

Supplementary information

Rising together: Exploring Sourdough Fermentation Diversity through Co-design in the HealthFerm Citizen Science Initiative

Subtitle: Sourdough Starter Characteristics, Baker Demographics, and Fermentation Practices across Europe

Annina Meyer^{*,1}, Thomas Gettemans^{*,2}, Jan Patrick Tan^{*,3}, Fabio Tuccillo⁴, Chiara Viretto⁵, Iulia-Roxana Angelescu⁶, Yamina De Bondt⁷, Michelle Neugebauer¹, Ali Zein Alabiden Tlais⁵, Fabio Cavelti¹, Luc De Vuyst², Marco Gobetti⁵, Christophe M. Courtin⁷, Medana Zamfir⁶, Rossana Coda⁴, Laura Nyström³, Stefan Weckx², Nicholas A. Bokulich^{1#}

*These authors contributed equally

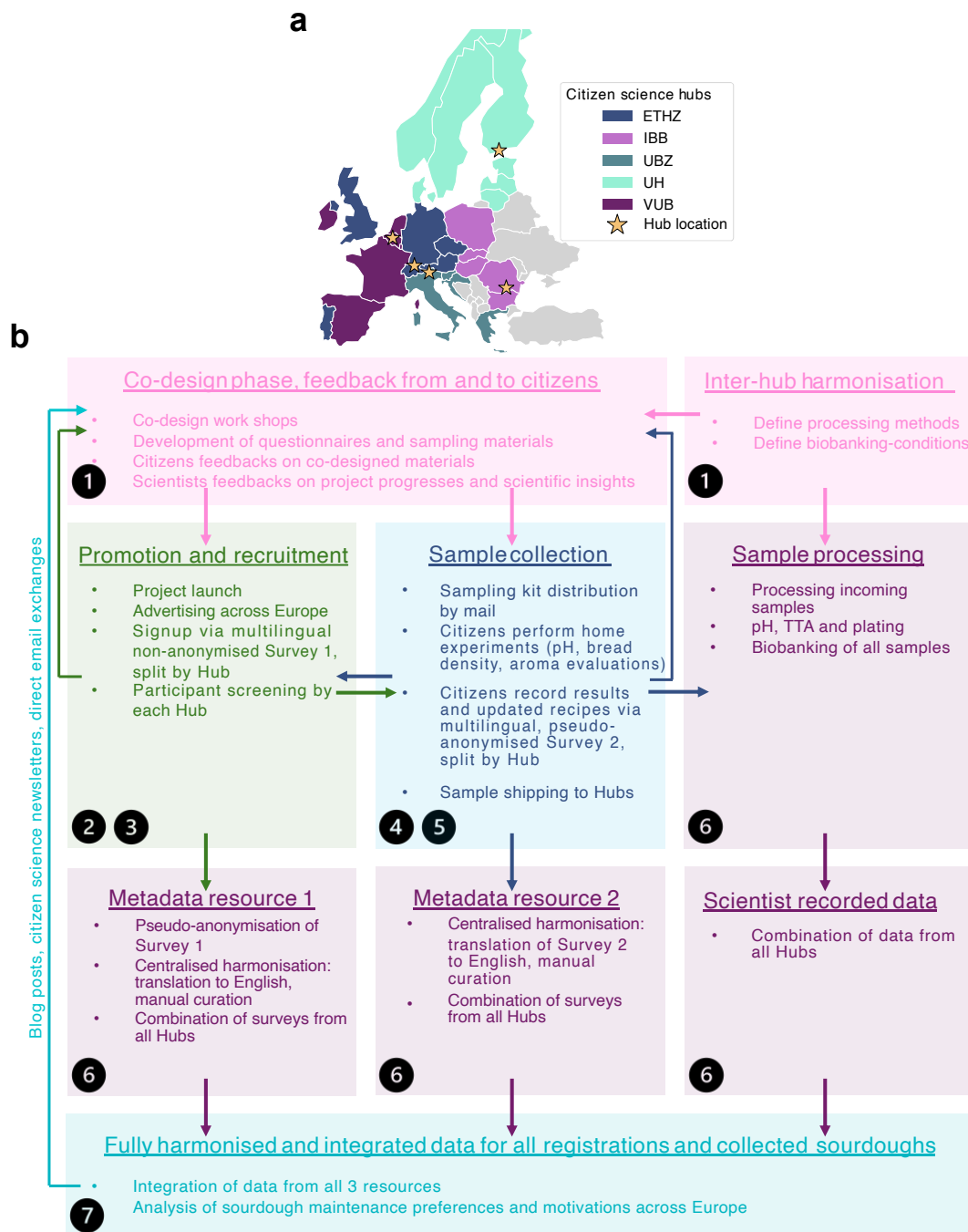
Affiliations

1. Laboratory of Food Systems Biotechnology, Department of Health Sciences and Technology, ETH Zurich, Schmelzbergstrasse 7, 8092 Zurich, Switzerland
2. Research Group of Industrial Microbiology and Food Biotechnology (IMDO), Faculty of Sciences and Bioengineering Sciences, Vrije Universiteit Brussel (VUB), Pleinlaan 2, B-1050 Brussels, Belgium
3. Laboratory of Food Biochemistry, Department of Health Sciences and Technology, ETH Zurich, Schmelzbergstrasse 9, 8092 Zurich, Switzerland
4. Department of Food and Nutrition, University of Helsinki, Agnes Sjöbergin katu 2, 00014 Helsinki, Finland
5. Faculty of Agricultural, Environmental and Food Sciences, Free University of Bolzano-Bozen, 39100 Bolzano, Italy
6. Institute of Biology Bucharest of the Romanian Academy, 296 Splaiul Independentei, Bucharest, Romania
7. Laboratory of Food Chemistry and Biochemistry and Leuven Food Science and Nutrition Research Centre (LFoRCe), KU Leuven, Kasteelpark Arenberg 20, B-3001 Leuven, Belgium

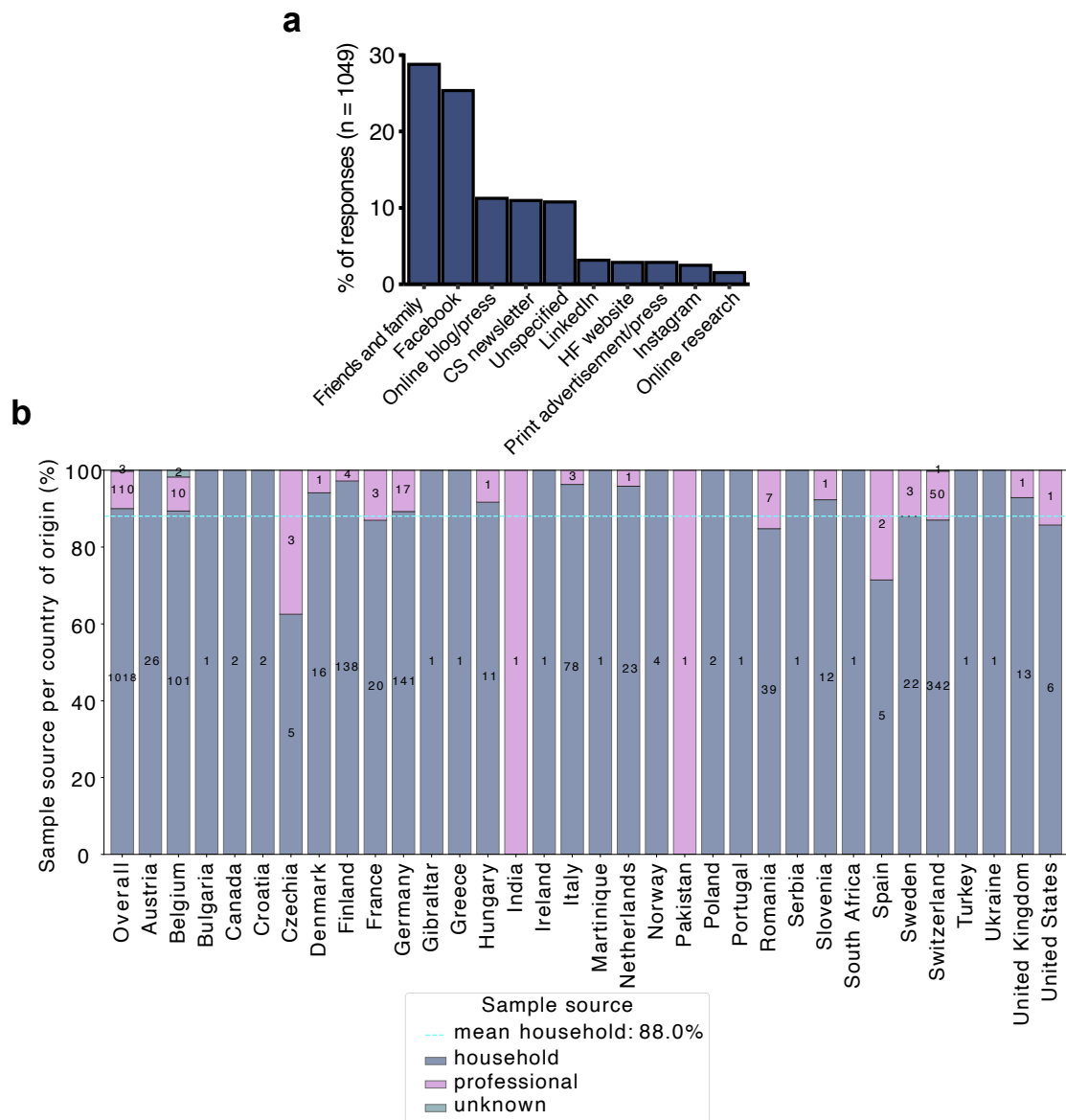
#Correspondence

nicholas.bokulich@hest.ethz.ch

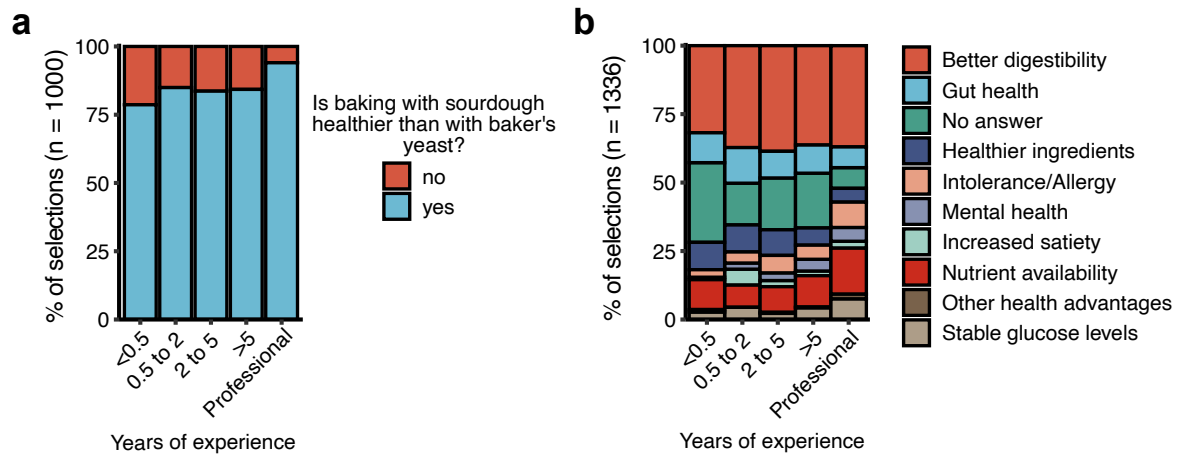
Supplementary figures



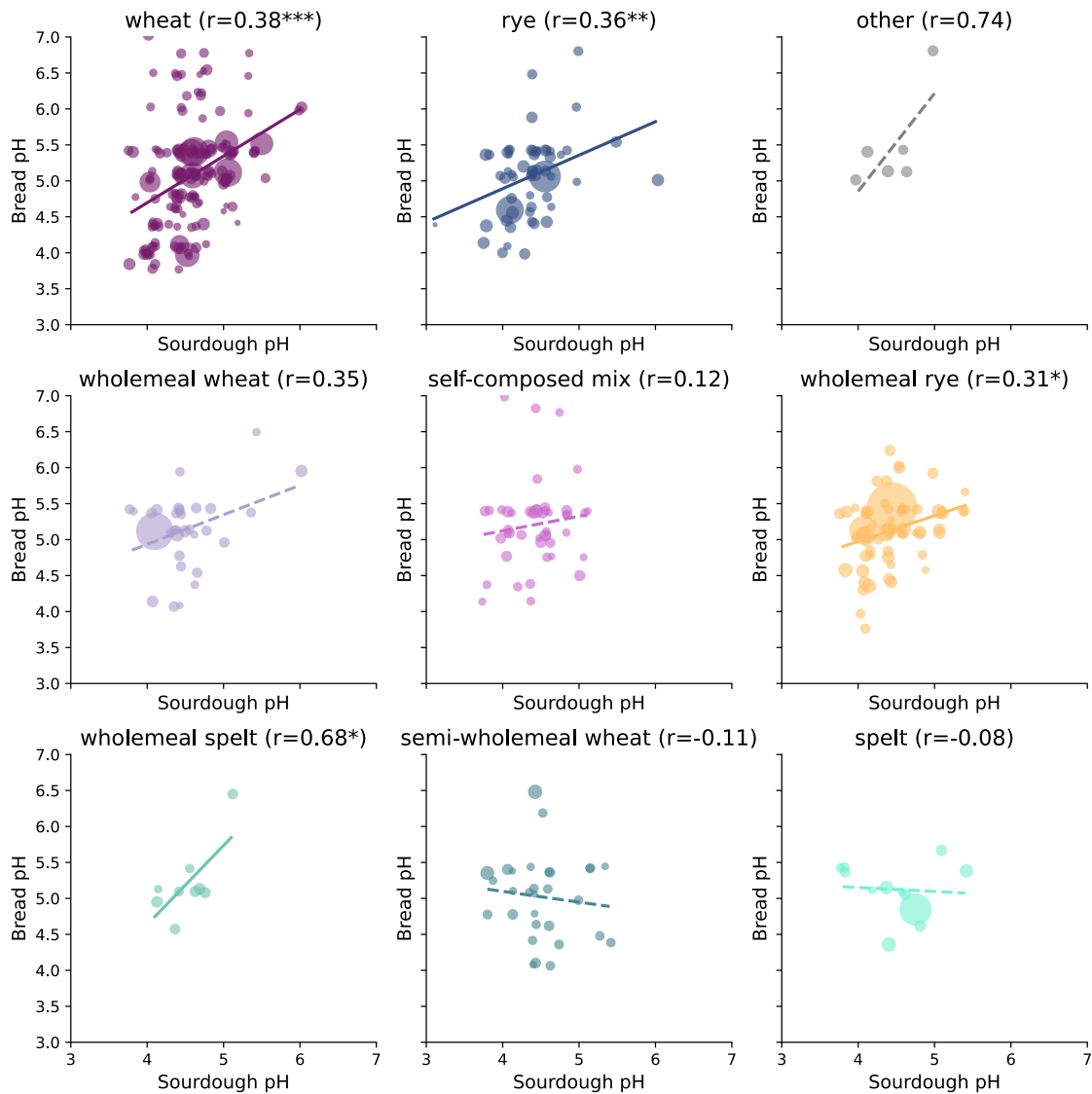
Supplementary Figure 1. Methodological framework and project stages of the co-design-driven HealthFerm sourdough citizen science initiative. **a**, Participating countries and laboratory hubs: ETHZ: ETH Zurich, Switzerland; IBB: Institute of Biology Bucharest, Romania; UBZ: Free University of Bozen-Bolzano, Italy; UH: University of Helsinki, Finland; VUB: Vrije Universiteit Brussel, Belgium. **b**, Schematic outlining the stepwise approach underlying the initiative, including: (1) the co-design phase, involving bidirectional feedback between citizens and scientists; (2–3) advertisement and participant recruitment via Survey 1; (4–5) sample collection and home-based experimental activities, home experiment result reporting via Survey 2; (6) unified sample processing across hubs and centralized harmonization of survey data; and (7) integrated survey data analysis. Communication and engagement channels (e.g., blog posts on the HealthFerm webpage, newsletters, and direct exchanges) supported participant involvement throughout the process.



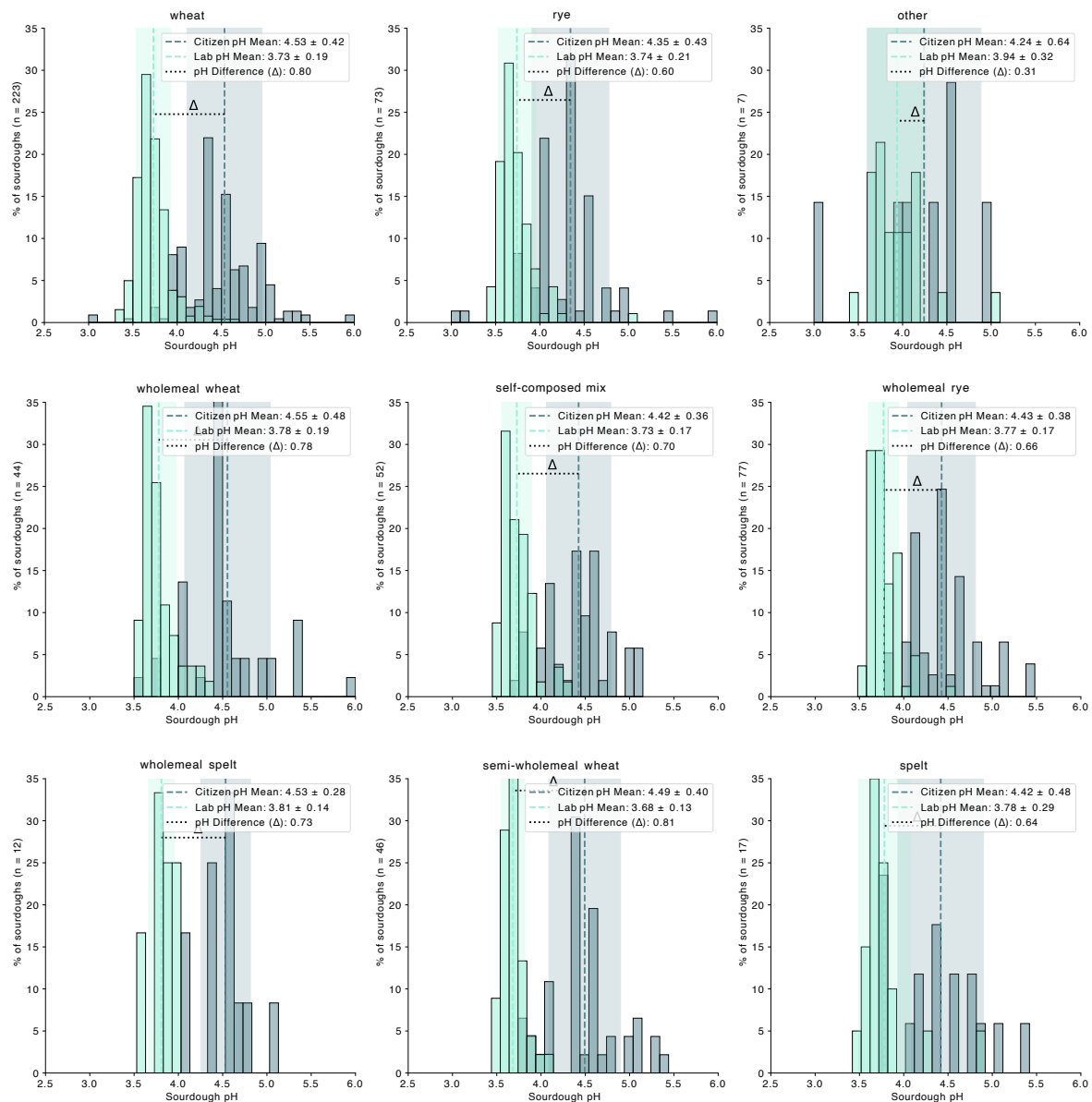
Supplementary Figure 2. Advertisement platforms and signup distributions across countries. **a**, Channels through which participants got in contact with the project team. **b**, Distribution of household and bakery samples across countries. The mean percentage of household samples across all countries is highlighted. Numbers within bars indicate absolute response counts per category.



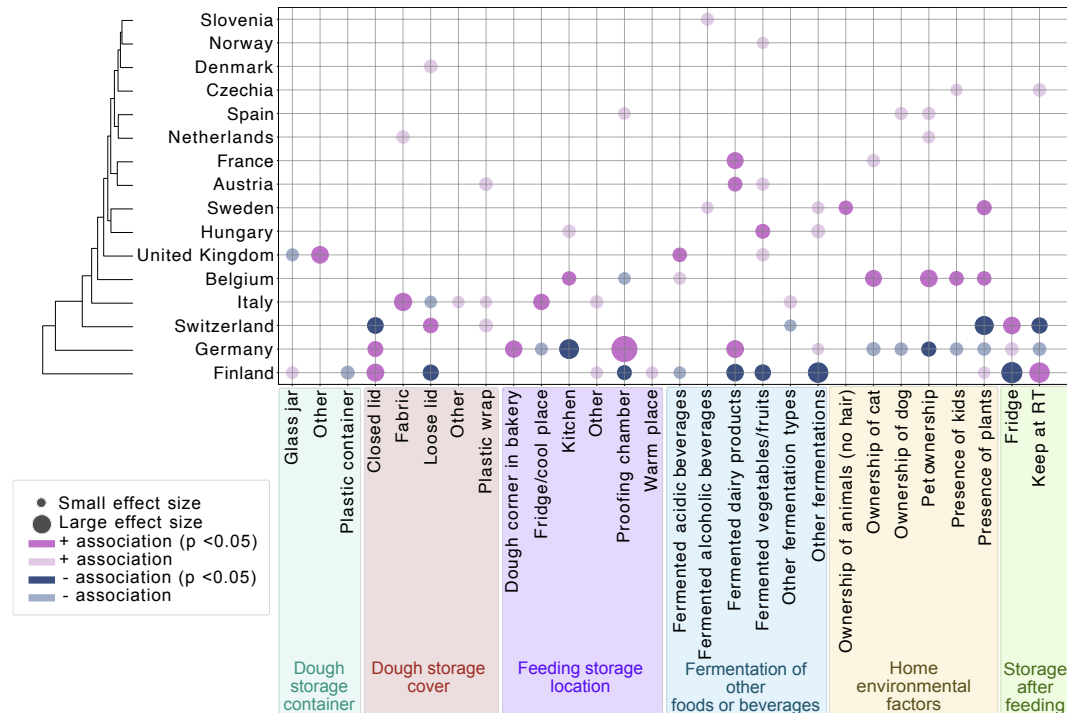
Supplementary Figure 3. Perceived health benefits across skill levels. a, Perception of sourdough bread being healthier than yeast-leavened bread, stratified by self-rated sourdough baking skill levels of all respondents. **b,** Perceived health benefits as specified by participants, stratified by self-rated sourdough baking skill levels of all respondents.



Supplementary Figure 4. Sourdough and bread pH correlations split by flour type. Pearson correlations between sourdough pH and sourdough bread pH as determined in home experiments, split by flour type. Significance of the correlation is marked according to p-values: * <0.05 ; ** <0.01 , *** <0.001 . Bubble sizes are proportional to the bread density assessed by citizens (big bubble size: high bread density; small bubble size: low bread density).



Supplementary Figure 5. Distributions of at-home measured and in the laboratory measured sourdough pH. pH shifts by sourdough flour type, comparing participant-measured pH at home with laboratory pH measurements after sample shipping.



Supplementary Figure 6. Sourdough maintenance practices and home environments among participants across European countries. Bubble plot clustering countries based on similarities in sourdough maintenance practices and home environments. This includes dough storage devices and covers, feeding locations, whether participants ferment other foods or beverages, environmental factors, and where they store their sourdough after feeding. Only countries and subcategories with at least one significant Chi-square association across tested variables are displayed. Associations are color-coded based on their statistical significance (darker shade: BH-FDR corrected p-value < 0.05; lighter shade: uncorrected p-value < 0.05) and whether they show positive or negative enrichment within a given country, non-significant associations are not displayed. Countries are hierarchically clustered based on effect size (Cramér's V) across all features, including both significant and non-significant enrichments, and bubble size corresponds to effect size (Cramér's V).

Supplementary Tables

Supplementary Table 1. Contents of the sampling kit and the purpose of each item.

Items	Purpose
Instruction booklet	Provides an introduction to the project, graphical instructions for the sampling procedure and the at-home experiments along with a QR-code directing to the result questionnaire (deposited on Zenodo; https://doi.org/10.5281/zenodo.15366921)
Sampling container	A sterile container to avoid microbial contamination from participant-provided containers.
Plastic freezer bag	Provides a second barrier in case of sample leakage during shipment.
pH strips and flavour wheels	Required items for performing the at-home experiments.
Prepaid return shipment label	Facilitates sample shipment and covers any costs from the participant.
Project-branded pen and sticker	Souvenir for participation.

Supplementary Table 2. Results of Chi-square enrichment tests for advertisement channels by country (corresponding to Figure 2E). p-values were corrected using the Benjamini–Hochberg false discovery rate (BH-FDR). Indicator codes: PE = positive enrichment, NE = negative enrichment, M = multiple indicators, U = unique indicator.

<i>Category</i>	<i>Cluster</i>	<i>Chi2 Statistic</i>	<i>Cramér's V</i>	<i>Catego ry count</i>	<i>Cluster Total</i>	<i>Category Total</i>	<i>Raw p- value</i>	<i>Corrected p- value</i>	<i>Enrichment Score</i>	<i>Interpretati on</i>	<i>Indicat or</i>
<i>bakery</i>	Belgium	3.2207	0.0551	6	90	32	0.0727	0.1309	2.2104	PE	M
<i>bakery</i>	Switzerland	5.8903	0.0745	18	367	32	0.0152	0.0433	1.6262	PE	M
<i>citizen science or uni newsletter</i>	Germany	0.0473	0.0067	6	149	50	0.8278	0.9511	0.8545	NE	M
<i>citizen science or uni newsletter</i>	Belgium	1.3794	0.0361	7	90	50	0.2402	0.3706	1.6504	PE	M
<i>citizen science or uni newsletter</i>	Austria	4.5433	0.0654	4	26	50	0.0330	0.0744	3.2646	PE	M
<i>citizen science or uni newsletter</i>	Switzerland	4.8158	0.0674	25	367	50	0.0282	0.0662	1.4455	PE	M
<i>citizen science or uni newsletter</i>	Slovenia	6.1778	0.0763	3	13	50	0.0129	0.0411	4.8969	PE	M
<i>direct email</i>	Germany	4.9603	0.0684	14	149	56	0.0259	0.0637	1.7802	PE	M
<i>direct email</i>	Belgium	0.1365	0.0113	6	90	56	0.7118	0.8356	1.2631	PE	M
<i>direct email</i>	Romania	4.2898	0.0636	6	46	56	0.0383	0.0828	2.4713	PE	M
<i>direct email</i>	Switzerland	0.8161	0.0277	23	367	56	0.3663	0.5346	1.1874	PE	M
<i>Facebook</i>	Finland	360.2175	0.5827	126	139	267	0.0000	0.0000	3.6021	PE	M
<i>Facebook</i>	Sweden	11.3041	0.1032	14	25	267	0.0008	0.0032	2.2253	PE	M
<i>Facebook</i>	Germany	39.8325	0.1938	6	149	267	0.0000	0.0000	0.1600	NE	M
<i>Facebook</i>	Netherlands	12.5994	0.1090	14	24	267	0.0004	0.0017	2.3180	PE	M
<i>Facebook</i>	Belgium	0.6391	0.0245	19	90	267	0.4240	0.5871	0.8389	NE	M
<i>Facebook</i>	France	17.9115	0.1299	15	23	267	0.0000	0.0001	2.5916	PE	M
<i>Facebook</i>	Austria	0.2277	0.0146	5	26	267	0.6332	0.7787	0.7642	NE	M
<i>Facebook</i>	Romania	2.9258	0.0525	17	46	267	0.0872	0.1518	1.4686	PE	M
<i>Facebook</i>	Switzerland	117.4117	0.3327	19	367	267	0.0000	0.0000	0.2057	NE	M
<i>Facebook</i>	Italy	3.7341	0.0593	12	78	267	0.0533	0.0993	0.6114	NE	M
<i>Facebook</i>	Slovenia	0.0216	0.0045	4	13	267	0.8831	0.9873	1.2227	PE	M

<i>Facebook</i>	Spain	0.4164	0.0198	3	7	267	0.5187	0.7003	1.7030	PE	M
<i>friends and family</i>	Finland	28.9857	0.1653	9	139	269	0.0000	0.0000	0.2554	NE	M
<i>friends and family</i>	Sweden	0.7315	0.0263	4	25	269	0.3924	0.5576	0.6311	NE	M
<i>friends and family</i>	Denmark	0.2073	0.0140	3	17	269	0.6489	0.7787	0.6960	NE	M
<i>friends and family</i>	United Kingdom	5.9690	0.0750	8	14	269	0.0146	0.0433	2.2539	PE	M
<i>friends and family</i>	Germany	5.2462	0.0703	26	149	269	0.0220	0.0594	0.6883	NE	M
<i>friends and family</i>	Belgium	0.3447	0.0180	20	90	269	0.5571	0.7338	0.8765	NE	M
<i>friends and family</i>	Czechia	7.8586	0.0861	5	6	269	0.0051	0.0171	3.2869	PE	M
<i>friends and family</i>	Romania	4.0915	0.0621	18	46	269	0.0431	0.0875	1.5434	PE	M
<i>friends and family</i>	Switzerland	10.1301	0.0977	115	367	269	0.0015	0.0056	1.2359	PE	M
<i>friends and family</i>	Hungary	18.5717	0.1323	10	12	269	0.0000	0.0001	3.2869	PE	M
<i>friends and family</i>	Italy	2.3959	0.0475	26	78	269	0.1217	0.1991	1.3147	PE	M
<i>friends and family</i>	Slovenia	0.0171	0.0040	4	13	269	0.8959	0.9873	1.2136	PE	M
<i>HealthFerm website</i>	Belgium	5.1177	0.0695	7	90	34	0.0237	0.0609	2.4271	PE	M
<i>HealthFerm website</i>	Austria	17.0908	0.1269	5	26	34	0.0000	0.0002	6.0011	PE	M
<i>HealthFerm website</i>	Switzerland	1.8779	0.0421	16	367	34	0.1706	0.2709	1.3605	PE	M
<i>Instagram</i>	Switzerland	3.7585	0.0595	15	367	28	0.0525	0.0993	1.5488	PE	U
<i>LinkedIn</i>	Denmark	191.0073	0.4243	11	17	34	0.0000	0.0000	20.1920	PE	M
<i>LinkedIn</i>	Switzerland	0.2134	0.0142	10	367	34	0.6441	0.7787	0.8503	NE	M
<i>online research</i>	Belgium	8.0738	0.0872	5	90	16	0.0045	0.0162	3.6840	PE	M
<i>online research</i>	Switzerland	1.0836	0.0320	8	367	16	0.2979	0.4468	1.4455	PE	M
<i>other</i>	Switzerland	0.2888	0.0165	18	367	59	0.5910	0.7598	0.8820	NE	M
<i>other</i>	Italy	224.0940	0.4596	34	78	59	0.0000	0.0000	7.8388	PE	M
<i>press</i>	Sweden	2.7746	0.0511	6	25	122	0.0958	0.1616	2.0872	PE	M
<i>press</i>	Belgium	0.0027	0.0016	11	90	122	0.9583	1.0000	1.0629	PE	M
<i>press</i>	Switzerland	129.7522	0.3497	99	367	122	0.0000	0.0000	2.3460	PE	M
<i>press</i>	Italy	4.0670	0.0619	3	78	122	0.0437	0.0875	0.3345	NE	M
<i>sourdough blog</i>	Germany	577.7783	0.7379	91	149	94	0.0000	0.0000	6.8935	PE	U

Supplementary Table 3. Chi-square enrichment test results for baking motivations across flour types used (related to Figure 4C). p-values were corrected using the Benjamini–Hochberg false discovery rate (BH-FDR). Indicator codes: PE = positive enrichment, NE = negative enrichment, M = multiple indicators, U = unique indicator.

<i>Feature</i>	<i>Category</i>	<i>Cluster</i>	<i>Chi2 Statistic</i>	<i>Cramér's V</i>	<i>Category count</i>	<i>Cluster Total</i>	<i>Category Total</i>	<i>Raw p- value</i>	<i>Corrected p- value</i>	<i>Enrichment Score</i>	<i>Interpretation</i>	<i>Indicator</i>
<i>Baking Motivation: Enjoy Baking</i>	yes	endosperm	0.5807	0.0227	445	638	800	0.4460	0.6918	0.9861	NE	M
<i>Baking Motivation: Enjoy Baking</i>	yes	mix	6.3947	0.0752	116	145	800	0.0114	0.0870	1.1310	PE	M
<i>Baking Motivation: Enjoy Baking</i>	yes	organic: no	0.0313	0.0053	309	432	800	0.8596	0.8596	0.9942	NE	M
<i>Baking Motivation: Enjoy Baking</i>	yes	other	4.8249	0.0664	116	145	788	0.0281	0.1247	1.1107	PE	M
<i>Baking Motivation: Enjoy Baking</i>	yes	other	17.1397	0.1231	10	29	800	0.0000	0.0007	0.4875	NE	M
<i>Baking Motivation: Enjoy Baking</i>	yes	rye	0.0115	0.0032	212	296	788	0.9147	0.9628	0.9943	NE	M
<i>Baking Motivation: Enjoy Baking</i>	yes	spelt	5.3434	0.0699	29	51	788	0.0208	0.1234	0.7894	NE	M
<i>Baking Motivation: Enjoy Baking</i>	yes	wheat	0.0821	0.0087	431	602	788	0.7745	0.9628	0.9940	NE	M
<i>Baking Motivation: Enjoy Baking</i>	yes	wholemeal	0.1724	0.0123	229	319	800	0.6780	0.8437	1.0149	PE	M
<i>Baking Motivation: Enjoy Baking</i>	yes	organic: yes	0.0313	0.0053	491	680	800	0.8596	0.8596	1.0037	PE	M
<i>Baking Motivation: Health</i>	yes	endosperm	1.1958	0.0325	317	638	579	0.2742	0.5893	0.9706	NE	M
<i>Baking Motivation: Health</i>	yes	mix	0.0948	0.0092	72	145	579	0.7581	0.8730	0.9699	NE	M
<i>Baking Motivation: Health</i>	yes	organic: no	4.0970	0.0607	208	432	579	0.0430	0.2148	0.9247	NE	M
<i>Baking Motivation: Health</i>	yes	other	0.1812	0.0129	72	145	565	0.6703	0.8938	0.9615	NE	M
<i>Baking Motivation: Health</i>	yes	other	1.5859	0.0374	11	29	579	0.2079	0.5554	0.7409	NE	M
<i>Baking Motivation: Health</i>	yes	rye	10.3556	0.0973	177	296	565	0.0013	0.0129	1.1578	PE	M
<i>Baking Motivation: Health</i>	yes	spelt	0.2786	0.0160	24	51	565	0.5976	0.8333	0.9112	NE	M
<i>Baking Motivation: Health</i>	yes	wheat	5.0102	0.0677	292	602	565	0.0252	0.1247	0.9392	NE	M
<i>Baking Motivation: Health</i>	yes	wholemeal	4.0334	0.0597	179	319	579	0.0446	0.2825	1.0961	PE	M

<i>Baking Motivation: Health</i>	yes	organic:	4.0970	0.0607	371	680	579	0.0430	0.2148	1.0478	PE	M
<i>Baking Motivation: Lower Cost</i>	yes	yes endosperm	0.4422	0.0198	87	638	162	0.5061	0.7439	0.9520	NE	M
<i>Baking Motivation: Lower Cost</i>	yes	mix	0.6890	0.0247	17	145	162	0.4065	0.6866	0.8185	NE	M
<i>Baking Motivation: Lower Cost</i>	yes	organic: no	0.2001	0.0134	66	432	162	0.6547	0.8510	1.0487	PE	M
<i>Baking Motivation: Lower Cost</i>	yes	other	0.8176	0.0273	17	145	159	0.3659	0.6418	0.8067	NE	M
<i>Baking Motivation: Lower Cost</i>	yes	rye	0.4515	0.0203	47	296	159	0.5016	0.7717	1.0925	PE	M
<i>Baking Motivation: Lower Cost</i>	yes	spelt	1.4043	0.0358	4	51	159	0.2360	0.6005	0.5396	NE	M
<i>Baking Motivation: Lower Cost</i>	yes	wheat	0.2688	0.0157	91	602	159	0.6042	0.8333	1.0401	PE	M
<i>Baking Motivation: Lower Cost</i>	yes	wholemeal	3.4224	0.0550	56	319	162	0.0643	0.2931	1.2256	PE	M
<i>Baking Motivation: Lower Cost</i>	yes	organic: yes endosperm	0.2001	0.0134	96	680	162	0.6547	0.8510	0.9691	NE	M
<i>Baking Motivation: Taste</i>	yes	mix	0.7697	0.0261	499	638	896	0.3803	0.6722	0.9873	NE	M
<i>Baking Motivation: Taste</i>	yes	organic: no	2.7965	0.0497	123	145	896	0.0945	0.3264	1.0708	PE	M
<i>Baking Motivation: Taste</i>	yes	other	0.7548	0.0261	342	432	896	0.3850	0.6416	0.9825	NE	M
<i>Baking Motivation: Taste</i>	yes	other	1.5951	0.0382	123	145	882	0.2066	0.5903	1.0522	PE	M
<i>Baking Motivation: Taste</i>	yes	other	33.4556	0.1720	10	29	896	0.0000	0.0000	0.4353	NE	M
<i>Baking Motivation: Taste</i>	yes	rye	1.0181	0.0305	245	296	882	0.3130	0.6260	1.0267	PE	M
<i>Baking Motivation: Taste</i>	yes	spelt	4.1534	0.0616	35	51	882	0.0416	0.1511	0.8512	NE	M
<i>Baking Motivation: Taste</i>	yes	wheat	0.8068	0.0272	479	602	882	0.3691	0.6418	0.9869	NE	M
<i>Baking Motivation: Taste</i>	yes	wholemeal	3.0837	0.0522	264	319	896	0.0791	0.3005	1.0446	PE	M
<i>Baking Motivation: Taste</i>	yes	organic: yes endosperm	0.7548	0.0261	554	680	896	0.3850	0.6416	1.0111	PE	M
<i>Baking Motivation: Tradition</i>	yes	mix	3.2968	0.0540	54	638	81	0.0694	0.2931	1.1818	PE	M
<i>Baking Motivation: Tradition</i>	yes	organic: no	0.9900	0.0296	7	145	81	0.3197	0.6231	0.6741	NE	M
<i>Baking Motivation: Tradition</i>	yes	other	0.8823	0.0282	27	432	81	0.3476	0.6416	0.8580	NE	M
<i>Baking Motivation: Tradition</i>	yes	rye	1.1296	0.0321	7	145	80	0.2879	0.6260	0.6602	NE	M
<i>Baking Motivation: Tradition</i>	yes	spelt	13.1166	0.1095	36	296	80	0.0003	0.0093	1.6632	PE	M
<i>Baking Motivation: Tradition</i>	yes	spelt	4.3140	0.0628	8	51	80	0.0378	0.1511	2.1451	PE	M

<i>Baking Motivation: Tradition</i>	yes	wheat	11.4924	0.1025	29	602	80	0.0007	0.0093	0.6588	NE	M
<i>Baking Motivation: Tradition</i>	yes	wholemeal	0.3615	0.0179	20	319	81	0.5477	0.7633	0.8754	NE	M
<i>Baking Motivation: Tradition</i>	yes	organic: yes	0.8823	0.0282	54	680	81	0.3476	0.6416	1.0902	PE	M
<i>Perceived Benefit: Better Digestibility</i>	yes	endosperm	0.5907	0.0229	307	638	532	0.4421	0.6918	1.0230	PE	M
<i>Perceived Benefit: Better Digestibility</i>	yes	mix	0.1672	0.0122	71	145	532	0.6826	0.8437	1.0410	PE	M
<i>Perceived Benefit: Better Digestibility</i>	yes	organic: no	0.1530	0.0117	203	432	532	0.6956	0.8510	0.9822	NE	M
<i>Perceived Benefit: Better Digestibility</i>	yes	other	0.0135	0.0035	71	145	527	0.9075	0.9628	1.0165	PE	M
<i>Perceived Benefit: Better Digestibility</i>	yes	other	11.8702	0.1024	4	29	532	0.0006	0.0054	0.2932	NE	M
<i>Perceived Benefit: Better Digestibility</i>	yes	rye	0.0154	0.0038	144	296	527	0.9012	0.9628	1.0099	PE	M
<i>Perceived Benefit: Better Digestibility</i>	yes	spelt	0.0004	0.0006	24	51	527	0.9845	1.0000	0.9769	NE	M
<i>Perceived Benefit: Better Digestibility</i>	yes	wheat	0.0330	0.0055	288	602	527	0.8558	0.9628	0.9931	NE	M
<i>Perceived Benefit: Better Digestibility</i>	yes	organic: yes	0.1530	0.0117	329	680	532	0.6956	0.8510	1.0113	PE	M
<i>Perceived Benefit: Gut Health</i>	yes	endosperm	3.3650	0.0545	70	638	143	0.0666	0.2931	0.8678	NE	M
<i>Perceived Benefit: Gut Health</i>	yes	mix	12.4166	0.1048	32	145	143	0.0004	0.0054	1.7455	PE	M
<i>Perceived Benefit: Gut Health</i>	yes	organic: no	1.2381	0.0334	49	432	143	0.2658	0.6416	0.8820	NE	M
<i>Perceived Benefit: Gut Health</i>	yes	other	11.9370	0.1045	32	145	140	0.0006	0.0093	1.7245	PE	M
<i>Perceived Benefit: Gut Health</i>	yes	rye	1.6890	0.0393	31	296	140	0.1937	0.5903	0.8184	NE	M
<i>Perceived Benefit: Gut Health</i>	yes	spelt	0.7178	0.0256	9	51	140	0.3969	0.6615	1.3790	PE	M
<i>Perceived Benefit: Gut Health</i>	yes	wheat	2.4130	0.0470	68	602	140	0.1203	0.4011	0.8827	NE	M
<i>Perceived Benefit: Gut Health</i>	yes	wholemeal	0.0275	0.0049	39	319	143	0.8684	0.9072	0.9669	NE	M
<i>Perceived Benefit: Gut Health</i>	yes	organic: yes	1.2381	0.0334	94	680	143	0.2658	0.6416	1.0749	PE	M
<i>Perceived Benefit: Healthier Ingredients</i>	yes	endosperm	0.0215	0.0044	67	638	121	0.8833	0.9072	0.9816	NE	M
<i>Perceived Benefit: Healthier Ingredients</i>	yes	mix	0.3355	0.0172	13	145	121	0.5625	0.7633	0.8380	NE	M
<i>Perceived Benefit: Healthier Ingredients</i>	yes	organic: no	0.0887	0.0089	45	432	121	0.7659	0.8510	0.9573	NE	M
<i>Perceived Benefit: Healthier Ingredients</i>	yes	other	0.4709	0.0207	13	145	120	0.4926	0.7717	0.8174	NE	M

Perceived Benefit: Healthier Ingredients	yes	rye	5.7720	0.0726	44	296	120	0.0163	0.1234	1.3552	PE	M
Perceived Benefit: Healthier Ingredients	yes	spelt	0.9236	0.0291	3	51	120	0.3365	0.6410	0.5363	NE	M
Perceived Benefit: Healthier Ingredients	yes	wheat	1.1579	0.0325	60	602	120	0.2819	0.6260	0.9086	NE	M
Perceived Benefit: Healthier Ingredients	yes	wholemeal	1.3188	0.0341	40	319	121	0.2508	0.5776	1.1721	PE	M
Perceived Benefit: Healthier Ingredients	yes	organic: yes	0.0887	0.0089	76	680	121	0.7659	0.8510	1.0271	PE	M
Perceived Benefit: Intolerance/Allergy	yes	endosperm	1.1340	0.0317	49	638	78	0.2869	0.5893	1.1136	PE	M
Perceived Benefit: Intolerance/Allergy	yes	mix	1.5092	0.0365	6	145	78	0.2193	0.5554	0.6000	NE	M
Perceived Benefit: Intolerance/Allergy	yes	organic: no	2.2294	0.0448	37	432	78	0.1354	0.4514	1.2210	PE	M
Perceived Benefit: Intolerance/Allergy	yes	other	1.3795	0.0355	6	145	74	0.2402	0.6005	0.6117	NE	M
Perceived Benefit: Intolerance/Allergy	yes	other	0.1378	0.0110	3	29	78	0.7105	0.8437	1.5000	PE	M
Perceived Benefit: Intolerance/Allergy	yes	rye	5.2786	0.0695	29	296	74	0.0216	0.1234	1.4484	PE	M
Perceived Benefit: Intolerance/Allergy	yes	wheat	1.0431	0.0309	36	602	74	0.3071	0.6260	0.8841	NE	M
Perceived Benefit: Intolerance/Allergy	yes	wholemeal	0.1530	0.0116	20	319	78	0.6957	0.8437	0.9091	NE	M
Perceived Benefit: Intolerance/Allergy	yes	organic: yes	2.2294	0.0448	41	680	78	0.1354	0.4514	0.8596	NE	M
Perceived Benefit: Nutrient Availability	yes	endosperm	2.1426	0.0435	78	638	154	0.1433	0.4188	0.8979	NE	M
Perceived Benefit: Nutrient Availability	yes	mix	0.0385	0.0058	21	145	154	0.8445	0.9072	1.0636	PE	M
Perceived Benefit: Nutrient Availability	yes	organic: no	15.8165	0.1193	37	432	154	0.0001	0.0007	0.6184	NE	M
Perceived Benefit: Nutrient Availability	yes	other	0.0257	0.0048	21	145	150	0.8726	0.9628	1.0563	PE	M
Perceived Benefit: Nutrient Availability	yes	other	0.0606	0.0073	3	29	154	0.8056	0.9004	0.7597	NE	M
Perceived Benefit: Nutrient Availability	yes	rye	0.1436	0.0115	43	296	150	0.7048	0.9094	1.0595	PE	M
Perceived Benefit: Nutrient Availability	yes	spelt	0.3873	0.0188	5	51	150	0.5337	0.7907	0.7150	NE	M
Perceived Benefit: Nutrient Availability	yes	wheat	0.0338	0.0056	81	602	150	0.8540	0.9628	0.9813	NE	M
Perceived Benefit: Nutrient Availability	yes	wholemeal	2.4140	0.0462	52	319	154	0.1203	0.3808	1.1972	PE	M
Perceived Benefit: Nutrient Availability	yes	organic: yes	15.8165	0.1193	117	680	154	0.0001	0.0007	1.2424	PE	M

Supplementary Table 4. PERMANOVA results based on the Jaccard distance matrix of aroma profiles, with variables ranked by explained variance (R^2) (related to Figure 5D).

<i>Variable</i>	<i>Pseudo-F</i>	<i>R²</i>	<i>Sample Size</i>	<i>Number of Groups</i>	<i>Uncorrected p-value</i>	<i>Corrected p-value (BH-FDR)</i>
<i>plants</i>	2.5745	0.0046	557	2	0.0020	0.0116
<i>flour_organic</i>	2.0455	0.0037	553	2	0.0020	0.0116
<i>flour_quality</i>	1.9707	0.0035	557	4	0.0010	0.0079
<i>flour_type_red_red</i>	1.8579	0.0034	550	4	0.0010	0.0079
<i>acid_beverage</i>	1.8652	0.0033	557	2	0.0070	0.0338
<i>lower_cost</i>	1.8248	0.0033	557	2	0.0090	0.0412
<i>samp_source</i>	1.8068	0.0032	557	3	0.0010	0.0079
<i>tradition</i>	1.7394	0.0031	557	2	0.0200	0.0757
<i>sustainability</i>	1.7141	0.0031	557	2	0.0130	0.0566
<i>sample_received_season</i>	1.6674	0.0030	557	4	0.0020	0.0116
<i>flour_change_origin</i>	0.9861	0.0030	331	131	0.7450	0.8102
<i>flour_type_red</i>	1.6309	0.0029	557	9	0.0010	0.0079
<i>stor_feeding</i>	1.5949	0.0029	557	6	0.0010	0.0079
<i>kids</i>	1.5851	0.0028	555	2	0.0450	0.1554
<i>europe_region</i>	1.5390	0.0028	553	4	0.0030	0.0154
<i>no_pets</i>	1.5412	0.0028	557	2	0.0500	0.1554
<i>cheese</i>	1.5134	0.0027	557	2	0.0470	0.1554
<i>dairy_products</i>	1.4868	0.0027	557	2	0.0520	0.1560
<i>bread_refresh_loc</i>	1.1126	0.0027	417	44	0.0020	0.0116
<i>bread_baked</i>	1.4641	0.0026	556	2	0.0680	0.1849
<i>cs_info</i>	1.3232	0.0026	517	13	0.0030	0.0154
<i>fermented_cereals</i>	1.4224	0.0025	557	2	0.0640	0.1796
<i>samp_month</i>	1.1011	0.0025	432	12	0.1400	0.3085
<i>flour_type</i>	1.3964	0.0025	557	15	0.0010	0.0079

<i>health_benefits_no_answer</i>	1.3880	0.0025	557	2	0.0980	0.2508
<i>alcoholic_beverage</i>	1.3445	0.0024	557	2	0.1010	0.2511
<i>dough_source</i>	1.3317	0.0024	557	5	0.0200	0.0757
<i>after_feeding</i>	1.2735	0.0024	533	3	0.0940	0.2478
<i>like_taste</i>	1.3268	0.0024	557	2	0.1410	0.3085
<i>dog</i>	1.3182	0.0024	557	2	0.1560	0.3085
<i>skill</i>	1.2411	0.0023	528	5	0.0620	0.1796
<i>hub</i>	1.3026	0.0023	557	5	0.0230	0.0834
<i>yeast_usage_prior</i>	1.3009	0.0023	557	2	0.1550	0.3085
<i>stable_glucose_level</i>	1.2920	0.0023	557	2	0.1490	0.3085
<i>samp_date</i>	1.0825	0.0023	469	176	0.0010	0.0079
<i>samp_country</i>	1.2846	0.0023	557	19	0.0010	0.0079
<i>beer</i>	1.2845	0.0023	557	2	0.1530	0.3085
<i>wholemeal_spelt</i>	1.2839	0.0023	557	2	0.1290	0.3033
<i>other_fermentations_yes_no</i>	1.2171	0.0023	533	2	0.2160	0.3871
<i>aroma_dough_difficulty</i>	1.2398	0.0023	543	6	0.0200	0.0757
<i>ph_measured</i>	1.2268	0.0022	556	2	0.1900	0.3673
<i>cow</i>	1.2172	0.0022	557	2	0.1560	0.3085
<i>lams</i>	1.2166	0.0022	557	2	0.0490	0.1554
<i>fermented_vegetables</i>	1.2118	0.0022	557	2	0.2020	0.3739
<i>fermented_legumes</i>	1.1959	0.0021	557	2	0.2320	0.4037
<i>water_type</i>	1.1823	0.0021	557	5	0.1260	0.3033
<i>person_id</i>	1.1782	0.0021	557	455	0.0010	0.0079
<i>flour_change</i>	1.1766	0.0021	557	2	0.2380	0.4060
<i>hamster</i>	1.1556	0.0021	557	2	0.2180	0.3871
<i>intolerances_allergy</i>	1.1519	0.0021	557	2	0.2430	0.4066
<i>email_signup</i>	1.0489	0.0020	521	2	0.3680	0.5426
<i>fermented_roots</i>	1.1122	0.0020	557	2	0.2010	0.3739

<i>cat</i>	1.0993	0.0020	557	2	0.3230	0.5006
<i>samp_city</i>	1.0983	0.0020	557	357	0.0010	0.0079
<i>covid</i>	1.0971	0.0020	557	3	0.2970	0.4785
<i>health</i>	1.0903	0.0020	557	2	0.3280	0.5006
<i>guinea_pig</i>	1.0857	0.0019	557	2	0.3230	0.5006
<i>baking_no_answer</i>	1.0756	0.0019	557	2	0.2550	0.4186
<i>fish</i>	1.0500	0.0019	557	2	0.3390	0.5085
<i>rabbit</i>	1.0252	0.0018	557	2	0.4040	0.5858
<i>mental_health</i>	1.0246	0.0018	557	2	0.4220	0.6019
<i>dough_stor_device</i>	1.0116	0.0018	557	3	0.4580	0.6325
<i>dough_cover</i>	1.0052	0.0018	557	5	0.4500	0.6315
<i>goat</i>	0.9861	0.0018	557	2	0.5560	0.7329
<i>nutrient_availability</i>	0.9858	0.0018	557	2	0.4960	0.6743
<i>flour_additions</i>	0.9709	0.0017	557	3	0.5650	0.7337
<i>bird</i>	0.9608	0.0017	557	2	0.6340	0.7454
<i>condiment</i>	0.9455	0.0017	557	2	0.5490	0.7329
<i>wine</i>	0.9178	0.0016	557	2	0.5820	0.7446
<i>chicken</i>	0.9157	0.0016	557	2	0.5910	0.7452
<i>hobby</i>	0.9079	0.0016	557	2	0.6090	0.7454
<i>gebril</i>	0.9022	0.0016	557	2	0.7880	0.8464
<i>reptiles</i>	0.8919	0.0016	557	2	0.6300	0.7454
<i>other_fermentations</i>	0.8904	0.0016	557	2	0.6170	0.7454
<i>fermented_fruits</i>	0.8883	0.0016	557	2	0.6620	0.7578
<i>business_job</i>	0.8703	0.0016	557	2	0.6520	0.7563
<i>like_baking</i>	0.8575	0.0015	557	2	0.6290	0.7454
<i>bees</i>	0.8415	0.0015	557	2	0.7320	0.8102
<i>others_health_adv</i>	0.8271	0.0015	557	2	0.7400	0.8102
<i>gut_health</i>	0.7900	0.0014	557	2	0.7320	0.8102

<i>other_baking_reasons</i>	0.7851	0.0014	557	2	0.7980	0.8467
<i>more_satiety</i>	0.7604	0.0014	557	2	0.8080	0.8469
<i>horse</i>	0.7432	0.0013	557	2	0.8910	0.9120
<i>better_digestibility</i>	0.7230	0.0013	557	2	0.8470	0.8773
<i>healthier_ingredients</i>	0.5923	0.0011	557	2	0.9520	0.9560
<i>intolerance_allergy</i>	0.5907	0.0011	557	2	0.9560	0.9560

Supplementary Table 5. Mantel test results based on the Jaccard distance matrix of aroma profiles, with variables ranked by Pearson correlation coefficient (R^2) (related to Figure 5D). p-values were corrected using the Benjamini–Hochberg false discovery rate (BH-FDR).

<i>Numerical Variable</i>	<i>Number of samples</i>	<i>Mantel R (Pearson)</i>	<i>P-Value (Pearson)</i>	<i>Corrected P-Value (Pearson)</i>	<i>Mantel R (Spearman)</i>	<i>P-Value (Spearman)</i>	<i>Corrected P-Value (Spearman)</i>
<i>number_sourdoughs</i>	533	0.0666	0.0010	0.0165	0.0793	0.0010	0.0165
<i>barley</i>	557	0.0269	0.1050	0.3729	0.0229	0.2030	0.5913
<i>rye</i>	557	0.0211	0.0900	0.3729	0.0152	0.2950	0.6084
<i>wheat</i>	557	0.0201	0.0010	0.0165	0.0191	0.0010	0.0165
<i>gluten_free_flour</i>	557	0.0200	0.2260	0.5327	-0.0091	0.6390	0.8168
<i>tta_laboratory</i>	541	0.0193	0.1320	0.3960	0.0168	0.1150	0.3960
<i>time_feeding</i>	553	0.0180	0.2700	0.5940	0.0076	0.5810	0.8168
<i>longitude</i>	557	0.0165	0.2900	0.5981	0.0046	0.7340	0.8352
<i>temp_feeding</i>	557	0.0130	0.3540	0.6872	0.0220	0.0830	0.3913
<i>ph_value_citizen</i>	544	0.0089	0.4720	0.8653	0.0056	0.6350	0.8168
<i>spelt</i>	557	0.0087	0.5710	0.9422	-0.0032	0.8540	0.8960
<i>bread_density</i>	446	0.0073	0.7010	0.9529	0.0291	0.0430	0.3548
<i>wholemeal_rye</i>	557	0.0050	0.6650	0.9529	-0.0031	0.8170	0.8960
<i>dough_age</i>	556	0.0030	0.8370	0.9529	0.0117	0.3560	0.6782
<i>refreshment_amount</i>	557	0.0027	0.8860	0.9529	-0.0116	0.4110	0.6782
<i>samp_year</i>	556	0.0027	0.8630	0.9529	0.0097	0.4540	0.7134
<i>refreshment_flour</i>	557	0.0018	0.8980	0.9529	-0.0248	0.0750	0.3913

<i>refreshment_water</i>	557	0.0017	0.9170	0.9529	-0.0249	0.0690	0.3913
<i>latitude</i>	557	0.0012	0.9240	0.9529	0.0049	0.6870	0.8168
<i>other_wheat_varieties</i>	557	-0.0007	0.9760	0.9760	-0.0026	0.8960	0.8960
<i>wholemeal_wheat</i>	557	-0.0028	0.8370	0.9529	-0.0060	0.6930	0.8168
<i>dough_yield</i>	555	-0.0039	0.8030	0.9529	0.0022	0.8850	0.8960
<i>elevation</i>	557	-0.0041	0.6870	0.9529	-0.0049	0.5720	0.8168
<i>temp_storage</i>	557	-0.0070	0.6260	0.9529	-0.0055	0.6850	0.8168
<i>pH_laboratory</i>	544	-0.0177	0.1820	0.5005	-0.0145	0.2670	0.6084
<i>bread_making_frequency</i>	520	-0.0197	0.2050	0.5204	-0.0173	0.2410	0.6084
<i>semi-wholemeal_wheat</i>	557	-0.0241	0.1040	0.3729	-0.0269	0.1140	0.3960
<i>sample_transport_duration</i>	526	-0.0254	0.1130	0.3729	0.0147	0.2150	0.5913
<i>bread_ph</i>	444	-0.0297	0.0580	0.3190	-0.0124	0.3850	0.6782
<i>dough_size_feeding</i>	557	-0.0338	0.0550	0.3190	-0.0148	0.2770	0.6084
<i>backslop_freq</i>	554	-0.0447	0.0020	0.0220	-0.0398	0.0050	0.0550

Supplementary Table 6. Pearson and Spearman correlations, as well as cosine similarity, between perceived aromas and measurable sourdough characteristics, fermentation parameters, and substrate proportions per sourdough (related to Figure 5E–F). p-values were corrected using the Benjamini–Hochberg false discovery rate (BH-FDR).

<i>Variable 1</i>	<i>Variable 2</i>	<i>Pearson Correlation</i>	<i>Spearman Correlation</i>	<i>Cosine Similarity</i>	<i>Uncorrected Pearson P-Value</i>	<i>Corrected Pearson P-Value</i>	<i>Uncorrected Spearman P-Value</i>	<i>Corrected Spearman P-Value</i>
<i>Chemical</i>	bread_density	-0.0529	-0.0120	0.1779	0.2646	0.6083	0.8007	0.9132
<i>Chemical</i>	dough_age	-0.0334	-0.0200	0.1232	0.4316	0.7512	0.6374	0.8274
<i>Chemical</i>	dough_yield	0.0178	-0.0333	0.4013	0.6752	0.8637	0.4330	0.6924
<i>Chemical</i>	pH_laboratory	0.0027	-0.0073	0.4084	0.9507	0.9690	0.8648	0.9472
<i>Chemical</i>	backslop_freq	-0.0608	-0.0655	0.2290	0.1529	0.4941	0.1234	0.3561
<i>Chemical</i>	barley	-0.0191	0.0139	0.0021	0.6534	0.8573	0.7426	0.8870
<i>Chemical</i>	bread_ph	-0.0808	-0.1042	0.4005	0.0890	0.3569	0.0281	0.1240
<i>Chemical</i>	dough_size_feeding	0.0416	0.0540	0.1356	0.3272	0.6586	0.2031	0.4653
<i>Chemical</i>	ph_value_citizen	-0.1017	-0.1070	0.3939	0.0177	0.1127	0.0125	0.0693

Chemical	rye	-0.0689	-0.0599	0.1263	0.1041	0.4000	0.1581	0.3963
Chemical	semi-wholemeal_wheat	0.0218	0.0236	0.1391	0.6075	0.8397	0.5785	0.7897
Chemical	spelt	0.0574	0.0849	0.1522	0.1759	0.5269	0.0452	0.1791
Chemical	temp_feeding	-0.0343	-0.0372	0.3886	0.4190	0.7353	0.3813	0.6475
Chemical	temp_storage	-0.0107	-0.0016	0.3227	0.8008	0.9062	0.9696	0.9900
Chemical	time_feeding	-0.0321	0.0108	0.2249	0.4514	0.7524	0.7996	0.9132
Chemical	wheat	0.1212	0.1237	0.3710	0.0042	0.0330	0.0035	0.0240
Chemical	wholemeal_rye	-0.0816	-0.0973	0.1269	0.0544	0.2477	0.0216	0.1065
Chemical	wholemeal_spelt	0.0217	0.0316	0.0767	0.6090	0.8397	0.4563	0.7081
Chemical	wholemeal_wheat	-0.0528	-0.0638	0.1163	0.2131	0.5581	0.1328	0.3719
Chemical	tta_laboratory	-0.1353	-0.1396	0.3404	0.0016	0.0144	0.0011	0.0089
Earthy	bread_density	-0.0188	0.0020	0.1936	0.6924	0.8657	0.9671	0.9890
Earthy	dough_age	-0.0314	-0.0467	0.1148	0.4597	0.7600	0.2720	0.5439
Earthy	dough_yield	0.0030	0.0262	0.3752	0.9443	0.9690	0.5372	0.7640
Earthy	pH_laboratory	0.0330	0.0430	0.3807	0.4420	0.7524	0.3170	0.5925
Earthy	backslop_freq	0.0159	-0.0191	0.2625	0.7094	0.8746	0.6529	0.8388
Earthy	barley	-0.0181	0.0235	0.0016	0.6704	0.8637	0.5805	0.7897
Earthy	bread_ph	-0.0578	-0.0600	0.3788	0.2243	0.5721	0.2067	0.4702
Earthy	dough_size_feeding	-0.0074	-0.0266	0.0857	0.8615	0.9294	0.5316	0.7594
Earthy	ph_value_citizen	-0.0055	0.0018	0.3775	0.8987	0.9523	0.9664	0.9890
Earthy	rye	-0.0825	-0.0383	0.1026	0.0518	0.2452	0.3667	0.6356
Earthy	semi-wholemeal_wheat	-0.0161	-0.0005	0.0980	0.7045	0.8720	0.9903	0.9976
Earthy	spelt	0.0449	0.0592	0.1351	0.2897	0.6360	0.1631	0.4062
Earthy	temp_feeding	-0.0297	-0.0118	0.3639	0.4844	0.7805	0.7804	0.9080
Earthy	temp_storage	-0.0139	-0.0608	0.2997	0.7439	0.8872	0.1519	0.3906
Earthy	time_feeding	0.0675	0.0310	0.2817	0.1127	0.4203	0.4670	0.7176
Earthy	wheat	0.0352	0.0321	0.2983	0.4071	0.7217	0.4496	0.7046
Earthy	wholemeal_rye	-0.0179	-0.0078	0.1655	0.6734	0.8637	0.8539	0.9422
Earthy	wholemeal_spelt	0.0447	0.0487	0.0943	0.2926	0.6400	0.2512	0.5382
Earthy	wholemeal_wheat	0.0439	0.0621	0.1876	0.3008	0.6404	0.1433	0.3794
Earthy	tta_laboratory	-0.0030	-0.0372	0.3554	0.9444	0.9690	0.3877	0.6498

<i>Fermented</i>	bread_density	-0.0975	-0.0533	0.3188	0.0396	0.2093	0.2612	0.5410
<i>Fermented</i>	dough_age	-0.0808	-0.0584	0.2115	0.0570	0.2529	0.1687	0.4116
<i>Fermented</i>	dough_yield	0.0054	-0.0387	0.6980	0.8994	0.9523	0.3624	0.6324
<i>Fermented</i>	pH_laboratory	0.0533	0.0489	0.7095	0.2148	0.5592	0.2553	0.5410
<i>Fermented</i>	backslop_freq	0.0531	0.0602	0.4982	0.2123	0.5581	0.1572	0.3963
<i>Fermented</i>	barley	-0.0467	-0.0574	0.0011	0.2707	0.6177	0.1762	0.4213
<i>Fermented</i>	bread_ph	0.0118	0.0298	0.7123	0.8045	0.9062	0.5308	0.7594
<i>Fermented</i>	dough_size_feeding	0.1002	0.0589	0.2407	0.0181	0.1138	0.1654	0.4102
<i>Fermented</i>	ph_value_citizen	0.0233	0.0237	0.7119	0.5872	0.8393	0.5817	0.7897
<i>Fermented</i>	rye	0.0574	0.0547	0.3545	0.1762	0.5269	0.1973	0.4536
<i>Fermented</i>	semi-wholemeal_wheat	0.1274	0.1188	0.2952	0.0026	0.0218	0.0050	0.0331
<i>Fermented</i>	spelt	0.0452	0.0626	0.2077	0.2873	0.6348	0.1401	0.3771
<i>Fermented</i>	temp_feeding	-0.1156	-0.1246	0.6716	0.0063	0.0461	0.0032	0.0225
<i>Fermented</i>	temp_storage	-0.0258	-0.0304	0.5621	0.5440	0.8239	0.4734	0.7221
<i>Fermented</i>	time_feeding	0.0367	0.1025	0.4514	0.3887	0.7021	0.0159	0.0823
<i>Fermented</i>	wheat	-0.0292	-0.0263	0.5002	0.4921	0.7909	0.5358	0.7637
<i>Fermented</i>	wholemeal_rye	-0.0645	-0.0455	0.2956	0.1283	0.4489	0.2840	0.5590
<i>Fermented</i>	wholemeal_spelt	0.0415	0.0460	0.1286	0.3278	0.6586	0.2784	0.5522
<i>Fermented</i>	wholemeal_wheat	-0.0321	-0.0402	0.2594	0.4496	0.7524	0.3431	0.6106
<i>Fermented</i>	tta_laboratory	-0.0846	-0.0863	0.6430	0.0492	0.2404	0.0448	0.1786
<i>Fermented dairy</i>	bread_density	-0.0747	-0.1565	0.3280	0.1152	0.4269	0.0009	0.0077
<i>Fermented dairy</i>	dough_age	0.0521	0.0609	0.2991	0.2197	0.5628	0.1515	0.3906
<i>Fermented dairy</i>	dough_yield	-0.0444	-0.0407	0.6940	0.2966	0.6404	0.3381	0.6087
<i>Fermented dairy</i>	pH_laboratory	0.0112	0.0029	0.7093	0.7948	0.9062	0.9463	0.9838
<i>Fermented dairy</i>	backslop_freq	0.1793	0.1542	0.5666	0.0000	0.0004	0.0003	0.0029
<i>Fermented dairy</i>	barley	-0.0462	-0.0248	0.0016	0.2760	0.6210	0.5590	0.7823
<i>Fermented dairy</i>	bread_ph	-0.0335	-0.0525	0.7023	0.4818	0.7795	0.2692	0.5439
<i>Fermented dairy</i>	dough_size_feeding	0.0973	0.0404	0.2390	0.0217	0.1301	0.3413	0.6095
<i>Fermented dairy</i>	ph_value_citizen	-0.0495	-0.0472	0.7044	0.2487	0.6002	0.2717	0.5439

<i>Fermented dairy</i>	rye	-0.0253	-0.0060	0.3034	0.5514	0.8251	0.8873	0.9602
<i>Fermented dairy</i>	semi-wholemeal_wheat	0.0217	0.0160	0.2245	0.6090	0.8397	0.7066	0.8577
<i>Fermented dairy</i>	spelt	-0.0465	-0.0351	0.1457	0.2735	0.6198	0.4077	0.6637
<i>Fermented dairy</i>	temp_feeding	-0.0377	-0.0357	0.6861	0.3744	0.6917	0.4008	0.6575
<i>Fermented dairy</i>	temp_storage	0.0508	0.0049	0.5955	0.2316	0.5828	0.9084	0.9730
<i>Fermented dairy</i>	time_feeding	0.0197	0.0020	0.4431	0.6442	0.8526	0.9630	0.9881
<i>Fermented dairy</i>	wheat	0.0834	0.0737	0.5563	0.0490	0.2404	0.0822	0.2655
<i>Fermented dairy</i>	wholemeal_rye	-0.0083	0.0231	0.3316	0.8444	0.9203	0.5858	0.7903
<i>Fermented dairy</i>	wholemeal_spelt	-0.0197	-0.0166	0.0861	0.6425	0.8526	0.6956	0.8554
<i>Fermented dairy</i>	wholemeal_wheat	0.0463	0.0773	0.3109	0.2751	0.6210	0.0683	0.2379
<i>Fermented dairy</i>	tta_laboratory	-0.0582	-0.0676	0.6512	0.1763	0.5269	0.1165	0.3473
<i>Fruity</i>	bread_density	-0.0683	-0.0529	0.2604	0.1501	0.4898	0.2649	0.5419
<i>Fruity</i>	dough_age	0.0026	-0.0688	0.2208	0.9511	0.9690	0.1049	0.3240
<i>Fruity</i>	dough_yield	-0.0437	-0.0025	0.5705	0.3046	0.6419	0.9525	0.9870
<i>Fruity</i>	pH_laboratory	0.0249	0.0215	0.5830	0.5627	0.8342	0.6175	0.8156
<i>Fruity</i>	backslop_freq	-0.0264	-0.0171	0.3746	0.5354	0.8188	0.6886	0.8554
<i>Fruity</i>	barley	0.0419	0.0755	0.0620	0.3239	0.6586	0.0749	0.2523
<i>Fruity</i>	bread_ph	-0.0157	-0.0330	0.5876	0.7421	0.8872	0.4877	0.7333
<i>Fruity</i>	dough_size_feeding	-0.0105	0.0741	0.1342	0.8050	0.9062	0.0806	0.2646
<i>Fruity</i>	ph_value_citizen	-0.0412	-0.0376	0.5836	0.3374	0.6658	0.3813	0.6475
<i>Fruity</i>	rye	-0.0230	-0.0163	0.2469	0.5875	0.8393	0.7005	0.8577
<i>Fruity</i>	semi-wholemeal_wheat	-0.0385	-0.0224	0.1435	0.3644	0.6783	0.5985	0.7972
<i>Fruity</i>	spelt	-0.0423	-0.0182	0.1132	0.3191	0.6586	0.6686	0.8479
<i>Fruity</i>	temp_feeding	0.0069	0.0290	0.5725	0.8706	0.9322	0.4943	0.7383
<i>Fruity</i>	temp_storage	-0.0216	-0.0567	0.4639	0.6116	0.8397	0.1818	0.4290
<i>Fruity</i>	time_feeding	0.0874	-0.0049	0.4135	0.0399	0.2093	0.9078	0.9730
<i>Fruity</i>	wheat	0.0601	0.0560	0.4593	0.1564	0.5004	0.1867	0.4358

<i>Fruity</i>	wholemeal_rye	0.0050	-0.0113	0.2815	0.9055	0.9540	0.7908	0.9132
<i>Fruity</i>	wholemeal_spelt	-0.0583	-0.0583	0.0357	0.1697	0.5241	0.1692	0.4116
<i>Fruity</i>	wholemeal_wheat_laboratory	-0.0549	-0.0325	0.1911	0.1957	0.5316	0.4446	0.7002
<i>Fruity</i>	bread_density	-0.0068	-0.0410	0.5436	0.8748	0.9325	0.3415	0.6095
<i>Grain/Cereal</i>	dough_age	-0.0262	-0.0731	0.3869	0.5816	0.8366	0.1233	0.3561
<i>Grain/Cereal</i>	dough_yield	0.0265	0.0742	0.2972	0.5335	0.8188	0.0806	0.2646
<i>Grain/Cereal</i>	pH_laboratory	0.0558	0.1133	0.7505	0.1895	0.5311	0.0075	0.0448
<i>Grain/Cereal</i>	backslop_freq	0.0722	0.0844	0.7532	0.0924	0.3685	0.0491	0.1876
<i>Grain/Cereal</i>	barley	0.0331	0.0960	0.5169	0.4364	0.7512	0.0239	0.1131
<i>Grain/Cereal</i>	bread_ph	-0.0487	-0.0233	0.0042	0.2510	0.6014	0.5837	0.7903
<i>Grain/Cereal</i>	dough_size_feeding	0.0302	-0.0086	0.7552	0.5253	0.8151	0.8561	0.9429
<i>Grain/Cereal</i>	ph_value_citizen	-0.0172	-0.0272	0.1721	0.6850	0.8657	0.5214	0.7569
<i>Grain/Cereal</i>	rye	0.0791	0.0629	0.7591	0.0651	0.2808	0.1427	0.3794
<i>Grain/Cereal</i>	semi-wholemeal_wheat	-0.1300	-0.1027	0.2624	0.0021	0.0185	0.0153	0.0805
<i>Grain/Cereal</i>	spelt	-0.0413	-0.0419	0.1968	0.3305	0.6586	0.3231	0.5969
<i>Grain/Cereal</i>	temp_feeding	-0.0341	0.0124	0.1664	0.4214	0.7374	0.7698	0.9032
<i>Grain/Cereal</i>	temp_storage	-0.0384	-0.1168	0.7285	0.3661	0.6783	0.0058	0.0367
<i>Grain/Cereal</i>	time_feeding	-0.0179	-0.0297	0.6025	0.6735	0.8637	0.4836	0.7333
<i>Grain/Cereal</i>	wheat	-0.0603	-0.0172	0.4271	0.1565	0.5004	0.6870	0.8554
<i>Grain/Cereal</i>	wholemeal_rye	-0.0277	-0.0438	0.5348	0.5149	0.8057	0.3018	0.5761
<i>Grain/Cereal</i>	wholemeal_spelt	0.0620	0.0847	0.3931	0.1442	0.4802	0.0457	0.1799
<i>Grain/Cereal</i>	wholemeal_wheat	-0.0569	-0.0560	0.0689	0.1800	0.5269	0.1868	0.4358
<i>Grain/Cereal</i>	tta_laboratory	0.0853	0.0871	0.3496	0.0442	0.2227	0.0398	0.1654
<i>Grain/Cereal</i>	bread_density	-0.0195	0.0233	0.7003	0.6517	0.8571	0.5886	0.7906
<i>Nutty</i>		-0.0564	-0.0525	0.0988	0.2343	0.5843	0.2686	0.5439

<i>Nutty</i>	dough_age	-0.0304	-0.0161	0.0728	0.4738	0.7736	0.7056	0.8577
<i>Nutty</i>	dough_yield	0.0376	0.0827	0.2673	0.3769	0.6926	0.0515	0.1943
<i>Nutty</i>	pH_laboratory	-0.0588	-0.0404	0.2647	0.1710	0.5249	0.3470	0.6123
<i>Nutty</i>	backslop_freq	0.0123	0.0233	0.1874	0.7721	0.8958	0.5849	0.7903
<i>Nutty</i>	barley	-0.0093	0.0585	0.0039	0.8268	0.9186	0.1676	0.4116
<i>Nutty</i>	bread_ph	-0.0479	-0.0904	0.2684	0.3136	0.6519	0.0569	0.2073
<i>Nutty</i>	dough_size_feeding	-0.0170	0.0252	0.0493	0.6896	0.8657	0.5527	0.7772
<i>Nutty</i>	ph_value_citizen	0.0242	0.0201	0.2722	0.5732	0.8365	0.6393	0.8274
<i>Nutty</i>	rye	-0.0481	-0.0245	0.0791	0.2573	0.6021	0.5636	0.7823
<i>Nutty</i>	semi-wholemeal_wheat	0.0351	0.0296	0.1115	0.4081	0.7217	0.4860	0.7333
<i>Nutty</i>	spelt	-0.0486	0.0138	0.0216	0.2523	0.6021	0.7448	0.8870
<i>Nutty</i>	temp_feeding	0.0263	0.0072	0.2668	0.5350	0.8188	0.8657	0.9472
<i>Nutty</i>	temp_storage	0.0536	0.0485	0.2471	0.2062	0.5482	0.2531	0.5397
<i>Nutty</i>	time_feeding	-0.0199	0.0315	0.1485	0.6399	0.8526	0.4604	0.7126
<i>Nutty</i>	wheat	0.1030	0.0972	0.2629	0.0150	0.0973	0.0218	0.1065
<i>Nutty</i>	wholemeal_rye	-0.0325	-0.0052	0.0995	0.4441	0.7524	0.9034	0.9712
<i>Nutty</i>	wholemeal_spelt	0.0105	0.0105	0.0477	0.8047	0.9062	0.8047	0.9132
<i>Nutty</i>	wholemeal_wheat	-0.0050	-0.0044	0.1015	0.9054	0.9540	0.9172	0.9730
<i>Nutty</i>	tta_laboratory	-0.0087	-0.0031	0.2484	0.8400	0.9203	0.9429	0.9837
<i>Sour</i>	bread_density	0.0446	0.1060	0.3371	0.3478	0.6661	0.0252	0.1150
<i>Sour</i>	dough_age	-0.0228	0.0024	0.1941	0.5912	0.8397	0.9557	0.9871
<i>Sour</i>	dough_yield	-0.0137	0.0149	0.5556	0.7467	0.8872	0.7259	0.8711
<i>Sour</i>	pH_laboratory	-0.0045	0.0041	0.5697	0.9170	0.9578	0.9241	0.9752
<i>Sour</i>	backslop_freq	0.0086	-0.0238	0.3809	0.8399	0.9203	0.5768	0.7897
<i>Sour</i>	barley	0.0474	0.1039	0.0662	0.2640	0.6083	0.0141	0.0759
<i>Sour</i>	bread_ph	-0.0464	-0.0377	0.5729	0.3290	0.6586	0.4277	0.6857
<i>Sour</i>	dough_size_feeding	0.0451	0.0584	0.1738	0.2882	0.6348	0.1686	0.4116
<i>Sour</i>	ph_value_citizen	-0.0896	-0.0805	0.5611	0.0367	0.2012	0.0606	0.2181
<i>Sour</i>	rye	0.0114	0.0063	0.2632	0.7882	0.9062	0.8827	0.9588
<i>Sour</i>	semi-wholemeal_wheat	-0.0579	-0.0471	0.1220	0.1725	0.5249	0.2668	0.5439
<i>Sour</i>	spelt	0.0404	0.0861	0.1738	0.3411	0.6661	0.0423	0.1707

<i>Sour</i>	temp_feeding	0.0399	-0.0075	0.5597	0.3475	0.6661	0.8594	0.9449
<i>Sour</i>	temp_storage	-0.0251	0.0114	0.4463	0.5540	0.8261	0.7879	0.9125
<i>Sour</i>	time_feeding	0.0046	0.0415	0.3494	0.9148	0.9578	0.3301	0.6010
<i>Sour</i>	wheat	-0.1338	-0.1487	0.3359	0.0015	0.0143	0.0004	0.0044
<i>Sour</i>	wholemeal_rye	0.1294	0.1386	0.3626	0.0022	0.0190	0.0010	0.0084
<i>Sour</i>	wholemeal_spelt	0.0319	0.0312	0.1057	0.4523	0.7524	0.4625	0.7141
<i>Sour</i>	wholemeal_wheat	-0.0523	-0.0668	0.1846	0.2175	0.5628	0.1153	0.3458
<i>Sour</i>	tta_laboratory	0.1207	0.1331	0.5690	0.0049	0.0380	0.0019	0.0146
<i>Toasted</i>	bread_density	-0.0471	-0.0500	0.1293	0.3209	0.6586	0.2918	0.5639
<i>Toasted</i>	dough_age	-0.0213	0.0290	0.1016	0.6162	0.8397	0.4957	0.7383
<i>Toasted</i>	dough_yield	0.0485	0.1271	0.3260	0.2541	0.6021	0.0027	0.0194
<i>Toasted</i>	pH_laboratory	-0.0422	-0.0152	0.3211	0.3262	0.6586	0.7236	0.8711
<i>Toasted</i>	backslop_freq	0.0769	-0.0156	0.2691	0.0705	0.3002	0.7133	0.8625
<i>Toasted</i>	barley	0.1067	0.0381	0.1164	0.0117	0.0802	0.3692	0.6356
<i>Toasted</i>	bread_ph	-0.0199	-0.0310	0.3177	0.6757	0.8637	0.5148	0.7508
<i>Toasted</i>	dough_size_feeding	-0.0272	0.0305	0.0534	0.5218	0.8117	0.4728	0.7221
<i>Toasted</i>	ph_value_citizen	-0.0444	-0.0538	0.3208	0.3009	0.6404	0.2100	0.4758
<i>Toasted</i>	rye	-0.0149	0.0155	0.1323	0.7248	0.8867	0.7149	0.8628
<i>Toasted</i>	semi-wholemeal_wheat	0.0827	0.0838	0.1701	0.0511	0.2437	0.0482	0.1852
<i>Toasted</i>	spelt	-0.0176	-0.0005	0.0643	0.6784	0.8637	0.9915	0.9976
<i>Toasted</i>	temp_feeding	0.0284	0.0462	0.3201	0.5035	0.7969	0.2765	0.5512
<i>Toasted</i>	temp_storage	0.0484	-0.0046	0.2876	0.2544	0.6021	0.9139	0.9730
<i>Toasted</i>	time_feeding	0.0462	0.0613	0.2317	0.2779	0.6215	0.1501	0.3891
<i>Toasted</i>	wheat	-0.0058	0.0037	0.2303	0.8912	0.9472	0.9309	0.9791
<i>Toasted</i>	wholemeal_rye	-0.0374	-0.0170	0.1216	0.3783	0.6928	0.6888	0.8554
<i>Toasted</i>	wholemeal_spelt	0.0646	0.0368	0.1059	0.1277	0.4489	0.3863	0.6498
<i>Toasted</i>	wholemeal_wheat	-0.0434	-0.0367	0.0898	0.3070	0.6426	0.3878	0.6498
<i>Toasted</i>	tta_laboratory	0.0303	-0.0342	0.3136	0.4824	0.7795	0.4270	0.6857
<i>Veggie</i>	bread_density	-0.0280	0.0744	0.2107	0.5547	0.8261	0.1169	0.3473
<i>Veggie</i>	dough_age	0.0219	-0.0287	0.1849	0.6057	0.8397	0.4988	0.7397
<i>Veggie</i>	dough_yield	-0.0112	0.0300	0.4386	0.7916	0.9062	0.4803	0.7308
<i>Veggie</i>	pH_laboratory	0.0605	0.0739	0.4447	0.1591	0.5036	0.0850	0.2718

<i>Veggie</i>	backslap_freq	-0.0803	-0.0921	0.2425	0.0588	0.2592	0.0303	0.1324
<i>Veggie</i>	barley	-0.0240	-0.0455	0.0000	0.5718	0.8365	0.2837	0.5590
<i>Veggie</i>	bread_ph	-0.0162	-0.0320	0.4308	0.7328	0.8872	0.5008	0.7397
<i>Veggie</i>	dough_size_feeding	0.0230	0.1038	0.1285	0.5873	0.8393	0.0142	0.0759
<i>Veggie</i>	ph_value_citizen	0.0028	-0.0042	0.4463	0.9482	0.9690	0.9227	0.9752
<i>Veggie</i>	rye	-0.0084	-0.0094	0.1940	0.8435	0.9203	0.8252	0.9218
<i>Veggie</i>	semi-wholemeal_wheat	-0.0196	-0.0137	0.1152	0.6439	0.8526	0.7477	0.8888
<i>Veggie</i>	spelt	-0.0147	0.0024	0.0988	0.7291	0.8872	0.9546	0.9871
<i>Veggie</i>	temp_feeding	-0.0560	-0.0331	0.4238	0.1866	0.5271	0.4352	0.6925
<i>Veggie</i>	temp_storage	-0.0778	-0.0451	0.3202	0.0667	0.2858	0.2881	0.5634
<i>Veggie</i>	time_feeding	-0.0362	-0.0039	0.2452	0.3953	0.7096	0.9279	0.9775
<i>Veggie</i>	wheat	-0.0217	-0.0072	0.3110	0.6089	0.8397	0.8660	0.9472
<i>Veggie</i>	wholemeal_rye	0.0664	0.0480	0.2640	0.1176	0.4313	0.2579	0.5410
<i>Veggie</i>	wholemeal_spelt	0.0236	0.0189	0.0836	0.5790	0.8366	0.6564	0.8388
<i>Veggie</i>	wholemeal_wheat	-0.0321	-0.0219	0.1502	0.4492	0.7524	0.6068	0.8031
<i>Veggie</i>	tta_laboratory	0.0038	0.0135	0.4167	0.9291	0.9643	0.7532	0.8920

Supplementary Table 7. Pearson and Spearman correlations, as well as cosine similarity, between measurable sourdough characteristics, home experiment results, fermentation parameters, and substrate proportions per sourdough (related to Figure 6E). p-values were corrected using the Benjamini–Hochberg false discovery rate (BH-FDR).

<i>Variable 1</i>	<i>Variable 2</i>	<i>Pearson Correlation</i>	<i>Spearman Correlation</i>	<i>Cosine Similarity</i>	<i>Uncorrected Pearson P-Value</i>	<i>Corrected Pearson P-Value</i>	<i>Uncorrected Spearman P-Value</i>	<i>Corrected Spearman P-Value</i>
<i>bread_density</i>	dough_age	-0.0170	0.0071	0.1880	0.7213	0.8844	0.8815	0.9588
<i>bread_density</i>	dough_yield	0.0089	0.1312	0.5179	0.8524	0.9243	0.0056	0.0364
<i>bread_density</i>	pH_laboratory	0.0485	0.0432	0.5254	0.3126	0.6519	0.3692	0.6356
<i>bread_density</i>	backslap_freq	-0.0691	-0.2610	0.3081	0.1463	0.4802	0.0000	0.0000
<i>bread_density</i>	barley	-0.0182	-0.0730	0.0180	0.7020	0.8720	0.1238	0.3561
<i>bread_density</i>	bread_ph	-0.0023	0.0266	0.5177	0.9614	0.9706	0.5787	0.7897
<i>bread_density</i>	dough_size_feeding	-0.0194	-0.0203	0.1040	0.6833	0.8657	0.6689	0.8479
<i>bread_density</i>	ph_value_citizen	-0.0049	-0.0888	0.5202	0.9181	0.9578	0.0621	0.2212

<i>bread_density</i>	rye	0.0284	0.1110	0.2604	0.5495	0.8251	0.0190	0.0964
<i>bread_density</i>	semi-wholemeal_wheat	-0.0659	-0.1419	0.0883	0.1646	0.5159	0.0027	0.0194
<i>bread_density</i>	spelt	0.0349	0.1040	0.1612	0.4626	0.7609	0.0281	0.1240
<i>bread_density</i>	temp_feeding	0.0117	-0.0266	0.5155	0.8054	0.9062	0.5754	0.7897
<i>bread_density</i>	temp_storage	0.0654	0.0941	0.4589	0.1679	0.5237	0.0470	0.1828
<i>bread_density</i>	time_feeding	-0.0336	0.0861	0.2895	0.4804	0.7795	0.0703	0.2425
<i>bread_density</i>	wheat	-0.0694	-0.3064	0.3443	0.1435	0.4802	0.0000	0.0000
<i>bread_density</i>	wholemeal_rye	0.1042	0.2153	0.3289	0.0279	0.1567	0.0000	0.0001
<i>bread_density</i>	wholemeal_spelt	-0.0154	0.0653	0.0616	0.7453	0.8872	0.1684	0.4116
<i>bread_density</i>	wholemeal_wheat	-0.0156	-0.0067	0.1915	0.7427	0.8872	0.8881	0.9602
<i>bread_density</i>	tta_laboratory	0.0166	0.2313	0.5007	0.7305	0.8872	0.0000	0.0000
<i>dough_age</i>	bread_density	-0.0170	0.0071	0.1880	0.7213	0.8844	0.8815	0.9588
<i>dough_age</i>	dough_yield	0.0184	0.0476	0.3702	0.6651	0.8633	0.2636	0.5410
<i>dough_age</i>	pH_laboratory	0.0439	-0.0795	0.4767	0.3068	0.6426	0.0642	0.2257
<i>dough_age</i>	backslop_freq	0.0759	0.0383	0.2983	0.0745	0.3116	0.3688	0.6356
<i>dough_age</i>	barley	-0.0188	-0.0867	0.0005	0.6583	0.8587	0.0410	0.1668
<i>dough_age</i>	bread_ph	0.0097	-0.0192	0.3755	0.8389	0.9203	0.6875	0.8554
<i>dough_age</i>	dough_size_finding	0.0364	-0.0128	0.1234	0.3915	0.7047	0.7631	0.8992
<i>dough_age</i>	ph_value_citizen	-0.0419	0.0137	0.3621	0.3294	0.6586	0.7503	0.8902
<i>dough_age</i>	rye	-0.0164	0.0045	0.1541	0.6989	0.8720	0.9160	0.9730
<i>dough_age</i>	semi-wholemeal_wheat	0.0136	-0.0630	0.1223	0.7492	0.8872	0.1377	0.3771
<i>dough_age</i>	spelt	-0.0544	-0.1531	0.0443	0.2001	0.5386	0.0003	0.0031
<i>dough_age</i>	temp_feeding	0.0198	0.0162	0.3674	0.6418	0.8526	0.7023	0.8577
<i>dough_age</i>	temp_storage	0.0701	0.0368	0.3398	0.0989	0.3869	0.3871	0.6498
<i>dough_age</i>	time_feeding	-0.0002	0.0030	0.2267	0.9965	0.9965	0.9447	0.9837
<i>dough_age</i>	wheat	0.0022	-0.0106	0.2720	0.9579	0.9706	0.8032	0.9132

<i>dough_age</i>	wholemeal_rye	0.0214	0.0943	0.1944	0.6151	0.8397	0.0262	0.1188
<i>dough_age</i>	wholemeal_spelt	-0.0132	-0.0128	0.0403	0.7564	0.8883	0.7632	0.8992
<i>dough_age</i>	wholemeal_wheat	0.0835	0.0247	0.2188	0.0492	0.2404	0.5613	0.7823
<i>dough_age</i>	tta_laboratory	0.0448	0.1080	0.4586	0.2984	0.6404	0.0120	0.0671
<i>dough_yield</i>	bread_density	0.0089	0.1312	0.5179	0.8524	0.9243	0.0056	0.0364
<i>dough_yield</i>	dough_age	0.0184	0.0476	0.3702	0.6651	0.8633	0.2636	0.5410
<i>dough_yield</i>	pH_laboratory	0.0395	0.0192	0.9833	0.3582	0.6739	0.6550	0.8388
<i>dough_yield</i>	backslop_freq	-0.0498	-0.0745	0.6483	0.2432	0.5916	0.0804	0.2646
<i>dough_yield</i>	barley	0.0372	0.0615	0.0529	0.3817	0.6970	0.1481	0.3872
<i>dough_yield</i>	bread_ph	-0.0983	-0.1069	0.9729	0.0388	0.2069	0.0246	0.1141
<i>dough_yield</i>	dough_size_feeding	-0.0100	-0.0656	0.2370	0.8146	0.9099	0.1225	0.3561
<i>dough_yield</i>	ph_value_citizen	-0.0323	-0.1101	0.9793	0.4526	0.7524	0.0103	0.0591
<i>dough_yield</i>	rye	0.1453	0.1883	0.4659	0.0006	0.0064	0.0000	0.0001
<i>dough_yield</i>	semi-wholemeal_wheat	-0.0567	-0.0444	0.2820	0.1823	0.5269	0.2965	0.5695
<i>dough_yield</i>	spelt	-0.0879	-0.0912	0.2313	0.0384	0.2069	0.0316	0.1356
<i>dough_yield</i>	temp_feeding	-0.1016	-0.0629	0.9551	0.0167	0.1070	0.1389	0.3771
<i>dough_yield</i>	temp_storage	-0.0133	-0.0767	0.7949	0.7549	0.8883	0.0708	0.2425
<i>dough_yield</i>	time_feeding	0.0960	0.2029	0.6113	0.0242	0.1427	0.0000	0.0000
<i>dough_yield</i>	wheat	-0.1986	-0.2476	0.6911	0.0000	0.0001	0.0000	0.0000
<i>dough_yield</i>	wholemeal_rye	0.0713	0.1441	0.4767	0.0933	0.3697	0.0007	0.0065
<i>dough_yield</i>	wholemeal_spelt	-0.0504	-0.0813	0.1298	0.2354	0.5843	0.0556	0.2038
<i>dough_yield</i>	wholemeal_wheat	0.0332	0.0741	0.3955	0.4357	0.7512	0.0813	0.2650
<i>dough_yield</i>	tta_laboratory	0.0564	0.1431	0.9246	0.1910	0.5311	0.0009	0.0075
<i>elevation</i>	bread_density	0.0220	0.1449	0.4049	0.6433	0.8526	0.0022	0.0159
<i>elevation</i>	dough_age	-0.0351	-0.0792	0.2629	0.4089	0.7217	0.0621	0.2212
<i>elevation</i>	dough_yield	-0.1040	-0.1969	0.7382	0.0143	0.0947	0.0000	0.0001
<i>elevation</i>	pH_laboratory	-0.1163	-0.1412	0.7610	0.0066	0.0480	0.0010	0.0079

<i>elevation</i>	backslop_freq	-0.0207	-0.0183	0.4969	0.6274	0.8501	0.6678	0.8479
<i>elevation</i>	barley	-0.0514	-0.1171	0.0033	0.2261	0.5721	0.0057	0.0364
<i>elevation</i>	bread_ph	0.1097	0.1146	0.7510	0.0207	0.1255	0.0157	0.0815
<i>elevation</i>	dough_size_fee ding	0.0812	0.1148	0.2360	0.0554	0.2477	0.0067	0.0412
<i>elevation</i>	ph_value_citizen	0.0576	0.1121	0.7627	0.1801	0.5269	0.0089	0.0518
<i>elevation</i>	rye	0.1045	0.0932	0.4026	0.0136	0.0917	0.0279	0.1240
<i>elevation</i>	semi- wholemeal_whe at	0.1618	0.1840	0.3252	0.0001	0.0016	0.0000	0.0002
<i>elevation</i>	spelt	0.2026	0.1436	0.3173	0.0000	0.0000	0.0007	0.0065
<i>elevation</i>	temp_feeding	-0.0134	0.0430	0.7396	0.7521	0.8878	0.3109	0.5865
<i>elevation</i>	temp_storage	-0.0078	0.0663	0.6125	0.8542	0.9247	0.1183	0.3489
<i>elevation</i>	time_feeding	-0.0762	-0.0600	0.4229	0.0734	0.3105	0.1585	0.3963
<i>elevation</i>	wheat	-0.2388	-0.2317	0.4463	0.0000	0.0000	0.0000	0.0000
<i>elevation</i>	wholemeal_rye	0.0397	0.0488	0.3835	0.3500	0.6662	0.2499	0.5373
<i>elevation</i>	wholemeal_spelt	0.0242	0.0201	0.1225	0.5690	0.8365	0.6352	0.8274
<i>elevation</i>	wholemeal_whe at	0.0176	0.0330	0.3116	0.6787	0.8637	0.4364	0.6925
<i>elevation</i>	tta_laboratory	0.0138	0.0721	0.7215	0.7491	0.8872	0.0938	0.2953
<i>pH_laboratory</i>	bread_density	0.0485	0.0432	0.5254	0.3126	0.6519	0.3692	0.6356
<i>pH_laboratory</i>	dough_age	0.0439	-0.0795	0.4767	0.3068	0.6426	0.0642	0.2257
<i>pH_laboratory</i>	dough_yield	0.0395	0.0192	0.9833	0.3582	0.6739	0.6550	0.8388
<i>pH_laboratory</i>	backslop_freq	-0.0826	-0.0999	0.6594	0.0550	0.2477	0.0201	0.1013
<i>pH_laboratory</i>	barley	-0.0076	-0.0264	0.0482	0.8593	0.9285	0.5388	0.7645
<i>pH_laboratory</i>	bread_ph	-0.0712	-0.0565	0.9897	0.1395	0.4802	0.2413	0.5279
<i>pH_laboratory</i>	dough_size_fee ding	-0.0266	0.0501	0.2405	0.5351	0.8188	0.2433	0.5284
<i>pH_laboratory</i>	ph_value_citizen	0.0694	0.0182	0.9948	0.1102	0.4179	0.6764	0.8520
<i>pH_laboratory</i>	rye	-0.0200	-0.0530	0.4474	0.6418	0.8526	0.2168	0.4878
<i>pH_laboratory</i>	semi- wholemeal_whe at	-0.0954	-0.0853	0.2912	0.0261	0.1510	0.0467	0.1827

<i>pH_laboratory</i>	spelt	0.0577	0.0104	0.2551	0.1789	0.5269	0.8089	0.9132
<i>pH_laboratory</i>	temp_feeding	-0.0457	-0.0814	0.9722	0.2875	0.6348	0.0579	0.2095
<i>pH_laboratory</i>	temp_storage	-0.0762	-0.1100	0.8063	0.0759	0.3148	0.0102	0.0591
<i>pH_laboratory</i>	time_feeding	-0.0039	-0.0967	0.6058	0.9285	0.9643	0.0246	0.1141
<i>pH_laboratory</i>	wheat	-0.0554	-0.0691	0.7215	0.1970	0.5328	0.1073	0.3298
<i>pH_laboratory</i>	wholemeal_rye	0.0574	0.0762	0.4797	0.1813	0.5269	0.0756	0.2535
<i>pH_laboratory</i>	wholemeal_spelt	0.0509	0.0793	0.1445	0.2356	0.5843	0.0645	0.2257
<i>pH_laboratory</i>	wholemeal_wheat at laboratory	-0.0416	-0.0423	0.3906	0.3324	0.6586	0.3251	0.5989
<i>backslop_freq</i>	bread_density	-0.0691	-0.2610	0.3081	0.1463	0.4802	0.0000	0.0000
<i>backslop_freq</i>	dough_age	0.0759	0.0383	0.2983	0.0745	0.3116	0.3688	0.6356
<i>backslop_freq</i>	dough_yield	-0.0498	-0.0745	0.6483	0.2432	0.5916	0.0804	0.2646
<i>backslop_freq</i>	pH_laboratory	-0.0826	-0.0999	0.6594	0.0550	0.2477	0.0201	0.1013
<i>backslop_freq</i>	barley	-0.0289	-0.0572	0.0104	0.4971	0.7969	0.1791	0.4258
<i>backslop_freq</i>	bread_ph	-0.0318	0.0003	0.6664	0.5047	0.7969	0.9955	0.9976
<i>backslop_freq</i>	dough_size_feeding	0.2458	0.0971	0.3383	0.0000	0.0000	0.0222	0.1068
<i>backslop_freq</i>	ph_value_citizen	0.0418	0.0635	0.6633	0.3324	0.6586	0.1400	0.3771
<i>backslop_freq</i>	rye	-0.1377	-0.1170	0.2032	0.0012	0.0112	0.0058	0.0367
<i>backslop_freq</i>	semi- wholemeal_wheat at laboratory	0.0414	0.0758	0.2264	0.3308	0.6586	0.0747	0.2523
<i>backslop_freq</i>	spelt	-0.0895	-0.0657	0.1015	0.0351	0.1940	0.1225	0.3561
<i>backslop_freq</i>	temp_feeding	0.0152	-0.0166	0.6497	0.7216	0.8844	0.6966	0.8554
<i>backslop_freq</i>	temp_storage	0.5154	0.1991	0.7639	0.0000	0.0000	0.0000	0.0000
<i>backslop_freq</i>	time_feeding	-0.0402	-0.0501	0.3796	0.3472	0.6661	0.2407	0.5279
<i>backslop_freq</i>	wheat	0.1424	0.0957	0.5566	0.0008	0.0081	0.0243	0.1141
<i>backslop_freq</i>	wholemeal_rye	-0.0941	-0.0634	0.2525	0.0268	0.1519	0.1358	0.3769
<i>backslop_freq</i>	wholemeal_spelt	0.0095	0.0298	0.1007	0.8230	0.9161	0.4845	0.7333
<i>backslop_freq</i>	wholemeal_wheat at laboratory	0.0495	0.0745	0.2975	0.2448	0.5931	0.0796	0.2646

<i>backslop_freq</i>	tta_laboratory	-0.0955	-0.0701	0.5955	0.0267	0.1519	0.1046	0.3240
<i>barley</i>	bread_density	-0.0182	-0.0730	0.0180	0.7020	0.8720	0.1238	0.3561
<i>barley</i>	dough_age	-0.0188	-0.0867	0.0005	0.6583	0.8587	0.0410	0.1668
<i>barley</i>	dough_yield	0.0372	0.0615	0.0529	0.3817	0.6970	0.1481	0.3872
<i>barley</i>	pH_laboratory	-0.0076	-0.0264	0.0482	0.8593	0.9285	0.5388	0.7645
<i>barley</i>	backslop_freq	-0.0289	-0.0572	0.0104	0.4971	0.7969	0.1791	0.4258
<i>barley</i>	bread_ph	-0.0758	-0.0534	0.0534	0.1109	0.4179	0.2617	0.5410
<i>barley</i>	dough_size_feeding	-0.0068	0.0227	0.0051	0.8730	0.9322	0.5932	0.7929
<i>barley</i>	ph_value_citizen	-0.1507	-0.0961	0.0342	0.0004	0.0047	0.0250	0.1149
<i>barley</i>	rye	-0.0239	0.0278	0.0003	0.5742	0.8365	0.5121	0.7492
<i>barley</i>	semi-wholemeal_wheat	-0.0034	0.0420	0.0109	0.9354	0.9690	0.3228	0.5969
<i>barley</i>	spelt	-0.0084	0.1197	0.0039	0.8431	0.9203	0.0047	0.0317
<i>barley</i>	temp_feeding	0.0650	0.0426	0.0614	0.1252	0.4489	0.3158	0.5922
<i>barley</i>	temp_storage	-0.0221	-0.0248	0.0259	0.6026	0.8397	0.5588	0.7823
<i>barley</i>	time_feeding	0.1939	0.0492	0.1830	0.0000	0.0001	0.2478	0.5347
<i>barley</i>	wheat	-0.0477	-0.0205	0.0022	0.2614	0.6076	0.6287	0.8235
<i>barley</i>	wholemeal_rye	-0.0259	-0.0478	0.0000	0.5419	0.8229	0.2599	0.5410
<i>barley</i>	wholemeal_spelt	-0.0068	-0.0121	0.0000	0.8723	0.9322	0.7762	0.9073
<i>barley</i>	wholemeal_wheat	-0.0207	-0.0398	0.0000	0.6256	0.8494	0.3483	0.6129
<i>barley</i>	tta_laboratory	0.2350	0.0278	0.1281	0.0000	0.0000	0.5189	0.7550
<i>bread_ph</i>	bread_density	-0.0023	0.0266	0.5177	0.9614	0.9706	0.5787	0.7897
<i>bread_ph</i>	dough_age	0.0097	-0.0192	0.3755	0.8389	0.9203	0.6875	0.8554
<i>bread_ph</i>	dough_yield	-0.0983	-0.1069	0.9729	0.0388	0.2069	0.0246	0.1141
<i>bread_ph</i>	pH_laboratory	-0.0712	-0.0565	0.9897	0.1395	0.4802	0.2413	0.5279
<i>bread_ph</i>	backslop_freq	-0.0318	0.0003	0.6664	0.5047	0.7969	0.9955	0.9976
<i>bread_ph</i>	barley	-0.0758	-0.0534	0.0534	0.1109	0.4179	0.2617	0.5410
<i>bread_ph</i>	dough_size_feeding	-0.0211	0.0489	0.2134	0.6582	0.8587	0.3042	0.5789

<i>bread_ph</i>	ph_value_citizen	0.2152	0.2655	0.9898	0.0000	0.0001	0.0000	0.0000
<i>bread_ph</i>	rye	-0.0119	-0.0268	0.4460	0.8025	0.9062	0.5730	0.7897
<i>bread_ph</i>	semi-wholemeal_wheat	-0.0106	0.0132	0.2679	0.8231	0.9161	0.7816	0.9080
<i>bread_ph</i>	spelt	-0.0560	-0.0053	0.2396	0.2392	0.5879	0.9106	0.9730
<i>bread_ph</i>	temp_feeding	-0.0523	-0.1461	0.9685	0.2716	0.6177	0.0020	0.0152
<i>bread_ph</i>	temp_storage	-0.0584	-0.0284	0.8023	0.2196	0.5628	0.5512	0.7771
<i>bread_ph</i>	time_feeding	-0.0239	-0.0409	0.6411	0.6171	0.8397	0.3921	0.6500
<i>bread_ph</i>	wheat	-0.0887	-0.1046	0.7152	0.0617	0.2701	0.0276	0.1240
<i>bread_ph</i>	wholemeal_rye	0.0248	0.0755	0.4779	0.6018	0.8397	0.1121	0.3394
<i>bread_ph</i>	wholemeal_spelt	0.0294	0.0102	0.1450	0.5362	0.8188	0.8306	0.9256
<i>bread_ph</i>	wholemeal_wheat	0.0226	0.0136	0.3911	0.6348	0.8526	0.7751	0.9073
<i>bread_ph</i>	tta_laboratory	-0.0060	0.0015	0.9350	0.9012	0.9526	0.9745	0.9934
<i>dough_size_fee</i>	bread_density	-0.0194	-0.0203	0.1040	0.6833	0.8657	0.6689	0.8479
<i>dough_size_fee</i>	dough_age	0.0364	-0.0128	0.1234	0.3915	0.7047	0.7631	0.8992
<i>dough_size_fee</i>	dough_yield	-0.0100	-0.0656	0.2370	0.8146	0.9099	0.1225	0.3561
<i>dough_size_fee</i>	pH_laboratory	-0.0266	0.0501	0.2405	0.5351	0.8188	0.2433	0.5284
<i>dough_size_fee</i>	backslop_freq	0.2458	0.0971	0.3383	0.0000	0.0000	0.0222	0.1068
<i>dough_size_fee</i>	barley	-0.0068	0.0227	0.0051	0.8730	0.9322	0.5932	0.7929
<i>dough_size_fee</i>	bread_ph	-0.0211	0.0489	0.2134	0.6582	0.8587	0.3042	0.5789
<i>dough_size_fee</i>	ph_value_citizen	-0.0179	0.0721	0.2364	0.6764	0.8637	0.0931	0.2947
<i>dough_size_fee</i>	rye	-0.0322	-0.0642	0.0813	0.4482	0.7524	0.1304	0.3689
<i>dough_size_fee</i>	semi-wholemeal_wheat	-0.0071	0.0103	0.0653	0.8675	0.9322	0.8087	0.9132
<i>dough_size_fee</i>	spelt	0.0415	-0.0180	0.0997	0.3278	0.6586	0.6723	0.8491
<i>dough_size_fee</i>	temp_feeding	0.0275	-0.0342	0.2428	0.5167	0.8057	0.4200	0.6802

dough_size_fee	temp_storage	0.1935	0.0494	0.3069	0.0000	0.0001	0.2446	0.5295
ding								
dough_size_fee	time_feeding	-0.0354	-0.1166	0.1206	0.4060	0.7217	0.0061	0.0378
ding								
dough_size_fee	wheat	0.0489	0.0006	0.2091	0.2497	0.6005	0.9879	0.9976
ding								
dough_size_fee	wholemeal_rye	-0.0201	-0.0417	0.0980	0.6356	0.8526	0.3263	0.5994
ding								
dough_size_fee	wholemeal_spelt	0.0015	-0.0118	0.0356	0.9714	0.9790	0.7815	0.9080
ding								
dough_size_fee	wholemeal_whe	-0.0366	0.0548	0.0635	0.3888	0.7021	0.1963	0.4531
ding	at							
dough_size_fee	tta_laboratory	-0.0233	-0.0348	0.2185	0.5894	0.8397	0.4188	0.6800
ding								
ph_value_citizen	bread_density	-0.0049	-0.0888	0.5202	0.9181	0.9578	0.0621	0.2212
ph_value_citizen	dough_age	-0.0419	0.0137	0.3621	0.3294	0.6586	0.7503	0.8902
ph_value_citizen	dough_yield	-0.0323	-0.1101	0.9793	0.4526	0.7524	0.0103	0.0591
ph_value_citizen	pH_laboratory	0.0694	0.0182	0.9948	0.1102	0.4179	0.6764	0.8520
ph_value_citizen	backslop_freq	0.0418	0.0635	0.6633	0.3324	0.6586	0.1400	0.3771
ph_value_citizen	barley	-0.1507	-0.0961	0.0342	0.0004	0.0047	0.0250	0.1149
ph_value_citizen	bread_ph	0.2152	0.2655	0.9898	0.0000	0.0001	0.0000	0.0000
ph_value_citizen	dough_size_fee	-0.0179	0.0721	0.2364	0.6764	0.8637	0.0931	0.2947
ding								
ph_value_citizen	rye	-0.1535	-0.1693	0.4322	0.0003	0.0038	0.0001	0.0009
ph_value_citizen	semi-	0.0164	0.0281	0.2992	0.7036	0.8720	0.5126	0.7492
	wholemeal_whe							
ding	at							
ph_value_citizen	spelt	-0.0406	-0.0256	0.2449	0.3449	0.6661	0.5514	0.7771
ph_value_citizen	temp_feeding	0.0279	-0.0026	0.9714	0.5157	0.8057	0.9523	0.9870
ph_value_citizen	temp_storage	-0.0044	0.0069	0.8042	0.9182	0.9578	0.8732	0.9534
ph_value_citizen	time_feeding	-0.2002	-0.2445	0.6385	0.0000	0.0001	0.0000	0.0000
ph_value_citizen	wheat	0.1057	0.1155	0.7260	0.0137	0.0917	0.0070	0.0424
ph_value_citizen	wholemeal_rye	-0.0241	-0.0375	0.4722	0.5749	0.8365	0.3829	0.6485
ph_value_citizen	wholemeal_spelt	0.0192	0.0314	0.1434	0.6546	0.8573	0.4646	0.7157
ph_value_citizen	wholemeal_whe	0.0245	0.0105	0.4006	0.5693	0.8365	0.8076	0.9132
ding	at							
ph_value_citizen	tta_laboratory	-0.3153	-0.2419	0.9221	0.0000	0.0000	0.0000	0.0000

<i>rye</i>	bread_density	0.0284	0.1110	0.2604	0.5495	0.8251	0.0190	0.0964
<i>rye</i>	dough_age	-0.0164	0.0045	0.1541	0.6989	0.8720	0.9160	0.9730
<i>rye</i>	dough_yield	0.1453	0.1883	0.4659	0.0006	0.0064	0.0000	0.0001
<i>rye</i>	pH_laboratory	-0.0200	-0.0530	0.4474	0.6418	0.8526	0.2168	0.4878
<i>rye</i>	backslop_freq	-0.1377	-0.1170	0.2032	0.0012	0.0112	0.0058	0.0367
<i>rye</i>	barley	-0.0239	0.0278	0.0003	0.5742	0.8365	0.5121	0.7492
<i>rye</i>	bread_ph	-0.0119	-0.0268	0.4460	0.8025	0.9062	0.5730	0.7897
<i>rye</i>	dough_size_feeding	-0.0322	-0.0642	0.0813	0.4482	0.7524	0.1304	0.3689
<i>rye</i>	ph_value_citizen	-0.1535	-0.1693	0.4322	0.0003	0.0038	0.0001	0.0009
<i>rye</i>	semi-wholemeal_wheat	-0.0482	-0.0285	0.0917	0.2558	0.6021	0.5014	0.7397
<i>rye</i>	spelt	-0.0616	0.0199	0.0589	0.1463	0.4802	0.6387	0.8274
<i>rye</i>	temp_feeding	-0.0741	-0.0475	0.4230	0.0807	0.3323	0.2634	0.5410
<i>rye</i>	temp_storage	-0.0226	0.0629	0.3516	0.5944	0.8397	0.1384	0.3771
<i>rye</i>	time_feeding	0.1077	0.1831	0.3478	0.0113	0.0780	0.0000	0.0002
<i>rye</i>	wheat	-0.3320	-0.2938	0.1226	0.0000	0.0000	0.0000	0.0000
<i>rye</i>	wholemeal_rye	-0.0813	-0.1055	0.1491	0.0552	0.2477	0.0127	0.0695
<i>rye</i>	wholemeal_spelt	-0.0598	-0.0551	0.0102	0.1584	0.5036	0.1944	0.4520
<i>rye</i>	wholemeal_wheat	-0.1673	-0.1136	0.0405	0.0001	0.0010	0.0073	0.0438
<i>rye</i>	tta_laboratory	0.1384	0.1556	0.4629	0.0012	0.0119	0.0003	0.0030
<i>semi-wholemeal_wheat</i>	bread_density	-0.0659	-0.1419	0.0883	0.1646	0.5159	0.0027	0.0194
<i>semi-wholemeal_wheat</i>	dough_age	0.0136	-0.0630	0.1223	0.7492	0.8872	0.1377	0.3771
<i>semi-wholemeal_wheat</i>	dough_yield	-0.0567	-0.0444	0.2820	0.1823	0.5269	0.2965	0.5695
<i>semi-wholemeal_wheat</i>	pH_laboratory	-0.0954	-0.0853	0.2912	0.0261	0.1510	0.0467	0.1827

semi-wholemeal_wheat	backstop_freq	0.0414	0.0758	0.2264	0.3308	0.6586	0.0747	0.2523
semi-wholemeal_wheat	barley	-0.0034	0.0420	0.0109	0.9354	0.9690	0.3228	0.5969
semi-wholemeal_wheat	bread_ph	-0.0106	0.0132	0.2679	0.8231	0.9161	0.7816	0.9080
semi-wholemeal_wheat	dough_size_feeding	-0.0071	0.0103	0.0653	0.8675	0.9322	0.8087	0.9132
semi-wholemeal_wheat	ph_value_citizen	0.0164	0.0281	0.2992	0.7036	0.8720	0.5126	0.7492
semi-wholemeal_wheat	rye	-0.0482	-0.0285	0.0917	0.2558	0.6021	0.5014	0.7397
semi-wholemeal_wheat	spelt	-0.0280	0.0289	0.0479	0.5092	0.8020	0.4954	0.7383
semi-wholemeal_wheat	temp_feeding	0.0542	0.0576	0.2996	0.2014	0.5399	0.1744	0.4193
semi-wholemeal_wheat	temp_storage	0.0254	0.0622	0.2533	0.5495	0.8251	0.1424	0.3794
semi-wholemeal_wheat	time_feeding	-0.0254	-0.0161	0.1595	0.5504	0.8251	0.7049	0.8577
semi-wholemeal_wheat	wheat	-0.2035	-0.2100	0.0810	0.0000	0.0000	0.0000	0.0000
semi-wholemeal_wheat	wholemeal_rye	-0.0629	-0.0412	0.0872	0.1384	0.4789	0.3312	0.6010
semi-wholemeal_wheat	wholemeal_spelt	-0.0439	-0.0460	0.0000	0.3009	0.6404	0.2787	0.5522
semi-wholemeal_wheat	wholemeal_wheat	0.1408	0.1730	0.2404	0.0009	0.0089	0.0000	0.0006
semi-wholemeal_wheat	tta_laboratory	0.0322	0.0643	0.2887	0.4554	0.7550	0.1352	0.3769
spelt	bread_density	0.0349	0.1040	0.1612	0.4626	0.7609	0.0281	0.1240
spelt	dough_age	-0.0544	-0.1531	0.0443	0.2001	0.5386	0.0003	0.0031

<i>spelt</i>	dough_yield	-0.0879	-0.0912	0.2313	0.0384	0.2069	0.0316	0.1356
<i>spelt</i>	pH_laboratory	0.0577	0.0104	0.2551	0.1789	0.5269	0.8089	0.9132
<i>spelt</i>	backslop_freq	-0.0895	-0.0657	0.1015	0.0351	0.1940	0.1225	0.3561
<i>spelt</i>	barley	-0.0084	0.1197	0.0039	0.8431	0.9203	0.0047	0.0317
<i>spelt</i>	bread_ph	-0.0560	-0.0053	0.2396	0.2392	0.5879	0.9106	0.9730
<i>spelt</i>	dough_size_feeding	0.0415	-0.0180	0.0997	0.3278	0.6586	0.6723	0.8491
<i>spelt</i>	ph_value_citizen	-0.0406	-0.0256	0.2449	0.3449	0.6661	0.5514	0.7771
<i>spelt</i>	rye	-0.0616	0.0199	0.0589	0.1463	0.4802	0.6387	0.8274
<i>spelt</i>	semi-wholemeal_wheat	-0.0280	0.0289	0.0479	0.5092	0.8020	0.4954	0.7383
<i>spelt</i>	temp_feeding	-0.0360	-0.0449	0.2354	0.3968	0.7101	0.2898	0.5634
<i>spelt</i>	temp_storage	-0.0675	0.0412	0.1635	0.1114	0.4179	0.3320	0.6010
<i>spelt</i>	time_feeding	0.0557	0.0106	0.1953	0.1912	0.5311	0.8042	0.9132
<i>spelt</i>	wheat	-0.2059	-0.1767	0.0443	0.0000	0.0000	0.0000	0.0004
<i>spelt</i>	wholemeal_rye	-0.0982	-0.0966	0.0346	0.0204	0.1255	0.0226	0.1079
<i>spelt</i>	wholemeal_spelt	0.0843	0.0561	0.1159	0.0467	0.2337	0.1859	0.4358
<i>spelt</i>	wholemeal_wheat	-0.0550	-0.0281	0.0498	0.1947	0.5311	0.5080	0.7461
<i>spelt</i>	tta_laboratory	0.0289	0.0370	0.2470	0.5019	0.7969	0.3903	0.6500
<i>temp_feeding</i>	bread_density	0.0117	-0.0266	0.5155	0.8054	0.9062	0.5754	0.7897
<i>temp_feeding</i>	dough_age	0.0198	0.0162	0.3674	0.6418	0.8526	0.7023	0.8577
<i>temp_feeding</i>	dough_yield	-0.1016	-0.0629	0.9551	0.0167	0.1070	0.1389	0.3771
<i>temp_feeding</i>	pH_laboratory	-0.0457	-0.0814	0.9722	0.2875	0.6348	0.0579	0.2095
<i>temp_feeding</i>	backslop_freq	0.0152	-0.0166	0.6497	0.7216	0.8844	0.6966	0.8554
<i>temp_feeding</i>	barley	0.0650	0.0426	0.0614	0.1252	0.4489	0.3158	0.5922
<i>temp_feeding</i>	bread_ph	-0.0523	-0.1461	0.9685	0.2716	0.6177	0.0020	0.0152
<i>temp_feeding</i>	dough_size_feeding	0.0275	-0.0342	0.2428	0.5167	0.8057	0.4200	0.6802
<i>temp_feeding</i>	ph_value_citizen	0.0279	-0.0026	0.9714	0.5157	0.8057	0.9523	0.9870
<i>temp_feeding</i>	rye	-0.0741	-0.0475	0.4230	0.0807	0.3323	0.2634	0.5410

<i>temp_feeding</i>	semi-wholemeal_wheat	0.0542	0.0576	0.2996	0.2014	0.5399	0.1744	0.4193
<i>temp_feeding</i>	spelt	-0.0360	-0.0449	0.2354	0.3968	0.7101	0.2898	0.5634
<i>temp_feeding</i>	temp_storage	0.0590	0.0221	0.7957	0.1644	0.5159	0.6030	0.8003
<i>temp_feeding</i>	time_feeding	-0.3444	-0.3289	0.5340	0.0000	0.0000	0.0000	0.0000
<i>temp_feeding</i>	wheat	0.0552	0.0410	0.7161	0.1932	0.5311	0.3342	0.6032
<i>temp_feeding</i>	wholemeal_rye	0.0453	0.0290	0.4708	0.2863	0.6348	0.4942	0.7383
<i>temp_feeding</i>	wholemeal_spelt	-0.0499	-0.0005	0.1258	0.2398	0.5879	0.9909	0.9976
<i>temp_feeding</i>	wholemeal_wheat	0.0022	-0.0402	0.3859	0.9588	0.9706	0.3441	0.6107
<i>temp_feeding</i>	tta_laboratory	0.1179	0.1050	0.9211	0.0060	0.0448	0.0146	0.0772
<i>temp_storage</i>	bread_density	0.0654	0.0941	0.4589	0.1679	0.5237	0.0470	0.1828
<i>temp_storage</i>	dough_age	0.0701	0.0368	0.3398	0.0989	0.3869	0.3871	0.6498
<i>temp_storage</i>	dough_yield	-0.0133	-0.0767	0.7949	0.7549	0.8883	0.0708	0.2425
<i>temp_storage</i>	pH_laboratory	-0.0762	-0.1100	0.8063	0.0759	0.3148	0.0102	0.0591
<i>temp_storage</i>	backslop_freq	0.5154	0.1991	0.7639	0.0000	0.0000	0.0000	0.0000
<i>temp_storage</i>	barley	-0.0221	-0.0248	0.0259	0.6026	0.8397	0.5588	0.7823
<i>temp_storage</i>	bread_ph	-0.0584	-0.0284	0.8023	0.2196	0.5628	0.5512	0.7771
<i>temp_storage</i>	dough_size_feeding	0.1935	0.0494	0.3069	0.0000	0.0001	0.2446	0.5295
<i>temp_storage</i>	ph_value_citizen	-0.0044	0.0069	0.8042	0.9182	0.9578	0.8732	0.9534
<i>temp_storage</i>	rye	-0.0226	0.0629	0.3516	0.5944	0.8397	0.1384	0.3771
<i>temp_storage</i>	semi-wholemeal_wheat	0.0254	0.0622	0.2533	0.5495	0.8251	0.1424	0.3794
<i>temp_storage</i>	spelt	-0.0675	0.0412	0.1635	0.1114	0.4179	0.3320	0.6010
<i>temp_storage</i>	temp_feeding	0.0590	0.0221	0.7957	0.1644	0.5159	0.6030	0.8003
<i>temp_storage</i>	time_feeding	-0.0031	-0.0021	0.4905	0.9428	0.9690	0.9604	0.9881
<i>temp_storage</i>	wheat	0.0829	-0.0379	0.6209	0.0505	0.2428	0.3714	0.6376
<i>temp_storage</i>	wholemeal_rye	-0.0400	0.0706	0.3627	0.3462	0.6661	0.0959	0.3007
<i>temp_storage</i>	wholemeal_spelt	-0.0651	-0.0872	0.0758	0.1251	0.4489	0.0396	0.1654

<i>temp_storage</i>	wholemeal_wheat	-0.0313	-0.1047	0.3030	0.4608	0.7600	0.0134	0.0728
<i>temp_storage</i>	tta_laboratory	-0.0223	0.0749	0.7530	0.6046	0.8397	0.0816	0.2650
<i>time_feeding</i>	bread_density	-0.0336	0.0861	0.2895	0.4804	0.7795	0.0703	0.2425
<i>time_feeding</i>	dough_age	-0.0002	0.0030	0.2267	0.9965	0.9965	0.9447	0.9837
<i>time_feeding</i>	dough_yield	0.0960	0.2029	0.6113	0.0242	0.1427	0.0000	0.0000
<i>time_feeding</i>	pH_laboratory	-0.0039	-0.0967	0.6058	0.9285	0.9643	0.0246	0.1141
<i>time_feeding</i>	backslop_freq	-0.0402	-0.0501	0.3796	0.3472	0.6661	0.2407	0.5279
<i>time_feeding</i>	barley	0.1939	0.0492	0.1830	0.0000	0.0001	0.2478	0.5347
<i>time_feeding</i>	bread_ph	-0.0239	-0.0409	0.6411	0.6171	0.8397	0.3921	0.6500
<i>time_feeding</i>	dough_size_feeding	-0.0354	-0.1166	0.1206	0.4060	0.7217	0.0061	0.0378
<i>time_feeding</i>	ph_value_citizen	-0.2002	-0.2445	0.6385	0.0000	0.0001	0.0000	0.0000
<i>time_feeding</i>	rye	0.1077	0.1831	0.3478	0.0113	0.0780	0.0000	0.0002
<i>time_feeding</i>	semi-wholemeal_wheat	-0.0254	-0.0161	0.1595	0.5504	0.8251	0.7049	0.8577
<i>time_feeding</i>	spelt	0.0557	0.0106	0.1953	0.1912	0.5311	0.8042	0.9132
<i>time_feeding</i>	temp_feeding	-0.3444	-0.3289	0.5340	0.0000	0.0000	0.0000	0.0000
<i>time_feeding</i>	temp_storage	-0.0031	-0.0021	0.4905	0.9428	0.9690	0.9604	0.9881
<i>time_feeding</i>	wheat	-0.0863	-0.1671	0.3961	0.0426	0.2164	0.0001	0.0010
<i>time_feeding</i>	wholemeal_rye	0.0107	0.0606	0.2960	0.8020	0.9062	0.1546	0.3943
<i>time_feeding</i>	wholemeal_spelt	0.0408	0.0362	0.1179	0.3382	0.6658	0.3958	0.6527
<i>time_feeding</i>	wholemeal_wheat	-0.0193	0.0516	0.2277	0.6501	0.8568	0.2262	0.5035
<i>time_feeding</i>	tta_laboratory	0.2309	0.1451	0.6317	0.0000	0.0000	0.0007	0.0067
<i>wheat</i>	bread_density	-0.0694	-0.3064	0.3443	0.1435	0.4802	0.0000	0.0000
<i>wheat</i>	dough_age	0.0022	-0.0106	0.2720	0.9579	0.9706	0.8032	0.9132
<i>wheat</i>	dough_yield	-0.1986	-0.2476	0.6911	0.0000	0.0001	0.0000	0.0000
<i>wheat</i>	pH_laboratory	-0.0554	-0.0691	0.7215	0.1970	0.5328	0.1073	0.3298
<i>wheat</i>	backslop_freq	0.1424	0.0957	0.5566	0.0008	0.0081	0.0243	0.1141
<i>wheat</i>	barley	-0.0477	-0.0205	0.0022	0.2614	0.6076	0.6287	0.8235

<i>wheat</i>	bread_ph	-0.0887	-0.1046	0.7152	0.0617	0.2701	0.0276	0.1240
<i>wheat</i>	dough_size_fee ding	0.0489	0.0006	0.2091	0.2497	0.6005	0.9879	0.9976
<i>wheat</i>	ph_value_citizen	0.1057	0.1155	0.7260	0.0137	0.0917	0.0070	0.0424
<i>wheat</i>	rye	-0.3320	-0.2938	0.1226	0.0000	0.0000	0.0000	0.0000
<i>wheat</i>	semi- wholemeal_whe at	-0.2035	-0.2100	0.0810	0.0000	0.0000	0.0000	0.0000
<i>wheat</i>	spelt	-0.2059	-0.1767	0.0443	0.0000	0.0000	0.0000	0.0004
<i>wheat</i>	temp_feeding	0.0552	0.0410	0.7161	0.1932	0.5311	0.3342	0.6032
<i>wheat</i>	temp_storage	0.0829	-0.0379	0.6209	0.0505	0.2428	0.3714	0.6376
<i>wheat</i>	time_feeding	-0.0863	-0.1671	0.3961	0.0426	0.2164	0.0001	0.0010
<i>wheat</i>	wholemeal_rye	-0.4041	-0.3969	0.0997	0.0000	0.0000	0.0000	0.0000
<i>wheat</i>	wholemeal_spelt	-0.1184	-0.1121	0.0215	0.0051	0.0391	0.0081	0.0476
<i>wheat</i>	wholemeal_whe at	-0.2407	-0.2216	0.1353	0.0000	0.0000	0.0000	0.0000
<i>wheat</i>	tta_laboratory	-0.5197	-0.5854	0.5514	0.0000	0.0000	0.0000	0.0000
<i>wholemeal_rye</i>	bread_density	0.1042	0.2153	0.3289	0.0279	0.1567	0.0000	0.0001
<i>wholemeal_rye</i>	dough_age	0.0214	0.0943	0.1944	0.6151	0.8397	0.0262	0.1188
<i>wholemeal_rye</i>	dough_yield	0.0713	0.1441	0.4767	0.0933	0.3697	0.0007	0.0065
<i>wholemeal_rye</i>	pH_laboratory	0.0574	0.0762	0.4797	0.1813	0.5269	0.0756	0.2535
<i>wholemeal_rye</i>	backslop_freq	-0.0941	-0.0634	0.2525	0.0268	0.1519	0.1358	0.3769
<i>wholemeal_rye</i>	barley	-0.0259	-0.0478	0.0000	0.5419	0.8229	0.2599	0.5410
<i>wholemeal_rye</i>	bread_ph	0.0248	0.0755	0.4779	0.6018	0.8397	0.1121	0.3394
<i>wholemeal_rye</i>	dough_size_fee ding	-0.0201	-0.0417	0.0980	0.6356	0.8526	0.3263	0.5994
<i>wholemeal_rye</i>	ph_value_citizen	-0.0241	-0.0375	0.4722	0.5749	0.8365	0.3829	0.6485
<i>wholemeal_rye</i>	rye	-0.0813	-0.1055	0.1491	0.0552	0.2477	0.0127	0.0695
<i>wholemeal_rye</i>	semi- wholemeal_whe at	-0.0629	-0.0412	0.0872	0.1384	0.4789	0.3312	0.6010
<i>wholemeal_rye</i>	spelt	-0.0982	-0.0966	0.0346	0.0204	0.1255	0.0226	0.1079
<i>wholemeal_rye</i>	temp_feeding	0.0453	0.0290	0.4708	0.2863	0.6348	0.4942	0.7383

<i>wholemeal_rye</i>	temp_storage	-0.0400	0.0706	0.3627	0.3462	0.6661	0.0959	0.3007
<i>wholemeal_rye</i>	time_feeding	0.0107	0.0606	0.2960	0.8020	0.9062	0.1546	0.3943
<i>wholemeal_rye</i>	wheat	-0.4041	-0.3969	0.0997	0.0000	0.0000	0.0000	0.0000
<i>wholemeal_rye</i>	wholemeal_spelt	-0.0119	-0.0173	0.0562	0.7785	0.9016	0.6845	0.8554
<i>wholemeal_rye</i>	wholemeal_wheat	-0.0637	-0.0568	0.1360	0.1330	0.4628	0.1803	0.4271
<i>wholemeal_rye</i>	tta_laboratory	0.3352	0.3856	0.5503	0.0000	0.0000	0.0000	0.0000
<i>wholemeal_spelt</i>	bread_density	-0.0154	0.0653	0.0616	0.7453	0.8872	0.1684	0.4116
<i>wholemeal_spelt</i>	dough_age	-0.0132	-0.0128	0.0403	0.7564	0.8883	0.7632	0.8992
<i>wholemeal_spelt</i>	dough_yield	-0.0504	-0.0813	0.1298	0.2354	0.5843	0.0556	0.2038
<i>wholemeal_spelt</i>	pH_laboratory	0.0509	0.0793	0.1445	0.2356	0.5843	0.0645	0.2257
<i>wholemeal_spelt</i>	backslop_freq	0.0095	0.0298	0.1007	0.8230	0.9161	0.4845	0.7333
<i>wholemeal_spelt</i>	barley	-0.0068	-0.0121	0.0000	0.8723	0.9322	0.7762	0.9073
<i>wholemeal_spelt</i>	bread_ph	0.0294	0.0102	0.1450	0.5362	0.8188	0.8306	0.9256
<i>wholemeal_spelt</i>	dough_size_feeding	0.0015	-0.0118	0.0356	0.9714	0.9790	0.7815	0.9080
<i>wholemeal_spelt</i>	ph_value_citizen	0.0192	0.0314	0.1434	0.6546	0.8573	0.4646	0.7157
<i>wholemeal_spelt</i>	rye	-0.0598	-0.0551	0.0102	0.1584	0.5036	0.1944	0.4520
<i>wholemeal_spelt</i>	semi-wholemeal_wheat	-0.0439	-0.0460	0.0000	0.3009	0.6404	0.2787	0.5522
<i>wholemeal_spelt</i>	spelt	0.0843	0.0561	0.1159	0.0467	0.2337	0.1859	0.4358
<i>wholemeal_spelt</i>	temp_feeding	-0.0499	-0.0005	0.1258	0.2398	0.5879	0.9909	0.9976
<i>wholemeal_spelt</i>	temp_storage	-0.0651	-0.0872	0.0758	0.1251	0.4489	0.0396	0.1654
<i>wholemeal_spelt</i>	time_feeding	0.0408	0.0362	0.1179	0.3382	0.6658	0.3958	0.6527
<i>wholemeal_spelt</i>	wheat	-0.1184	-0.1121	0.0215	0.0051	0.0391	0.0081	0.0476
<i>wholemeal_spelt</i>	wholemeal_rye	-0.0119	-0.0173	0.0562	0.7785	0.9016	0.6845	0.8554
<i>wholemeal_spelt</i>	wholemeal_wheat	-0.0009	-0.0002	0.0548	0.9837	0.9868	0.9966	0.9976
<i>wholemeal_spelt</i>	tta_laboratory	0.1281	0.1395	0.1781	0.0028	0.0232	0.0011	0.0089
<i>wholemeal_wheat</i>	bread_density	-0.0156	-0.0067	0.1915	0.7427	0.8872	0.8881	0.9602

<i>wholemeal_wheat</i>	dough_age	0.0835	0.0247	0.2188	0.0492	0.2404	0.5613	0.7823
<i>wholemeal_wheat</i>	dough_yield	0.0332	0.0741	0.3955	0.4357	0.7512	0.0813	0.2650
<i>wholemeal_wheat</i>	pH_laboratory	-0.0416	-0.0423	0.3906	0.3324	0.6586	0.3251	0.5989
<i>wholemeal_wheat</i>	backslop_freq	0.0495	0.0745	0.2975	0.2448	0.5931	0.0796	0.2646
<i>wholemeal_wheat</i>	barley	-0.0207	-0.0398	0.0000	0.6256	0.8494	0.3483	0.6129
<i>wholemeal_wheat</i>	bread_ph	0.0226	0.0136	0.3911	0.6348	0.8526	0.7751	0.9073
<i>wholemeal_wheat</i>	dough_size_finding	-0.0366	0.0548	0.0635	0.3888	0.7021	0.1963	0.4531
<i>wholemeal_wheat</i>	ph_value_citizen	0.0245	0.0105	0.4006	0.5693	0.8365	0.8076	0.9132
<i>wholemeal_wheat</i>	rye	-0.1673	-0.1136	0.0405	0.0001	0.0010	0.0073	0.0438
<i>wholemeal_wheat</i>	semi-wholemeal_wheat	0.1408	0.1730	0.2404	0.0009	0.0089	0.0000	0.0006
<i>wholemeal_wheat</i>	spelt	-0.0550	-0.0281	0.0498	0.1947	0.5311	0.5080	0.7461
<i>wholemeal_wheat</i>	temp_feeding	0.0022	-0.0402	0.3859	0.9588	0.9706	0.3441	0.6107
<i>wholemeal_wheat</i>	temp_storage	-0.0313	-0.1047	0.3030	0.4608	0.7600	0.0134	0.0728
<i>wholemeal_wheat</i>	time_feeding	-0.0193	0.0516	0.2277	0.6501	0.8568	0.2262	0.5035
<i>wholemeal_wheat</i>	wheat	-0.2407	-0.2216	0.1353	0.0000	0.0000	0.0000	0.0000
<i>wholemeal_wheat</i>	wholemeal_rye	-0.0637	-0.0568	0.1360	0.1330	0.4628	0.1803	0.4271
<i>wholemeal_wheat</i>	wholemeal_spelt	-0.0009	-0.0002	0.0548	0.9837	0.9868	0.9966	0.9976
<i>wholemeal_wheat</i>	tta_laboratory	0.1727	0.1917	0.4247	0.0001	0.0008	0.0000	0.0001
<i>tta_laboratory</i>	bread_density	0.0166	0.2313	0.5007	0.7305	0.8872	0.0000	0.0000
<i>tta_laboratory</i>	dough_age	0.0448	0.1080	0.4586	0.2984	0.6404	0.0120	0.0671
<i>tta_laboratory</i>	dough_yield	0.0564	0.1431	0.9246	0.1910	0.5311	0.0009	0.0075
<i>tta_laboratory</i>	pH_laboratory	-0.1745	-0.1448	0.9321	0.0000	0.0007	0.0007	0.0067
<i>tta_laboratory</i>	backslop_freq	-0.0955	-0.0701	0.5955	0.0267	0.1519	0.1046	0.3240
<i>tta_laboratory</i>	barley	0.2350	0.0278	0.1281	0.0000	0.0000	0.5189	0.7550

<i>tta_laboratory</i>	bread_ph	-0.0060	0.0015	0.9350	0.9012	0.9526	0.9745	0.9934
<i>tta_laboratory</i>	dough_size_fee ding	-0.0233	-0.0348	0.2185	0.5894	0.8397	0.4188	0.6800
<i>tta_laboratory</i>	ph_value_citizen	-0.3153	-0.2419	0.9221	0.0000	0.0000	0.0000	0.0000
<i>tta_laboratory</i>	rye	0.1384	0.1556	0.4629	0.0012	0.0119	0.0003	0.0030
<i>tta_laboratory</i>	semi- wholemeal_whe at	0.0322	0.0643	0.2887	0.4554	0.7550	0.1352	0.3769
<i>tta_laboratory</i>	spelt	0.0289	0.0370	0.2470	0.5019	0.7969	0.3903	0.6500
<i>tta_laboratory</i>	temp_feeding	0.1179	0.1050	0.9211	0.0060	0.0448	0.0146	0.0772
<i>tta_laboratory</i>	temp_storage	-0.0223	0.0749	0.7530	0.6046	0.8397	0.0816	0.2650
<i>tta_laboratory</i>	time_feeding	0.2309	0.1451	0.6317	0.0000	0.0000	0.0007	0.0067
<i>tta_laboratory</i>	wheat	-0.5197	-0.5854	0.5514	0.0000	0.0000	0.0000	0.0000
<i>tta_laboratory</i>	wholemeal_rye	0.3352	0.3856	0.5503	0.0000	0.0000	0.0000	0.0000
<i>tta_laboratory</i>	wholemeal_spelt	0.1281	0.1395	0.1781	0.0028	0.0232	0.0011	0.0089
<i>tta_laboratory</i>	wholemeal_whe at	0.1727	0.1917	0.4247	0.0001	0.0008	0.0000	0.0001

Supplementary Table 8. Chi-square enrichment test results for sourdough ingredients across countries (related to Figure 7A). *p*-values were corrected using the Benjamini–Hochberg false discovery rate (BH-FDR). Indicator codes: PE = positive enrichment, NE = negative enrichment, M = multiple indicators, U = unique indicator.

<i>Feature</i>	<i>Category</i>	<i>Cluster</i>	<i>Chi2 Statistic</i>	<i>Cramér' s V</i>	<i>Cluster Count with Category</i>	<i>Cluster Total</i>	<i>Category Total</i>	<i>Raw p- value</i>	<i>Corrected p- value</i>	<i>Enrichment Score</i>	<i>Interpreta tion</i>	<i>Indica tor</i>
<i>Flour Additions</i>	yes	Italy	21.5315	0.1398	16	81	74	0.0000	0.0000	2.9416	PE	M
<i>Flour Change</i>	yes	France	7.8217	0.0842	18	23	521	0.0052	0.0213	1.6553	PE	M
<i>Flour Change</i>	yes	Germany	17.3575	0.1255	50	158	521	0.0000	0.0002	0.6694	NE	M
<i>Flour Milling Grade</i>	endosperm	Finland	50.9589	0.2136	120	142	630	0.0000	0.0000	1.4983	PE	M
<i>Flour Milling Grade</i>	endosperm	Switzerlan d	18.6251	0.1291	187	393	630	0.0000	0.0001	0.8436	NE	M
<i>Flour Milling Grade</i>	endosperm	Italy	11.8811	0.1031	61	81	630	0.0006	0.0031	1.3352	PE	M
<i>Flour Milling Grade</i>	endosperm	Belgium	10.5508	0.0972	47	113	630	0.0012	0.0055	0.7374	NE	M
<i>Flour Milling Grade</i>	endosperm	Denmark	6.2889	0.0750	4	17	630	0.0121	0.0428	0.4172	NE	M

Flour Milling Grade	mix	Germany	7.2910	0.0808	9	158	141	0.0069	0.0252	0.4513	NE	M
Flour Milling Grade	mix	Denmark	21.8652	0.1399	9	17	141	0.0000	0.0000	4.1940	PE	M
Flour Milling Grade	mix	Sweden	10.5949	0.0974	9	25	141	0.0011	0.0055	2.8519	PE	M
Flour Milling Grade	mix	United Kingdom	4.8977	0.0662	5	14	141	0.0269	0.0905	2.8293	PE	M
Flour Milling Grade	other	Belgium	43.4672	0.1973	14	113	29	0.0000	0.0000	4.7720	PE	M
Flour Milling Grade	wholemeal	Finland	37.6523	0.1836	9	142	317	0.0000	0.0000	0.2233	NE	M
Flour Milling Grade	wholemeal	Switzerland	16.2077	0.1205	141	393	317	0.0001	0.0004	1.2642	PE	M
Flour Milling Grade	wholemeal	Germany	15.4812	0.1177	66	158	317	0.0001	0.0005	1.4719	PE	M
Flour Milling Grade	wholemeal	Italy	5.8948	0.0726	13	81	317	0.0152	0.0527	0.5655	NE	M
Flour Organic	yes	Finland	16.4732	0.1225	64	142	669	0.0000	0.0003	0.7397	NE	M
Flour Organic	yes	Italy	10.7441	0.0989	35	81	669	0.0010	0.0054	0.7092	NE	M
Flour Organic	yes	Romania	10.5630	0.0981	17	46	669	0.0012	0.0055	0.6066	NE	M
Flour Organic	yes	Germany	19.7720	0.1342	122	158	669	0.0000	0.0001	1.2673	PE	M
Flour Organic	yes	Austria	7.3368	0.0817	23	26	669	0.0068	0.0250	1.4519	PE	M
Flour Type (Grain)	other	Germany	7.7723	0.0848	9	156	141	0.0053	0.0214	0.4423	NE	M
Flour Type (Grain)	other	Denmark	20.7979	0.1387	9	17	141	0.0000	0.0000	4.0588	PE	M
Flour Type (Grain)	other	Sweden	9.9093	0.0957	9	25	141	0.0016	0.0076	2.7600	PE	M
Flour Type (Grain)	other	United Kingdom	4.5618	0.0650	5	14	141	0.0327	0.1083	2.7381	PE	M
Flour Type (Grain)	rye	Germany	49.2316	0.2134	79	156	294	0.0000	0.0000	1.8620	PE	M
Flour Type (Grain)	rye	Austria	35.8923	0.1822	21	26	294	0.0000	0.0000	2.9698	PE	M
Flour Type (Grain)	rye	Finland	7.6379	0.0841	24	140	294	0.0057	0.0223	0.6303	NE	M
Flour Type (Grain)	rye	Romania	6.3317	0.0765	4	43	294	0.0119	0.0425	0.3420	NE	M
Flour Type (Grain)	spelt	Switzerland	18.7321	0.1316	33	383	51	0.0000	0.0001	1.8263	PE	U
Flour Type (Grain)	wheat	Italy	35.3790	0.1809	70	80	595	0.0000	0.0000	1.5897	PE	M
Flour Type (Grain)	wheat	Finland	21.4634	0.1409	103	140	595	0.0000	0.0000	1.3367	PE	M

Flour Type (Grain)	wheat	Germany	19.4771	0.1342	60	156	595	0.0000	0.0001	0.6988	NE	M
Flour Type (Grain)	wheat	Austria	12.3632	0.1069	5	26	595	0.0004	0.0025	0.3494	NE	M
Flour Type (Grain)	wheat	Switzerland	8.8784	0.0906	187	383	595	0.0029	0.0128	0.8871	NE	M
Flour Type (Grain)	wheat	Romania	7.6346	0.0840	33	43	595	0.0057	0.0223	1.3943	PE	M
Water Source	bottled water	Switzerland	7.3664	0.0818	8	391	49	0.0066	0.0250	0.4601	NE	M
Water Source	bottled water	France	43.8491	0.1995	8	23	49	0.0000	0.0000	7.8225	PE	M
Water Source	bottled water	Romania	15.8865	0.1201	8	46	49	0.0001	0.0004	3.9113	PE	M
Water Source	bottled water	Italy	14.9246	0.1164	11	81	49	0.0001	0.0007	3.0542	PE	M
Water Source	spring water	Romania	47.6393	0.2079	5	46	9	0.0000	0.0000	13.3092	PE	U
Water Source	tap water	Romania	43.6804	0.1991	22	46	925	0.0000	0.0000	0.5698	NE	M
Water Source	tap water	France	20.0686	0.1349	11	23	925	0.0000	0.0001	0.5698	NE	M
Water Source	tap water	Switzerland	7.8132	0.0842	345	391	925	0.0052	0.0213	1.0512	PE	M
Water Source	tap water	Austria	3.9483	0.0599	26	26	925	0.0469	0.1488	1.1914	PE	M
Water Source	tap water	Finland	14.0503	0.1129	135	142	925	0.0002	0.0010	1.1326	PE	M
Water Source	tap water	Belgium	8.2023	0.0863	75	102	925	0.0042	0.0182	0.8760	NE	M
Water Source	tap water (descaled)	Germany	9.7766	0.0942	22	158	83	0.0018	0.0080	1.8487	PE	U
Water Source	tap water (filtered)	Romania	41.2981	0.1936	9	46	32	0.0000	0.0000	6.7378	PE	M
Water Source	tap water (filtered)	Belgium	11.7526	0.1033	9	102	32	0.0006	0.0033	3.0386	PE	M
Water Source	tap water (filtered)	France	5.2865	0.0693	3	23	32	0.0215	0.0734	4.4918	PE	M
Yeast Usage Prior	yes	Finland	138.6970	0.3548	26	142	696	0.0000	0.0000	0.2899	NE	M
Yeast Usage Prior	yes	Romania	26.7130	0.1557	12	46	696	0.0000	0.0000	0.4130	NE	M
Yeast Usage Prior	yes	Germany	38.2563	0.1863	135	158	696	0.0000	0.0000	1.3528	PE	M
Yeast Usage Prior	yes	Switzerland	32.3141	0.1712	291	391	696	0.0000	0.0000	1.1784	PE	M
Yeast Usage Prior	yes	Austria	4.3669	0.0629	22	26	696	0.0366	0.1179	1.3397	PE	M

Supplementary Table 9. Chi-square enrichment test results for sourdough baking motivations and perceived health benefits across countries (related to Figure 7B). *p*-values were corrected using the Benjamini–Hochberg false discovery rate (BH-FDR). Indicator codes: PE = positive enrichment, NE = negative enrichment, M = multiple indicators, U = unique indicator.

<i>Feature</i>	<i>Category</i>	<i>Cluster</i>	<i>Chi2 Statistic</i>	<i>Cramér's V</i>	<i>Cluster Count with Category</i>	<i>Cluster Total</i>	<i>Category Total</i>	<i>Raw p-value</i>	<i>Corrected p-value</i>	<i>Enrichment Score</i>	<i>Interpretation</i>	<i>Indicator</i>
<i>Baking Motivation: Enjoy Baking</i>	yes	Belgium	20.0601	0.1340	59	113	791	0.0000	0.0005	0.7373	NE	M
<i>Baking Motivation: Enjoy Baking</i>	yes	Germany	7.6165	0.0826	127	158	791	0.0058	0.0606	1.1351	PE	M
<i>Baking Motivation: Enjoy Baking</i>	yes	Finland	5.5681	0.0706	113	142	791	0.0183	0.1338	1.1237	PE	M
<i>Baking Motivation: Health</i>	yes	Italy	31.0100	0.1666	17	81	574	0.0000	0.0000	0.4084	NE	M
<i>Baking Motivation: Health</i>	yes	Romania	12.7701	0.1069	36	46	574	0.0004	0.0130	1.5230	PE	M
<i>Baking Motivation: Health</i>	yes	Germany	6.0409	0.0735	96	158	574	0.0140	0.1114	1.1824	PE	M
<i>Baking Motivation: Intolerance/Allergy</i>	yes	Finland	4.0948	0.0605	5	142	15	0.0430	0.2252	2.6221	PE	M
<i>Baking Motivation: Lower Cost</i>	yes	Switzerland	12.5328	0.1059	36	393	160	0.0004	0.0130	0.6395	NE	M
<i>Baking Motivation: Lower Cost</i>	yes	Hungary	9.8135	0.0937	6	12	160	0.0017	0.0385	3.4906	PE	M
<i>Baking Motivation: Lower Cost</i>	yes	Slovenia	8.3928	0.0867	6	13	160	0.0038	0.0503	3.2221	PE	M
<i>Baking Motivation: Lower Cost</i>	yes	Sweden	8.0671	0.0850	9	25	160	0.0045	0.0547	2.5133	PE	M
<i>Baking Motivation: Lower Cost</i>	yes	Finland	6.7859	0.0779	31	142	160	0.0092	0.0876	1.5241	PE	M
<i>Baking Motivation: Other Reasons</i>	yes	Italy	7.6495	0.0828	6	81	26	0.0057	0.0606	3.1823	PE	M
<i>Baking Motivation: Sustainability</i>	yes	Switzerland	9.3261	0.0914	14	393	20	0.0023	0.0431	1.9896	PE	M
<i>Baking Motivation: Taste</i>	yes	Romania	9.0583	0.0901	28	46	888	0.0026	0.0450	0.7657	NE	M
<i>Baking Motivation: Taste</i>	yes	Italy	6.4603	0.0761	55	81	888	0.0110	0.0935	0.8541	NE	M
<i>Baking Motivation: Taste</i>	yes	Czechia	6.3181	0.0752	3	8	888	0.0120	0.0982	0.4717	NE	M
<i>Baking Motivation: Taste</i>	yes	Finland	5.5745	0.0706	124	142	888	0.0182	0.1338	1.0984	PE	M
<i>Baking Motivation: Taste</i>	yes	Belgium	5.2624	0.0686	80	113	888	0.0218	0.1499	0.8905	NE	M
<i>Baking Motivation: Tradition</i>	yes	Czechia	7.0315	0.0793	3	8	80	0.0080	0.0792	5.2359	PE	M

<i>Baking Motivation: Tradition</i>	yes	Finland	4.8617	0.0660	17	142	80	0.0275	0.1705	1.6716	PE	M
<i>Baking Motivation: Tradition</i>	yes	Sweden	4.5176	0.0636	5	25	80	0.0335	0.2013	2.7925	PE	M
<i>Perceived Benefit: Better Digestibility</i>	yes	Romania	8.6579	0.0880	32	46	528	0.0033	0.0470	1.4717	PE	M
<i>Perceived Benefit: Better Digestibility</i>	yes	Denmark	4.9304	0.0664	3	17	528	0.0264	0.1705	0.3733	NE	M
<i>Perceived Benefit: Better Digestibility</i>	yes	Italy	4.1245	0.0608	29	81	528	0.0423	0.2252	0.7574	NE	M
<i>Perceived Benefit: Gut Health</i>	yes	Germany	13.7568	0.1110	5	158	140	0.0002	0.0111	0.2525	NE	M
<i>Perceived Benefit: Gut Health</i>	yes	Romania	9.3801	0.0916	13	46	140	0.0022	0.0431	2.2548	PE	M
<i>Perceived Benefit: Gut Health</i>	yes	United Kingdom	4.9729	0.0667	5	14	140	0.0257	0.1705	2.8495	PE	M
<i>Perceived Benefit: Gut Health</i>	yes	Sweden	4.2302	0.0615	7	25	140	0.0397	0.2164	2.2340	PE	M
<i>Perceived Benefit: Healthier Ingredients</i>	yes	Switzerland	11.0500	0.0995	25	393	119	0.0009	0.0237	0.5971	NE	M
<i>Perceived Benefit: Healthier Ingredients</i>	yes	Germany	8.8130	0.0888	28	158	119	0.0030	0.0456	1.6634	PE	M
<i>Perceived Benefit: Healthier Ingredients</i>	yes	France	7.6486	0.0827	7	23	119	0.0057	0.0606	2.8568	PE	M
<i>Perceived Benefit: Increased Satiety</i>	yes	France	4.4023	0.0628	3	23	36	0.0359	0.2083	4.0471	PE	M
<i>Perceived Benefit: Intolerance/Allergy</i>	yes	Switzerland	4.3247	0.0622	36	393	77	0.0376	0.2130	1.3288	PE	M
<i>Perceived Benefit: Mental Health</i>	yes	Denmark	4.9009	0.0662	3	17	46	0.0268	0.1705	4.2852	PE	M
<i>Perceived Benefit: Nutrient Availability</i>	yes	Sweden	8.9169	0.0893	9	25	153	0.0028	0.0456	2.6282	PE	M
<i>Perceived Benefit: Nutrient Availability</i>	yes	Austria	8.1248	0.0853	9	26	153	0.0044	0.0547	2.5271	PE	M
<i>Perceived Benefit: Nutrient Availability</i>	yes	Italy	6.4952	0.0763	3	81	153	0.0108	0.0935	0.2704	NE	M
<i>Perceived Benefit: Nutrient Availability</i>	yes	Switzerland	5.9016	0.0727	40	393	153	0.0151	0.1171	0.7431	NE	M
<i>Perceived Benefit: Stable Glucose Levels</i>	yes	Romania	21.9975	0.1403	9	46	50	0.0000	0.0003	4.3709	PE	M
<i>Perceived Health Benefits</i>	yes	Italy	12.4676	0.1083	55	79	895	0.0004	0.0130	0.8269	NE	M
<i>Perceived Health Benefits</i>	yes	Germany	6.5616	0.0786	116	151	895	0.0104	0.0935	0.9124	NE	M
<i>Perceived Health Benefits</i>	yes	Romania	3.8853	0.0605	44	46	895	0.0487	0.2501	1.1361	PE	M
<i>Perceived Health Benefits</i>	yes	Austria	3.8594	0.0603	26	26	895	0.0495	0.2516	1.1877	PE	M
<i>Self-Reported Sourdough Skill (Years)</i>	<0.5	Germany	11.1784	0.1021	3	153	104	0.0008	0.0237	0.2023	NE	M

Self-Reported Sourdough Skill (Years)	<0.5	Switzerland	5.2984	0.0703	48	380	104	0.0213	0.1499	1.3032	PE	M
Self-Reported Sourdough Skill (Years)	>5	Germany	21.3039	0.1409	66	153	294	0.0000	0.0003	1.5744	PE	M
Self-Reported Sourdough Skill (Years)	>5	Sweden	9.1046	0.0921	14	25	294	0.0025	0.0450	2.0438	PE	M
Self-Reported Sourdough Skill (Years)	>5	Switzerland	7.8843	0.0857	84	380	294	0.0050	0.0592	0.8068	NE	M
Self-Reported Sourdough Skill (Years)	>5	Finland	5.3098	0.0703	27	142	294	0.0212	0.1499	0.6939	NE	M
Self-Reported Sourdough Skill (Years)	>5	Italy	3.9015	0.0603	30	80	294	0.0482	0.2501	1.3686	PE	M
Self-Reported Sourdough Skill (Years)	0.5 to 2	Norway	10.5138	0.0990	3	3	167	0.0012	0.0301	6.4251	PE	M
Self-Reported Sourdough Skill (Years)	0.5 to 2	Germany	10.2803	0.0979	10	153	167	0.0013	0.0326	0.4199	NE	M
Self-Reported Sourdough Skill (Years)	0.5 to 2	Netherlands	4.5965	0.0655	8	24	167	0.0320	0.1966	2.1417	PE	M
Self-Reported Sourdough Skill (Years)	2 to 5	Finland	22.3861	0.1444	83	142	429	0.0000	0.0003	1.4619	PE	M
Self-Reported Sourdough Skill (Years)	2 to 5	Sweden	7.2004	0.0819	3	25	429	0.0073	0.0748	0.3001	NE	M
Self-Reported Sourdough Skill (Years)	2 to 5	Romania	4.4952	0.0647	11	46	429	0.0340	0.2017	0.5981	NE	M
Self-Reported Sourdough Skill (Years)	professional	Czechia	13.3896	0.1117	3	5	79	0.0003	0.0123	8.1494	PE	M
Self-Reported Sourdough Skill (Years)	professional	Switzerland	6.6145	0.0785	39	380	79	0.0101	0.0935	1.3940	PE	M

Supplementary Table 10. Chi-square enrichment test results for sourdough storage and home/bakery environments across countries. p-values were corrected using the Benjamini–Hochberg false discovery rate (BH-FDR). Indicator codes: PE = positive enrichment, NE = negative enrichment, M = multiple indicators, U = unique indicator.

Feature	Category	Cluster	Chi2 Statistic	Cramér's V	Cluster Count with Category	Cluster Total	Category Total	Raw p-value	Corrected p-value	Enrichment Score	Interpretation	Indicator
Dough Storage Container	glass jar	United Kingdom	5.2668	0.0691	8	14	919	0.0217	0.1261	0.6852	NE	M
Dough Storage Container	glass jar	Finland	4.8135	0.0661	128	142	919	0.0282	0.1551	1.0809	PE	M
Dough Storage Container	other	United Kingdom	19.3020	0.1323	3	14	21	0.0000	0.0004	11.2449	PE	M
Dough Storage Container	plastic container	Finland	6.9390	0.0794	10	142	162	0.0084	0.0756	0.4790	NE	U
Dough Storage Cover	closed lid	Finland	20.4713	0.1363	102	142	593	0.0000	0.0003	1.3349	PE	M
Dough Storage Cover	closed lid	Switzerland	15.2300	0.1176	179	391	593	0.0001	0.0020	0.8508	NE	M

<i>Dough Storage Cover</i>	closed lid	Germany	12.4660	0.1064	106	158	593	0.0004	0.0068	1.2467	PE	M
<i>Dough Storage Cover</i>	fabric	Italy	22.3307	0.1424	9	81	28	0.0000	0.0001	4.3730	PE	M
<i>Dough Storage Cover</i>	fabric	Netherlands	6.1456	0.0747	3	24	28	0.0132	0.0974	4.9196	PE	M
<i>Dough Storage Cover</i>	loose lid	Finland	13.4132	0.1103	33	142	413	0.0002	0.0044	0.6201	NE	M
<i>Dough Storage Cover</i>	loose lid	Switzerland	11.4041	0.1017	173	391	413	0.0007	0.0117	1.1806	PE	M
<i>Dough Storage Cover</i>	loose lid	Denmark	6.7071	0.0780	12	17	413	0.0096	0.0845	1.8835	PE	M
<i>Dough Storage Cover</i>	loose lid	Italy	4.4607	0.0636	21	81	413	0.0347	0.1727	0.6918	NE	M
<i>Dough Storage Cover</i>	other	Italy	4.2603	0.0622	5	81	25	0.0390	0.1885	2.7210	PE	M
<i>Dough Storage Cover</i>	plastic wrap	Switzerland	7.1833	0.0807	24	391	43	0.0074	0.0672	1.5731	PE	M
<i>Dough Storage Cover</i>	plastic wrap	Austria	6.4896	0.0767	4	26	43	0.0109	0.0922	3.9428	PE	M
<i>Dough Storage Cover</i>	plastic wrap	Italy	3.9628	0.0600	7	81	43	0.0465	0.2029	2.2148	PE	M
<i>Feeding Storage Location</i>	dough corner in bakery	Germany	18.0757	0.1281	5	158	6	0.0000	0.0006	5.8122	PE	U
<i>Feeding Storage Location</i>	fridge/cool place	Italy	14.1107	0.1132	18	81	107	0.0002	0.0031	2.2887	PE	M
<i>Feeding Storage Location</i>	fridge/cool place	Germany	5.1817	0.0686	7	158	107	0.0228	0.1282	0.4563	NE	M
<i>Feeding Storage Location</i>	kitchen	Germany	31.5897	0.1693	66	158	685	0.0000	0.0000	0.6720	NE	M
<i>Feeding Storage Location</i>	kitchen	Belgium	7.8789	0.0846	77	102	685	0.0050	0.0493	1.2145	PE	M
<i>Feeding Storage Location</i>	kitchen	Hungary	5.8486	0.0729	12	12	685	0.0156	0.1038	1.6088	PE	M
<i>Feeding Storage Location</i>	other	Italy	5.9005	0.0732	6	81	29	0.0151	0.1022	2.8148	PE	M
<i>Feeding Storage Location</i>	other	Finland	4.4678	0.0637	8	142	29	0.0345	0.1727	2.1408	PE	M
<i>Feeding Storage Location</i>	proofing chamber	Germany	99.3663	0.3003	53	158	117	0.0000	0.0000	3.1595	PE	M
<i>Feeding Storage Location</i>	proofing chamber	Finland	9.5285	0.0930	4	142	117	0.0020	0.0270	0.2653	NE	M
<i>Feeding Storage Location</i>	proofing chamber	Spain	4.6758	0.0651	3	7	117	0.0306	0.1635	4.0366	PE	M
<i>Feeding Storage Location</i>	proofing chamber	Belgium	4.5609	0.0643	4	102	117	0.0327	0.1662	0.3694	NE	M
<i>Feeding Storage Location</i>	warm place	Finland	4.3619	0.0629	29	142	158	0.0368	0.1812	1.4244	PE	U

<i>Fermented Acidic Beverages</i>	yes	United Kingdom	8.5751	0.0876	6	14	146	0.0034	0.0373	3.2789	PE	M
<i>Fermented Acidic Beverages</i>	yes	Belgium	5.1778	0.0681	23	113	146	0.0229	0.1282	1.5572	PE	M
<i>Fermented Acidic Beverages</i>	yes	Finland	4.6133	0.0643	10	142	146	0.0317	0.1635	0.5388	NE	M
<i>Fermented Alcoholic Beverages</i>	yes	Slovenia	5.4213	0.0697	3	13	57	0.0199	0.1182	4.5223	PE	M
<i>Fermented Alcoholic Beverages</i>	yes	Sweden	4.1801	0.0612	4	25	57	0.0409	0.1920	3.1354	PE	M
<i>Fermented Dairy Products</i>	yes	Germany	20.1523	0.1343	54	158	229	0.0000	0.0003	1.6671	PE	M
<i>Fermented Dairy Products</i>	yes	Finland	19.0396	0.1306	9	142	229	0.0000	0.0004	0.3092	NE	M
<i>Fermented Dairy Products</i>	yes	France	16.5063	0.1216	13	23	229	0.0000	0.0011	2.7570	PE	M
<i>Fermented Dairy Products</i>	yes	Austria	9.1967	0.0907	12	26	229	0.0024	0.0292	2.2513	PE	M
<i>Fermented Vegetables/Fruits</i>	yes	Finland	14.8221	0.1152	23	142	340	0.0001	0.0022	0.5321	NE	M
<i>Fermented Vegetables/Fruits</i>	yes	Hungary	9.3482	0.0915	9	12	340	0.0022	0.0282	2.4640	PE	M
<i>Fermented Vegetables/Fruits</i>	yes	United Kingdom	6.1376	0.0741	9	14	340	0.0132	0.0974	2.1120	PE	M
<i>Fermented Vegetables/Fruits</i>	yes	Austria	5.8030	0.0721	14	26	340	0.0160	0.1038	1.7690	PE	M
<i>Fermented Vegetables/Fruits</i>	yes	Norway	3.9748	0.0597	3	3	340	0.0462	0.2029	3.2853	PE	M
<i>Other Fermentation Types</i>	yes	Italy	6.1799	0.0744	8	81	45	0.0129	0.0974	2.4516	PE	M
<i>Other Fermentation Types</i>	yes	Switzerland	4.0718	0.0604	9	393	45	0.0436	0.1985	0.5684	NE	M
<i>Other Fermentations</i>	yes	Finland	35.7845	0.1819	35	142	523	0.0000	0.0000	0.5095	NE	M
<i>Other Fermentations</i>	yes	Hungary	7.4356	0.0829	11	12	523	0.0064	0.0595	1.8947	PE	M
<i>Other Fermentations</i>	yes	Sweden	4.7894	0.0666	18	25	523	0.0286	0.1551	1.4882	PE	M
<i>Other Fermentations</i>	yes	Germany	4.0156	0.0609	86	153	523	0.0451	0.2002	1.1618	PE	M
<i>Ownership of Animals (No Hair)</i>	yes	Sweden	7.9960	0.0846	3	25	23	0.0047	0.0472	5.8278	PE	M
<i>Ownership of Cat</i>	yes	Belgium	16.0826	0.1200	41	113	237	0.0001	0.0013	1.7101	PE	M
<i>Ownership of Cat</i>	yes	Germany	7.4804	0.0818	20	158	237	0.0062	0.0591	0.5966	NE	M
<i>Ownership of Cat</i>	yes	France	5.6684	0.0712	10	23	237	0.0173	0.1051	2.0492	PE	M
<i>Ownership of Dog</i>	yes	Germany	5.9372	0.0729	15	158	184	0.0148	0.1020	0.5763	NE	M

<i>Ownership of Dog</i>	yes	Spain	5.7548	0.0718	4	7	184	0.0164	0.1039	3.4689	PE	M
<i>Pet Ownership</i>	yes	Belgium	19.3977	0.1327	57	102	391	0.0000	0.0004	1.5736	PE	M
<i>Pet Ownership</i>	yes	Germany	10.0073	0.0953	38	158	391	0.0016	0.0226	0.6772	NE	M
<i>Pet Ownership</i>	yes	Spain	5.7032	0.0720	6	7	391	0.0169	0.1051	2.4136	PE	M
<i>Pet Ownership</i>	yes	Netherlands	4.6069	0.0647	14	24	391	0.0318	0.1635	1.6426	PE	M
<i>Presence of Kids</i>	yes	Belgium	8.6006	0.0890	50	101	388	0.0034	0.0373	1.3869	PE	M
<i>Presence of Kids</i>	yes	Germany	5.9466	0.0740	42	157	388	0.0147	0.1020	0.7495	NE	M
<i>Presence of Kids</i>	yes	Czechia	4.0608	0.0611	5	6	388	0.0439	0.1985	2.3346	PE	M
<i>Presence of Plants</i>	yes	Switzerland	26.4896	0.1560	157	387	557	0.0000	0.0000	0.7924	NE	M
<i>Presence of Plants</i>	yes	Sweden	9.7183	0.0945	21	25	557	0.0018	0.0250	1.6408	PE	M
<i>Presence of Plants</i>	yes	Belgium	8.3105	0.0874	66	101	557	0.0039	0.0413	1.2764	PE	M
<i>Presence of Plants</i>	yes	Germany	6.1794	0.0754	65	156	557	0.0129	0.0974	0.8139	NE	M
<i>Presence of Plants</i>	yes	Finland	4.2444	0.0625	83	139	557	0.0394	0.1885	1.1664	PE	M
<i>Storage After Feeding</i>	fridge	Finland	40.4009	0.1933	84	142	860	0.0000	0.0000	0.7436	NE	M
<i>Storage After Feeding</i>	fridge	Switzerland	18.6984	0.1315	331	381	860	0.0000	0.0004	1.0920	PE	M
<i>Storage After Feeding</i>	fridge	Germany	6.4952	0.0775	134	153	860	0.0108	0.0922	1.1009	PE	M
<i>Storage After Feeding</i>	keep at rt	Finland	34.9822	0.1799	53	142	204	0.0000	0.0000	1.9778	PE	M
<i>Storage After Feeding</i>	keep at rt	Switzerland	13.2838	0.1109	49	381	204	0.0003	0.0046	0.6815	NE	M
<i>Storage After Feeding</i>	keep at rt	Germany	6.4325	0.0771	17	153	204	0.0112	0.0936	0.5888	NE	M
<i>Storage After Feeding</i>	keep at rt	Czechia	6.1369	0.0753	4	6	204	0.0132	0.0974	3.5327	PE	M

Supplementary list 1. Deduplicated and curated list of the main questions and interests obtained from the participants to the co-design workshops across Europe.

- What are the health effects of using sourdough?
- Does the microbial composition of a sourdough change over time?
- Why does sourdough sometimes go bad, which microbes can do it?
- Does the method of storing a sourdough influence it?
- Is there a difference between sourdoughs made with additive-free flour and normal flour?
- Can you change or regulate the taste and function of a sourdough?
- Do different sourdoughs have different microbes?
- Does a change in cereal flour type have an effect on the sourdough?
- Is filtered water okay for use in a sourdough?
- What is the optimal feeding frequency?
- How long can you leave your sourdough without feeding?
- What are the influences of the addition of different ingredients?
- How much does a starter vary between different timepoints? When is it stable?
- Which microorganisms are the most useful in my sourdough and can I selectively enrich them in some way?
- Does the air quality/ pollution influence a starter more than the general geolocation?
- Most important influences on the sourdough?
- Which microorganisms are present and is there a link with the conditions?
- Does my sourdough contain rare microorganisms?
- What is the link between a sourdough and the sensorial properties of the bread?
- How acidic is my sourdough? Which compounds are present? Are there unique ones, absences, health benefits related to some,...
- Is a professional sourdough starter different? Is it easier to maintain?
- Is it safe to eat a sourdough starter without baking it?
- Is it possible to use gut-bacteria to inoculate a sourdough starter?
- Is the microbial activity of the sourdough affecting the dough behaviour and the bread?
- Can you use gluten-free flour to bake sourdough bread?
- Does the taste of the bread change depending on the acids that are produced in the sourdough?