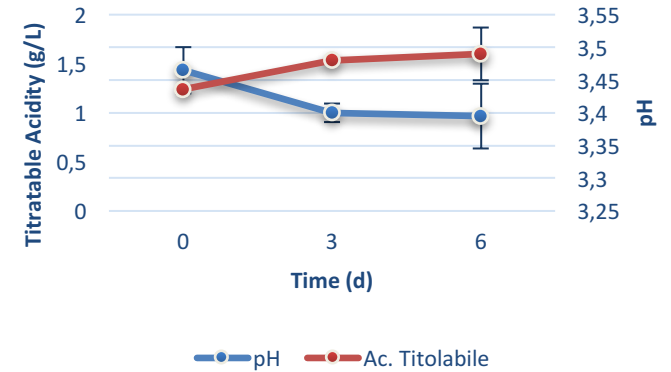


Trial 2



7 days
28 °C

TIME (days)	SAMPLE N°	pH	TITRABLE ACIDITY (g/L)
0	1	3,49	1,24
	2	3,44	1,24
3	1	3,39	1,54
	2	3,41	1,53
6	1	3,36	1,79
	2	3,43	1,41



TEST 3

Trial 2



A selected strain (K2G30) used as starter

Trial 3

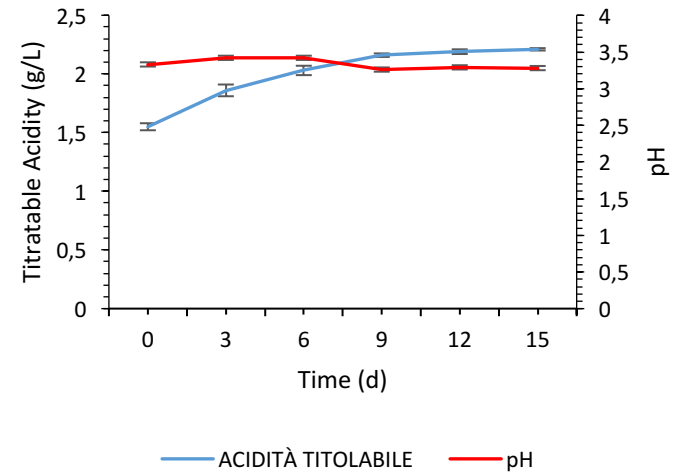


15 days
28 °C



Time (days)	pH	Titratable acidity (g/L)
0	3.33 ± 0.02	1.55 ± 0.03
3	3.42 ± 0.015	1.86 ± 0.05
6	3.42 ± 0.02	2.03 ± 0.04
9	3.26 ± 0.025	2.16 ± 0.015
12	3.29 ± 0.01	2.19 ± 0.02
15	3.28 ± 0.02	2.21 ± 0.01

K2G30	
Isolated from	Kombucha tea
Growth modality in solid medium	Cellulosic
Growth modality in broth	Multilayer
CaCO ₃ consumption	+
Acetic acid production	+
BC production	+
CB (g/L) in GY broth	23,19 g/L
Safely deposited at UMCC	UMCC2756
Species	<i>K. xylinus</i>



CONCLUSIONS AND PERSPECTIVES

- ✓ The selected raw materials (cheese whey, kombucha tea and kefir) possesses fermentative attitude to be used in fermented non-alcoholic beverages development.
- ✓ The strategy used in this study allowed the production of a fermented non-alcoholic beverage having optimal basic fermentation
- ✓ **These preliminary results show that an innovative beverage that combines sustainability with health attributes can be obtained from kombucha tea, cheese whey, kefir culture and a selected strain (K2G30).**
- ✓ **Further studies are aimed to establish parameters for obtaining a drink or a food condiment and to optimize processes conditions.**

THANKS TO
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