

# Microbiotas characterized for 19 traditional Italian sourdough breads

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Italy is well-known for aesthetics that play to every sense of the human sensory system: automotive style, espresso, ancient architecture, music, and Fettuccini Alfredo, among much else. Now a team of Italian investigators has analyzed the microbiota of 19 sourdoughs used in traditional Italian breads. They report their findings in the February issue of the journal *Applied and Environmental Microbiology*.

"We found a large diversity of mainly [lactic acid bacteria](#) among the sourdoughs," says principal investigator Marco Gobbetti. "We related such differences to the environmental parameters and the type of flour used; and such [microbial diversity](#) should be considered a sort of fingerprint for the uniqueness of each sourdough."

The research began with the notion of building an Italian sourdough library, wherein all things relating to sourdough—characterizing strains, typical protocols, photos of the bread, etc.—would be available, says Gobbetti. The working hypothesis: "behind the different and non-reproducible features of each bread, there is a microbial consortium that promotes that uniqueness," says Gobbetti. New techniques in biotechnology made possible this analysis, he says.

Some notable findings: the ratio of individual [lactic acid](#) bacteria to yeast cells varied from 100:1 to 10:1, "which is common for sourdoughs," says Gobbetti. Two outliers were Pane di Matera, and Pane Casareccio di Genzano, with ratios of 1000:1 and 1:1, respectively. The number of strains of lactic acid bacteria varied from 5-17. The number of species

of lactic acid bacteria also varied widely among the sourdoughs. Greater diversity of both strains and species probably correlates with a more typical sourdough taste, says Gobbetti.

The investigators note that free amino acids and gamma amino butyric acid (GABA), products of lactic acid bacteria, may increase a sourdough's nutritional value. In particular, "the amount of GABA in 150 g. of Pane di Matera PGI represents the minimum effective daily dose to achieve a lowering of blood pressure in mild hypertensives," says Gobbetti.

Interestingly, specific lactic acid bacteria are often characteristic of sourdoughs from a specific region, according to the report. But these are subject to change. Several years ago, when Pane di Altamura PDO sourdough was characterized, *Lactobacillus plantarum* was found to be the dominant species. This time, *Wickerhamomyces cibaria* and *W. confusa* predominated. Several factors may influence such change, "especially... instability of the sourdough microbiotas during daily back slopping as affected by the type of flour and related autochthonous [lactic acid bacteria]," according to the report. "Indeed, a stable [microbiota](#) over a long period of time has been described only in a few sourdoughs that are used as the sole leavening agent." (Back slopping refers to the procedure for renewing or refreshing the sourdough by taking part of the fermented dough to inoculate new flour and water.)

"The results of this study could be helpful to choose specific starter cultures," the researchers conclude. "This should guarantee a high reproducibility of the quality characterizing the traditional and/or typical breads."

**More information:** F. Minervini, R. Di Cagno, A. Lattanzi, M. De Angelis, L. Antonielli, G. Cardinali, S. Cappelle, and M. Gobbetti, 2012. Lactic acid bacterium and yeast microbiotas of 19 sourdoughs used for

traditional/typical Italian breads: interactions between ingredients and microbial species diversity. *Appl. Environ. Microbiol.* 78:1251-1264.

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