



INNOVATION AND TRADITION

**Functional food
opportunity in bread, pizza,
and baked goods with
KluyBread®
(*Kluyveromyces marxianus fragilis* B0399®)**

Functional Bread Symposium

Udine, Scientific and Technological Park «L.Danieli», December 14th, 2017

- By verifying that **lactic acid bacteria** have beneficial effects and can cure certain diseases, **PROBIOTICS** were born.
- The term “lactic” generally refers to the acid produced, and not to the underlying process involved: **LACTIC FERMENTATION**.
- In addition to bacteria, yeasts are also recognized to have probiotic properties. Among these, *Saccharomyces spp.* is the most widespread.
- **Particular interest revolves around the yeast *Kluyveromyces marxianus fragilis* B0399® (KluyBread®)** which shares its ability with other bacteria to produce lactic acid. It is a strain that has been selected, deposited, and registered as a **Probiotic Lactic Yeast®** with its own scientific dossier.

Definition of “probiotic”

➤ FAO and WHO (*Health and Nutritional Properties of Probiotics in Food 2001*):

“Live microorganism which when administered in adequate amounts confer a health benefit on the host”

➤ Ministry of Health (*Guides on Probiotics and Prebiotics, May 2013 revision*):

«microorganisms that have beneficial functions for the host when ingested in large amount»

**THE PROBIOTIC EFFECT IS RESERVED FOR “MICROORGANISMS”,
AND NOT FOR “SUBSTANCES”**


“ParaProbiotic” Concept

➤ **“The probiotic paradox: live and dead cells are biological response modifiers”** (Adams CA. Nutr Res Rev. 2010 Jun;23(1):37-46)

.....the **probiotic paradox** is that both live and dead cells in probiotic products can generate beneficial biological responses.

➤ **“The immunomodulatory properties of probiotic microorganisms beyond their viability (ghost probiotics: proposal of paraprobiotic concept)”** (Taverniti V, Guglielmetti S. Genes Nutr. 2011 Aug; 6(3):261-74)

..... we propose the **new term 'paraprobiotic'** to indicate the use of inactivated microbial cells or cell fractions to confer a health benefit to the consumer.



“Paraprobiotics” are cells or cell fractions from inactive microbial cell cultures which are able to generate a biological response, particularly triggering the host’s immune response. The problems associated with the strain’s half-life or infection of the host due to the change in bacterial microflora, can thus be reduced drastically.

(Capurso L. Recent Prog Med 2016; 107: 267-277267)
Scientific and Technological Park- UDINE

www.TURVAL.COM

Definition of “Prebiotic”

(FAO “*tecnic Meeting Report: Prebiotics*”(Roma, Settembre 2007)

“A prebiotic is a non-viable food component that confers a health benefit on the host associated with modulation of the microbiota”

“Prebiotic substances are primarily indigestible carbohydrates of sometimes microbial origins, which are able to favor the development and/or activity of the intestinal microflora or of microorganisms administered as probiotics”

PROBIOTIC + PREBIOTIC = SYMBIONT *(educational definition)*

The presence of prebiotic substances alongside probiotic microorganisms creates a favorable nutritional environment for the growth of those very microorganisms.

***Kluyveromyces marxianus fragilis B0399® (KluyBread®) è
is a PROBIOTIC/PARAPROBIOTIC/PREBIOTIC/SYMBIONT dependent on
the conditions in which its found***

**It is the only probiotic efficient at low doses: 10^7 (10 million) CFUs per day
Against the standard dose of at least: 10^9 (one billion) CFUs per day**

Italian claim (MINSAN) (on *probiotics and prebiotics*)
“FAVORS BALANCE OF THE INTESTINAL FLORA”

It does not represent an indication on health (*art 2, comma 2, punto 5 del Reg(CE) 1924/2006*) **rather, the acknowledgement of their “efficacy” in a physiological sense.**

Requested characteristics of the microorganisms

- DEPOSITED STRAINS
- SECURE STRAINS (status QPS)
- TRADITIONAL USE
- NO TRANSMISSIBLE ANTIBIOTIC RESISTANCE
- APPROPRIATE DOSE (10^9 UFC/day or, if different, **supported by scientific studies**)

as in the case of KluyBread®
(Kluyveromyces B0399®)

“Kluyveromyces B0399® demonstrated a number of beneficial and strain-specific properties desirable for application as a probiotic”

research done by University of Bologna, Italy and University of Reading, UK and published by the American Society for Microbiology in the scientific journal Applied Environmental Microbiology, 2012 Feb; 78(4).

Characterization is given by:

- Capability of degrading lactose (β -galactosidase/lactase) – homofermentative
- Natural resistance rather than acquired resistance to antibiotics
- Gastric barrier resistance
- Source for prebiotics (GOS, MOS, FOS) and enzymes (β -glucanase, inulinase, etc.)
- Pathogen inhibition and prevention (Clostridia, coliforms, *Candida* etc.)
- Growth and stimulation of favorable endogenous flora even at low doses (10^7 CFU/day)
- Effective against irritable bowel syndrome (IBS) symptoms
- Modulates immune response
- Traditionalism (cheeses, kefir)
- QPS status (EFSA) and FDA-approved

KLUYVEROMYCES B0399 APPROVED BY:



“FUNCTIONAL FOODS”

Innovation and tradition

KluyBread® (*Kluyveromyces marxianus fragilis B0399®*)

EXPANDS

the health and nutritional benefits of the Probiotic Lactic Yeast® into the baking and baked goods sector

KluyBread® (*Kluyveromyces B0399®*)

FUNCTIONAL FOOD:

(Scientific concepts of functional foods in Europe. Consensus document. Br J Nutr 1999;81 Suppl 1:S1-S27)

- 1) Needs to remain a food,**
- 2) Contain natural components that are generally in low concentration or absent in other foods,**
- 3) Manifest its benefits when consumed at its suggested dose**
- 4) Have scientific accreditation**

“KluyBread®” Products

- KLUYBREAD-PH (lyophilized)
- KLUYBREAD-L (liquid)
- KLUYBREAD-SP (spray)

Kluyveromyces marxianus fragilis B0399®
of high purity and titration, either active or inactive.

- PASTAE MATER }

mixed yeast culture with Kluybread®, combined with growth substrate = multistarter inoculum, preformed metabolites, gluten-free.

- UNODUE }

Enzymatic pool at high concentration and stability for the re-equilibration of the rheology of the dough.

Comparison of *Saccharomyces spp./KluyBread*[®] (*Kluyveromyces B0399*[®])

	<i>Saccharomyces spp.</i>	KLUYBREAD [®] (<i>Kluyveromyces B0399</i> [®])
Traditional use	YES	YES
CO ₂ production	YES	NO
Probiotic effect	YES	YES
Prebiotic effect	NO	YES
Lactic acid production	NO	YES
Lactose metabolism (β -galactosidase production)	NO	YES
Biometabolite production	YES	YES

SINERGY *Saccharomyces* spp./KluyBread® (*Kluyveromyces* B0399®):

ACTIVITY	EFFECTS
<p><i>Saccharomyces</i> spp.</p> <p>CO₂ PRODUCTION</p>	<p>DOUGH LEAVENING</p>
<p><i>KluyBread</i>® (<i>Kluyveromyces</i> B0399®)</p> <p>LACTIC FERMENTATION</p> <p>INOCULUM, MULTIPLICATION IN THE DOUGH AND INACTIVATION IN OVEN</p> <p>INACTIVATED/CELLULAR FRAGMENTS IN THE FINAL PRODUCT</p>	<p>RHEOLOGY, TEXTURE, SHELF LIFE</p> <p>PARAPROBIOTIC EFFECT</p> <p>PROBIOTIC EFFECT</p>

MESSAGE FOR THE CONSUMER

The use of KluyBread® (Kluyveromyces B0399®) gives value to the final product in order to amount to a “characterizing ingredient”

As defined in the art. 8 comma 1 del DLvo 109/92 and regulated by the art.22 del Reg (UE)1169/2011 as part of QUID - Quantitative Ingredient Declaration-) that fall under the denominations attributable to

“bread (or other) product with probiotic lactic yeast”

KluyBread® (Kluyveromyces B0399®) is a “probiotic,” but the dough ingredients does not legitimize the message product has “probiotic” attributes (it is not a “probiotic bread”!)



It functions as a paraprobiotic and prebiotic after baking.



Functional Bread Symposium
Udine, Scientific and Technological Park «L.Danieli»,
December 14th, 2017

**THANK YOU FOR YOUR
ATTENTION ON THE
LACTIC YEAST® , KLUYBREAD®**

Laboratori Turval Italia Srl – Head Office and Research Dpt: Scientific and Technological Park
Via Jacopo Linussio, 51 – 33100 Udine (UD) – P. IVA 01883020305
WWW.TURVAL.COM