



**Figure S1.** Rarefaction curves of 16S rRNA reads in (a) pea seeds, (b) partial crop peas, (c) whole crop peas, and 18S rRNA reads in (d) pea seeds, (e) partial crop peas, and (f) whole crop peas, discerned according to treatment (native peas: green; ensiled (+) peas: blue; ensiled (+) peas after 7 d aerobic storage: yellow; ensiled (-) peas: red; ensiled (-) peas after 7 d aerobic storage: orange). (+) denotes addition of microbial inoculant, (-) denotes ensiling without addition of inoculant. The rarefaction curves represent the number of amplicon sequence variants (ASVs) as a function of sequencing depth (number of reads). Each point represents a mean of 10 iterations. The standard deviation ranged from 0 to 5.08 (16S rRNA) and from 0 to 3.89 ASVs (18S rRNA).

**Table S1.** Number of observed amplicon sequence variants (ASVs) from 16S rRNA analysis.

| ID   | Maturity stage (BBCH) | Plant part   | Treatment | Observed ASVs |
|------|-----------------------|--------------|-----------|---------------|
| SC1  | 76                    | Seeds        | Native    | 23            |
| SC2  | 76                    | Seeds        | Native    | 59            |
| SA67 | 76                    | Partial crop | Native    | 104           |
| SA68 | 76                    | Partial crop | (+)       | 54            |
| SC3  | 76                    | Whole crop   | Native    | 78            |
| SC4  | 76                    | Whole crop   | (+)       | 64            |
| SC5  | 76                    | Whole crop   | (+) AS    | 118           |
| SC6  | 77                    | Seeds        | Native    | 20            |
| SC7  | 77                    | Seeds        | Native    | 24            |
| SC10 | 77                    | Partial crop | Native    | 93            |
| SC11 | 77                    | Partial crop | Native    | 84            |
| SC12 | 77                    | Partial crop | Native    | 70            |
| SC14 | 77                    | Partial crop | (+)       | 38            |
| SA21 | 77                    | Partial crop | (-)       | 106           |
| SC13 | 77                    | Partial crop | (-)       | 95            |
| SA22 | 77                    | Partial crop | (-) AS    | 75            |
| SC8  | 77                    | Whole crop   | Native    | 89            |
| SA70 | 77                    | Whole crop   | (+)       | 65            |
| SC9  | 77                    | Whole crop   | (+)       | 103           |
| SA69 | 77                    | Whole crop   | (-)       | 96            |
| SA71 | 78                    | Seeds        | Native    | 15            |
| SC15 | 78                    | Seeds        | Native    | 11            |
| SC17 | 78                    | Seeds        | (+)       | 17            |
| SC18 | 78                    | Seeds        | (+)       | 16            |
| SC16 | 78                    | Seeds        | (-)       | 34            |
| SA75 | 78                    | Partial crop | Native    | 117           |
| SA76 | 78                    | Partial crop | Native    | 135           |
| SA77 | 78                    | Partial crop | Native    | 193           |
| SA32 | 78                    | Partial crop | (+)       | 65            |
| SA33 | 78                    | Partial crop | (+)       | 39            |
| SA34 | 78                    | Partial crop | (+)       | 47            |
| SA36 | 78                    | Partial crop | (+)       | 38            |
| SA35 | 78                    | Partial crop | (+) AS    | 54            |
| SA37 | 78                    | Partial crop | (+) AS    | 75            |
| SA17 | 78                    | Partial crop | (-)       | 35            |
| SA30 | 78                    | Partial crop | (-)       | 45            |
| SA31 | 78                    | Partial crop | (-)       | 33            |
| SA78 | 78                    | Partial crop | (-)       | 28            |
| SA18 | 78                    | Partial crop | (-) AS    | 59            |
| SA29 | 78                    | Partial crop | (-) AS    | 46            |
| SA72 | 78                    | Whole crop   | Native    | 112           |
| SA73 | 78                    | Whole crop   | Native    | 103           |
| SC19 | 78                    | Whole crop   | (-)       | 22            |
| SC20 | 78                    | Whole crop   | (-)       | 22            |
| SA79 | 79                    | Seeds        | Native    | 31            |
| SA80 | 79                    | Seeds        | Native    | 46            |
| SA43 | 79                    | Seeds        | (+)       | 14            |
| SA44 | 79                    | Seeds        | (+)       | 16            |

|      |    |              |        |     |
|------|----|--------------|--------|-----|
| SA45 | 79 | Seeds        | (+)    | 14  |
| SA38 | 79 | Seeds        | (-)    | 32  |
| SA41 | 79 | Seeds        | (-)    | 31  |
| SA42 | 79 | Seeds        | (-)    | 43  |
| SA15 | 79 | Partial crop | Native | 80  |
| SA16 | 79 | Partial crop | Native | 98  |
| SA27 | 79 | Partial crop | (+)    | 46  |
| SA51 | 79 | Partial crop | (+)    | 28  |
| SA52 | 79 | Partial crop | (+)    | 30  |
| SA54 | 79 | Partial crop | (+)    | 29  |
| SA53 | 79 | Partial crop | (+) AS | 26  |
| SA55 | 79 | Partial crop | (+) AS | 24  |
| SA50 | 79 | Partial crop | (-)    | 50  |
| SA57 | 79 | Partial crop | (-)    | 49  |
| SA59 | 79 | Partial crop | (-)    | 45  |
| SA60 | 79 | Partial crop | (-)    | 42  |
| SA58 | 79 | Partial crop | (-) AS | 49  |
| SA62 | 79 | Partial crop | (-) AS | 50  |
| SA25 | 79 | Whole crop   | Native | 193 |
| SA26 | 79 | Whole crop   | Native | 123 |
| SA11 | 79 | Whole crop   | (+)    | 39  |
| SA13 | 79 | Whole crop   | (+)    | 39  |
| SA14 | 79 | Whole crop   | (+)    | 40  |
| SA20 | 79 | Whole crop   | (+)    | 19  |
| SA10 | 79 | Whole crop   | (+) AS | 41  |
| SA12 | 79 | Whole crop   | (+) AS | 42  |
| SA19 | 79 | Whole crop   | (-)    | 42  |
| SA46 | 79 | Whole crop   | (-)    | 42  |
| SA48 | 79 | Whole crop   | (-)    | 46  |
| SA49 | 79 | Whole crop   | (-)    | 32  |
| SA61 | 79 | Whole crop   | (-) AS | 33  |
| SA47 | 79 | Whole crop   | (-) AS | 27  |
| SA81 | 86 | Seeds        | Native | 50  |
| SA82 | 86 | Seeds        | Native | 43  |
| SA86 | 86 | Seeds        | (+)    | 15  |
| SA88 | 86 | Seeds        | (+)    | 21  |
| SA90 | 86 | Seeds        | (+)    | 55  |
| SA92 | 86 | Seeds        | (+)    | 24  |
| SA87 | 86 | Seeds        | (+) AS | 30  |
| SA89 | 86 | Seeds        | (+) AS | 26  |
| SA91 | 86 | Seeds        | (+) AS | 20  |
| SA40 | 86 | Seeds        | (-)    | 90  |
| SA84 | 86 | Seeds        | (-)    | 39  |
| SA85 | 86 | Seeds        | (-)    | 31  |
| SA39 | 86 | Seeds        | (-) AS | 36  |
| SA63 | 86 | Seeds        | (-) AS | 32  |
| SA83 | 86 | Seeds        | (-) AS | 25  |
| SA93 | 86 | Partial crop | Native | 58  |
| SA94 | 86 | Partial crop | Native | 92  |
| SA4  | 86 | Partial crop | (+)    | 29  |

|      |    |              |        |    |
|------|----|--------------|--------|----|
| SA5  | 86 | Partial crop | (+)    | 30 |
| SA6  | 86 | Partial crop | (+)    | 67 |
| SA8  | 86 | Partial crop | (+)    | 31 |
| SA28 | 86 | Partial crop | (+) AS | 49 |
| SA7  | 86 | Partial crop | (+) AS | 22 |
| SA2  | 86 | Partial crop | (-)    | 44 |
| SA3  | 86 | Partial crop | (-)    | 52 |
| SA9  | 86 | Partial crop | (-)    | 37 |
| SA95 | 86 | Partial crop | (-)    | 61 |
| SA1  | 86 | Partial crop | (-) AS | 47 |
| SA64 | 86 | Partial crop | (-) AS | 45 |

---

(+) ensiling with use of bacterial inoculant, (-) ensiling without use of inoculant,

AS = aerobic storage (i.e., silages were stored 7 d under aerobic conditions).

Maturity stages are encoded according to Meier (45).

**Table S2.** Number of observed amplicon sequence variants (ASVs) from 18S rRNA analysis.

| ID   | Maturity stage (BBCH) | Plant part   | Treatment | Observed ASVs |
|------|-----------------------|--------------|-----------|---------------|
| SD29 | 76                    | Seeds        | Native    | 1             |
| SD30 | 76                    | Seeds        | Native    | 8             |
| SD53 | 76                    | Seeds        | (+)       | 8             |
| SD6  | 76                    | Seeds        | (+)       | 5             |
| SD10 | 76                    | Partial crop | Native    | 25            |
| SD11 | 76                    | Partial crop | Native    | 11            |
| SD12 | 76                    | Partial crop | Native    | 10            |
| SD1  | 76                    | Partial crop | (+) AS    | 12            |
| SD38 | 76                    | Partial crop | (+) AS    | 8             |
| SD13 | 76                    | Partial crop | (-) AS    | 9             |
| SD37 | 76                    | Partial crop | (-) AS    | 10            |
| SD33 | 76                    | Whole crop   | Native    | 24            |
| SD7  | 76                    | Whole crop   | Native    | 30            |
| SD8  | 76                    | Whole crop   | Native    | 29            |
| SD54 | 76                    | Whole crop   | (+)       | 21            |
| SD36 | 76                    | Whole crop   | (+) AS    | 11            |
| SD9  | 76                    | Whole crop   | (+) AS    | 9             |
| SD34 | 76                    | Whole crop   | (-) AS    | 10            |
| SD35 | 76                    | Whole crop   | (-) AS    | 10            |
| SD2  | 77                    | Seeds        | Native    | 3             |
| SD3  | 77                    | Seeds        | Native    | 4             |
| SD15 | 77                    | Partial crop | Native    | 23            |
| SD16 | 77                    | Partial crop | Native    | 13            |
| SD40 | 77                    | Partial crop | Native    | 25            |
| SC66 | 77                    | Partial crop | (+)       | 11            |
| SD26 | 77                    | Partial crop | (+)       | 9             |
| SD25 | 77                    | Partial crop | (+) AS    | 7             |
| SC56 | 77                    | Partial crop | (-)       | 24            |
| SC65 | 77                    | Partial crop | (-)       | 55            |
| SD41 | 77                    | Partial crop | (-) AS    | 7             |
| SD42 | 77                    | Partial crop | (-) AS    | 11            |
| SD4  | 77                    | Whole crop   | Native    | 12            |
| SD5  | 77                    | Whole crop   | Native    | 22            |
| SD81 | 77                    | Whole crop   | Native    | 9             |
| SC24 | 77                    | Whole crop   | (+)       | 49            |
| SD14 | 77                    | Whole crop   | (+) AS    | 7             |
| SD32 | 77                    | Whole crop   | (+) AS    | 8             |
| SB21 | 77                    | Whole crop   | (-)       | 46            |
| SC23 | 77                    | Whole crop   | (-)       | 42            |
| SD31 | 77                    | Whole crop   | (-) AS    | 4             |
| SD39 | 77                    | Whole crop   | (-) AS    | 9             |
| SD23 | 78                    | Seeds        | Native    | 2             |
| SD24 | 78                    | Seeds        | Native    | 5             |
| SD89 | 78                    | Seeds        | Native    | 4             |

|      |    |              |        |    |
|------|----|--------------|--------|----|
| SA70 | 78 | Seeds        | (+)    | 16 |
| SA72 | 78 | Seeds        | (+)    | 52 |
| SA73 | 78 | Seeds        | (+)    | 75 |
| SD28 | 78 | Seeds        | (+)    | 7  |
| SA71 | 78 | Seeds        | (+) AS | 51 |
| SB22 | 78 | Seeds        | (-)    | 43 |
| SD51 | 78 | Seeds        | (-)    | 7  |
| SD56 | 78 | Seeds        | (-)    | 2  |
| SD91 | 78 | Seeds        | (-)    | 5  |
| SD17 | 78 | Partial crop | Native | 26 |
| SD18 | 78 | Partial crop | Native | 29 |
| SD19 | 78 | Partial crop | Native | 35 |
| SA79 | 78 | Partial crop | (+)    | 22 |
| SA80 | 78 | Partial crop | (+)    | 43 |
| SD47 | 78 | Partial crop | (+) AS | 8  |
| SD48 | 78 | Partial crop | (+) AS | 8  |
| SB25 | 78 | Partial crop | (-)    | 69 |
| SD45 | 78 | Partial crop | (-) AS | 12 |
| SD46 | 78 | Partial crop | (-) AS | 7  |
| SA74 | 78 | Whole crop   | Native | 50 |
| SA75 | 78 | Whole crop   | Native | 54 |
| SB23 | 78 | Whole crop   | Native | 44 |
| SD44 | 78 | Whole crop   | (+) AS | 7  |
| SB24 | 78 | Whole crop   | (-)    | 50 |
| SD82 | 78 | Whole crop   | (-) AS | 35 |
| SD88 | 78 | Whole crop   | (-) AS | 14 |
| SD49 | 79 | Seeds        | Native | 5  |
| SD50 | 79 | Seeds        | Native | 9  |
| SA81 | 79 | Seeds        | (+)    | 5  |
| SD86 | 79 | Seeds        | (+)    | 16 |
| SD87 | 79 | Seeds        | (+)    | 5  |
| SD83 | 79 | Seeds        | (-)    | 11 |
| SD84 | 79 | Seeds        | (-)    | 7  |
| SD85 | 79 | Seeds        | (-)    | 10 |
| SB28 | 79 | Partial crop | Native | 48 |
| SD80 | 79 | Partial crop | Native | 37 |
| SD92 | 79 | Whole crop   | Native | 42 |
| SD93 | 79 | Whole crop   | Native | 39 |
| SD61 | 86 | Seeds        | Native | 7  |
| SD62 | 86 | Seeds        | Native | 6  |
| SD65 | 86 | Seeds        | (+)    | 4  |
| SD67 | 86 | Seeds        | (+)    | 9  |
| SD69 | 86 | Seeds        | (+)    | 7  |
| SD79 | 86 | Seeds        | (+)    | 3  |
| SD66 | 86 | Seeds        | (+) AS | 11 |
| SD68 | 86 | Seeds        | (+) AS | 10 |

|      |    |              |        |    |
|------|----|--------------|--------|----|
| SD90 | 86 | Seeds        | (+) AS | 10 |
| SD63 | 86 | Seeds        | (-)    | 9  |
| SD74 | 86 | Seeds        | (-)    | 5  |
| SD76 | 86 | Seeds        | (-)    | 2  |
| SD78 | 86 | Seeds        | (-)    | 4  |
| SD73 | 86 | Seeds        | (-) AS | 8  |
| SD75 | 86 | Seeds        | (-) AS | 10 |
| SD77 | 86 | Seeds        | (-) AS | 9  |
| SD70 | 86 | Partial crop | Native | 33 |
| SD71 | 86 | Partial crop | Native | 19 |
| SD94 | 86 | Partial crop | (+)    | 18 |
| SD96 | 86 | Partial crop | (+)    | 21 |
| SA82 | 86 | Partial crop | (+) AS | 51 |
| SD95 | 86 | Partial crop | (+) AS | 14 |
| SA83 | 86 | Partial crop | (-)    | 69 |
| SD58 | 86 | Partial crop | (-)    | 8  |
| SD64 | 86 | Partial crop | (-)    | 17 |
| SD72 | 86 | Partial crop | (-)    | 27 |
| SD57 | 86 | Partial crop | (-) AS | 8  |
| SD59 | 86 | Partial crop | (-) AS | 12 |

---

(+) ensiling with use of bacterial inoculant, (-) ensiling without use of inoculant,  
AS = aerobic storage (i.e., silages were stored 7 d under aerobic conditions).  
Maturity stages are encoded according to Meier (45).

**Table S3.** Number of 16S rRNA reads per sample.

| ID   | Maturity stage (BBCH) | Plant part   | Treatment | Reads per sample |
|------|-----------------------|--------------|-----------|------------------|
| SC1  | 76                    | Seeds        | Native    | 783              |
| SC2  | 76                    | Seeds        | Native    | 12543            |
| SA67 | 76                    | Partial crop | Native    | 52444            |
| SA68 | 76                    | Partial crop | (+)       | 76170            |
| SC3  | 76                    | Whole crop   | Native    | 63343            |
| SC4  | 76                    | Whole crop   | (+)       | 68725            |
| SC5  | 76                    | Whole crop   | (+) AS    | 72056            |
| SC6  | 77                    | Seeds        | Native    | 982              |
| SC7  | 77                    | Seeds        | Native    | 2426             |
| SC10 | 77                    | Partial crop | Native    | 46360            |
| SC11 | 77                    | Partial crop | Native    | 22778            |
| SC12 | 77                    | Partial crop | Native    | 46984            |
| SC14 | 77                    | Partial crop | (+)       | 90167            |
| SA21 | 77                    | Partial crop | (-)       | 309264           |
| SC13 | 77                    | Partial crop | (-)       | 89765            |
| SA22 | 77                    | Partial crop | (-) AS    | 124414           |
| SC8  | 77                    | Whole crop   | Native    | 42085            |
| SA70 | 77                    | Whole crop   | (+)       | 127435           |
| SC9  | 77                    | Whole crop   | (+)       | 87978            |
| SA69 | 77                    | Whole crop   | (-)       | 82166            |
| SA71 | 78                    | Seeds        | Native    | 859              |
| SC15 | 78                    | Seeds        | Native    | 355              |
| SC17 | 78                    | Seeds        | (+)       | 54368            |
| SC18 | 78                    | Seeds        | (+)       | 62429            |
| SC16 | 78                    | Seeds        | (-)       | 74208            |
| SA75 | 78                    | Partial crop | Native    | 52144            |
| SA76 | 78                    | Partial crop | Native    | 37015            |
| SA77 | 78                    | Partial crop | Native    | 59392            |
| SA32 | 78                    | Partial crop | (+)       | 169370           |
| SA33 | 78                    | Partial crop | (+)       | 92173            |
| SA34 | 78                    | Partial crop | (+)       | 93887            |
| SA36 | 78                    | Partial crop | (+)       | 70879            |
| SA35 | 78                    | Partial crop | (+) AS    | 95216            |
| SA37 | 78                    | Partial crop | (+) AS    | 102042           |
| SA17 | 78                    | Partial crop | (-)       | 128556           |
| SA30 | 78                    | Partial crop | (-)       | 345646           |
| SA31 | 78                    | Partial crop | (-)       | 181764           |
| SA78 | 78                    | Partial crop | (-)       | 100349           |
| SA18 | 78                    | Partial crop | (-) AS    | 171625           |
| SA29 | 78                    | Partial crop | (-) AS    | 198022           |
| SA72 | 78                    | Whole crop   | Native    | 84360            |
| SA73 | 78                    | Whole crop   | Native    | 50821            |
| SC19 | 78                    | Whole crop   | (-)       | 38060            |
| SC20 | 78                    | Whole crop   | (-)       | 44165            |
| SA79 | 79                    | Seeds        | Native    | 59470            |
| SA80 | 79                    | Seeds        | Native    | 26371            |
| SA43 | 79                    | Seeds        | (+)       | 110425           |
| SA44 | 79                    | Seeds        | (+)       | 73348            |



|      |    |              |        |        |
|------|----|--------------|--------|--------|
| SA45 | 79 | Seeds        | (+)    | 91215  |
| SA38 | 79 | Seeds        | (-)    | 107227 |
| SA41 | 79 | Seeds        | (-)    | 98725  |
| SA42 | 79 | Seeds        | (-)    | 63482  |
| SA15 | 79 | Partial crop | Native | 173538 |
| SA16 | 79 | Partial crop | Native | 155927 |
| SA27 | 79 | Partial crop | (+)    | 237667 |
| SA51 | 79 | Partial crop | (+)    | 111937 |
| SA52 | 79 | Partial crop | (+)    | 72000  |
| SA54 | 79 | Partial crop | (+)    | 118817 |
| SA53 | 79 | Partial crop | (+) AS | 103359 |
| SA55 | 79 | Partial crop | (+) AS | 99545  |
| SA50 | 79 | Partial crop | (-)    | 96517  |
| SA57 | 79 | Partial crop | (-)    | 101054 |
| SA59 | 79 | Partial crop | (-)    | 101025 |
| SA60 | 79 | Partial crop | (-)    | 76781  |
| SA58 | 79 | Partial crop | (-) AS | 94763  |
| SA62 | 79 | Partial crop | (-) AS | 111384 |
| SA25 | 79 | Whole crop   | Native | 155380 |
| SA26 | 79 | Whole crop   | Native | 206072 |
| SA11 | 79 | Whole crop   | (+)    | 313164 |
| SA13 | 79 | Whole crop   | (+)    | 162496 |
| SA14 | 79 | Whole crop   | (+)    | 437064 |
| SA20 | 79 | Whole crop   | (+)    | 66050  |
| SA10 | 79 | Whole crop   | (+) AS | 223750 |
| SA12 | 79 | Whole crop   | (+) AS | 190599 |
| SA19 | 79 | Whole crop   | (-)    | 120447 |
| SA46 | 79 | Whole crop   | (-)    | 104663 |
| SA48 | 79 | Whole crop   | (-)    | 67143  |
| SA49 | 79 | Whole crop   | (-)    | 91394  |
| SA61 | 79 | Whole crop   | (-) AS | 117410 |
| SA47 | 79 | Whole crop   | (-) AS | 78479  |
| SA81 | 86 | Seeds        | Native | 16367  |
| SA82 | 86 | Seeds        | Native | 4279   |
| SA86 | 86 | Seeds        | (+)    | 76848  |
| SA88 | 86 | Seeds        | (+)    | 86302  |
| SA90 | 86 | Seeds        | (+)    | 122655 |
| SA92 | 86 | Seeds        | (+)    | 78477  |
| SA87 | 86 | Seeds        | (+) AS | 77062  |
| SA89 | 86 | Seeds        | (+) AS | 98183  |
| SA91 | 86 | Seeds        | (+) AS | 65508  |
| SA40 | 86 | Seeds        | (-)    | 17125  |
| SA84 | 86 | Seeds        | (-)    | 86993  |
| SA85 | 86 | Seeds        | (-)    | 2422   |
| SA39 | 86 | Seeds        | (-) AS | 81517  |
| SA63 | 86 | Seeds        | (-) AS | 67566  |
| SA83 | 86 | Seeds        | (-) AS | 32070  |
| SA93 | 86 | Partial crop | Native | 84521  |
| SA94 | 86 | Partial crop | Native | 75260  |
| SA4  | 86 | Partial crop | (+)    | 168672 |

|      |    |              |        |        |
|------|----|--------------|--------|--------|
| SA5  | 86 | Partial crop | (+)    | 236970 |
| SA6  | 86 | Partial crop | (+)    | 338286 |
| SA8  | 86 | Partial crop | (+)    | 179699 |
| SA28 | 86 | Partial crop | (+) AS | 268507 |
| SA7  | 86 | Partial crop | (+) AS | 275263 |
| SA2  | 86 | Partial crop | (-)    | 113187 |
| SA3  | 86 | Partial crop | (-)    | 132227 |
| SA9  | 86 | Partial crop | (-)    | 132243 |
| SA95 | 86 | Partial crop | (-)    | 86941  |
| SA1  | 86 | Partial crop | (-) AS | 206299 |
| SA64 | 86 | Partial crop | (-) AS | 101577 |

---

(+) ensiling with use of bacterial inoculant, (-) ensiling without use of inoculant,

AS = aerobic storage (i.e., silages were stored 7 d under aerobic conditions).

Maturity stages are encoded according to Meier (45).

**Table S4.** Number of 18S rRNA reads per sample.

| ID   | Maturity stage (BBCH) | Plant part   | Treatment | Reads per sample |
|------|-----------------------|--------------|-----------|------------------|
| SD29 | 76                    | Seeds        | Native    | 154              |
| SD30 | 76                    | Seeds        | Native    | 148              |
| SD53 | 76                    | Seeds        | (+)       | 842              |
| SD6  | 76                    | Seeds        | (+)       | 196              |
| SD10 | 76                    | Partial crop | Native    | 3604             |
| SD11 | 76                    | Partial crop | Native    | 604              |
| SD12 | 76                    | Partial crop | Native    | 1052             |
| SD1  | 76                    | Partial crop | (+) AS    | 61794            |
| SD38 | 76                    | Partial crop | (+) AS    | 120084           |
| SD13 | 76                    | Partial crop | (-) AS    | 79817            |
| SD37 | 76                    | Partial crop | (-) AS    | 128350           |
| SD33 | 76                    | Whole crop   | Native    | 2354             |
| SD7  | 76                    | Whole crop   | Native    | 8352             |
| SD8  | 76                    | Whole crop   | Native    | 2493             |
| SD54 | 76                    | Whole crop   | (+)       | 101407           |
| SD36 | 76                    | Whole crop   | (+) AS    | 78590            |
| SD9  | 76                    | Whole crop   | (+) AS    | 44485            |
| SD34 | 76                    | Whole crop   | (-) AS    | 110600           |
| SD35 | 76                    | Whole crop   | (-) AS    | 90603            |
| SD2  | 77                    | Seeds        | Native    | 71               |
| SD3  | 77                    | Seeds        | Native    | 110              |
| SD15 | 77                    | Partial crop | Native    | 1521             |
| SD16 | 77                    | Partial crop | Native    | 614              |
| SD40 | 77                    | Partial crop | Native    | 2401             |
| SC66 | 77                    | Partial crop | (+)       | 3687             |
| SD26 | 77                    | Partial crop | (+)       | 67273            |
| SD25 | 77                    | Partial crop | (+) AS    | 105220           |
| SC56 | 77                    | Partial crop | (-)       | 37624            |
| SC65 | 77                    | Partial crop | (-)       | 78009            |
| SD41 | 77                    | Partial crop | (-) AS    | 83080            |
| SD42 | 77                    | Partial crop | (-) AS    | 102498           |
| SD4  | 77                    | Whole crop   | Native    | 758              |
| SD5  | 77                    | Whole crop   | Native    | 1611             |
| SD81 | 77                    | Whole crop   | Native    | 63817            |
| SC24 | 77                    | Whole crop   | (+)       | 61806            |
| SD14 | 77                    | Whole crop   | (+) AS    | 48760            |
| SD32 | 77                    | Whole crop   | (+) AS    | 35938            |
| SB21 | 77                    | Whole crop   | (-)       | 22116            |
| SC23 | 77                    | Whole crop   | (-)       | 48713            |
| SD31 | 77                    | Whole crop   | (-) AS    | 13927            |
| SD39 | 77                    | Whole crop   | (-) AS    | 75244            |
| SD23 | 78                    | Seeds        | Native    | 38               |
| SD24 | 78                    | Seeds        | Native    | 60               |
| SD89 | 78                    | Seeds        | Native    | 66               |

|      |    |              |        |        |
|------|----|--------------|--------|--------|
| SA70 | 78 | Seeds        | (+)    | 5733   |
| SA72 | 78 | Seeds        | (+)    | 152421 |
| SA73 | 78 | Seeds        | (+)    | 219075 |
| SD28 | 78 | Seeds        | (+)    | 1647   |
| SA71 | 78 | Seeds        | (+) AS | 11997  |
| SB22 | 78 | Seeds        | (-)    | 17918  |
| SD51 | 78 | Seeds        | (-)    | 941    |
| SD56 | 78 | Seeds        | (-)    | 56     |
| SD91 | 78 | Seeds        | (-)    | 119    |
| SD17 | 78 | Partial crop | Native | 3059   |
| SD18 | 78 | Partial crop | Native | 3658   |
| SD19 | 78 | Partial crop | Native | 3813   |
| SA79 | 78 | Partial crop | (+)    | 5378   |
| SA80 | 78 | Partial crop | (+)    | 9240   |
| SD47 | 78 | Partial crop | (+) AS | 66469  |
| SD48 | 78 | Partial crop | (+) AS | 77127  |
| SB25 | 78 | Partial crop | (-)    | 38710  |
| SD45 | 78 | Partial crop | (-) AS | 101710 |
| SD46 | 78 | Partial crop | (-) AS | 81470  |
| SA74 | 78 | Whole crop   | Native | 83798  |
| SA75 | 78 | Whole crop   | Native | 98331  |
| SB23 | 78 | Whole crop   | Native | 11200  |
| SD44 | 78 | Whole crop   | (+) AS | 67146  |
| SB24 | 78 | Whole crop   | (-)    | 14493  |
| SD82 | 78 | Whole crop   | (-) AS | 8097   |
| SD88 | 78 | Whole crop   | (-) AS | 59816  |
| SD49 | 79 | Seeds        | Native | 321    |
| SD50 | 79 | Seeds        | Native | 447    |
| SA81 | 79 | Seeds        | (+)    | 110    |
| SD86 | 79 | Seeds        | (+)    | 2801   |
| SD87 | 79 | Seeds        | (+)    | 96     |
| SD83 | 79 | Seeds        | (-)    | 427    |
| SD84 | 79 | Seeds        | (-)    | 168    |
| SD85 | 79 | Seeds        | (-)    | 6493   |
| SB28 | 79 | Partial crop | Native | 33966  |
| SD80 | 79 | Partial crop | Native | 14800  |
| SD92 | 79 | Whole crop   | Native | 16638  |
| SD93 | 79 | Whole crop   | Native | 13647  |
| SD61 | 86 | Seeds        | Native | 162    |
| SD62 | 86 | Seeds        | Native | 337    |
| SD65 | 86 | Seeds        | (+)    | 106    |
| SD67 | 86 | Seeds        | (+)    | 1031   |
| SD69 | 86 | Seeds        | (+)    | 186    |
| SD79 | 86 | Seeds        | (+)    | 75     |
| SD66 | 86 | Seeds        | (+) AS | 74578  |
| SD68 | 86 | Seeds        | (+) AS | 25555  |

|      |    |              |        |        |
|------|----|--------------|--------|--------|
| SD90 | 86 | Seeds        | (+) AS | 51599  |
| SD63 | 86 | Seeds        | (-)    | 215    |
| SD74 | 86 | Seeds        | (-)    | 96     |
| SD76 | 86 | Seeds        | (-)    | 83     |
| SD78 | 86 | Seeds        | (-)    | 167    |
| SD73 | 86 | Seeds        | (-) AS | 26772  |
| SD75 | 86 | Seeds        | (-) AS | 24820  |
| SD77 | 86 | Seeds        | (-) AS | 47036  |
| SD70 | 86 | Partial crop | Native | 7607   |
| SD71 | 86 | Partial crop | Native | 1489   |
| SD94 | 86 | Partial crop | (+)    | 2176   |
| SD96 | 86 | Partial crop | (+)    | 5215   |
| SA82 | 86 | Partial crop | (+) AS | 26125  |
| SD95 | 86 | Partial crop | (+) AS | 829    |
| SA83 | 86 | Partial crop | (-)    | 69089  |
| SD58 | 86 | Partial crop | (-)    | 211    |
| SD64 | 86 | Partial crop | (-)    | 98958  |
| SD72 | 86 | Partial crop | (-)    | 70548  |
| SD57 | 86 | Partial crop | (-) AS | 101120 |
| SD59 | 86 | Partial crop | (-) AS | 257309 |

---

(+) ensiling with use of bacterial inoculant, (-) ensiling without use of inoculant,  
AS = aerobic storage (i.e., silages were stored 7 d under aerobic conditions).  
Maturity stages are encoded according to Meier (45).

**Table S6.** Relative abundance of epiphytic bacteria on pea seeds, partial crop peas, and whole crop peas after harvesting (native material) at five maturity stages.

| Maturity stage (BBCH) | Plant part    | <i>Bacillus</i> | <i>Oceanobacillus</i> | <i>Exiguobacterium</i> | <i>Enterococcus</i> | <i>Lactobacillus</i> | <i>Pediococcus</i> | <i>Weissella</i> | <i>Hafnia-Obesumbacterium</i> | <i>Serratia</i> | Uncl. ( <i>Enterobacteriaceae</i> ) | <i>Pseudomonas</i> | Others |
|-----------------------|---------------|-----------------|-----------------------|------------------------|---------------------|----------------------|--------------------|------------------|-------------------------------|-----------------|-------------------------------------|--------------------|--------|
| 76                    | Seeds         | 7.0<br>(0.94)   | 0.7<br>(1)            | 0                      | 0.9<br>(0.3)        | 20.7<br>(6.76)       | 11.1<br>(1.85)     | 5.2<br>(2.9)     | 12.2<br>(2.12)                | 0               | 17.1<br>(7.37)                      | 7.9<br>(7.0)       | 17.1   |
|                       | Partial crops | 26.7            | 6.0                   | 0.7                    | 10.4                | 5.4                  | 0.3                | 0.2              | 3.8                           | 4.9             | 34.2                                | 0.2                | 7.3    |
|                       | Whole crops   | 3.4             | 0.6                   | 9.4                    | 8.4                 | 0.6                  | 0.1                | < 0.1            | 6.3                           | 23.1            | 44.7                                | 0.4                | 3.0    |
| 77                    | Seeds         | 16.7<br>(6.51)  | 2.2<br>(2.1)          | 0                      | 3.3<br>(0.086)      | 28.8<br>(31.0)       | 7.2<br>(5.6)       | 0.3<br>(0.4)     | 0                             | 0.6<br>(0.8)    | 11.1<br>(0.152)                     | 16.4<br>(16.5)     | 13.5   |
|                       | Partial crops | 11.2<br>(11.0)  | 2.0<br>(2.0)          | 0.2<br>(0.03)          | 7.0<br>(7.7)        | 3.1<br>(3.0)         | 4.5<br>(3.5)       | 20.7<br>(35.0)   | 4.0<br>(2.4)                  | 3.4<br>(1.8)    | 38.3<br>(17.4)                      | 0.6<br>(0.4)       | 5.2    |
|                       | Whole crops   | 6.2             | 0.7                   | 1.9                    | 10.5                | 1.2                  | 0.4                | 0.2              | 11.4                          | 14.1            | 43.8                                | 1.2                | 8.4    |
| 78                    | Seeds         | 4.7<br>(6.6)    | 0                     | 0                      | 0                   | 24.4<br>(7.82)       | 6.6<br>(3.8)       | 9.6<br>(5.7)     | 0                             | 0               | 43.2<br>(21.4)                      | 2.4<br>(3.5)       | 9.0    |
|                       | Partial crops | 0.2<br>(0.2)    | < 0.1<br>(0.01)       | 1.4<br>(0.79)          | 8.9<br>(1.7)        | 0.8<br>(0.04)        | 0.5<br>(0.3)       | 0.6<br>(0.3)     | 1.2<br>(0.37)                 | 4.2<br>(1.6)    | 68.2<br>(1.33)                      | 5.0<br>(5.5)       | 9.3    |
|                       | Whole crops   | 0.2<br>(0.2)    | < 0.1<br>(0.01)       | 2.5<br>(0.87)          | 5.6<br>(3.5)        | 0.6<br>(0.2)         | 0.9<br>(1.0)       | 8.2<br>(6.6)     | 2.1<br>(2.3)                  | 1.8<br>(1.7)    | 71.4<br>(1.75)                      | 2.4<br>(1.8)       | 4.2    |
| 79                    | Seeds         | 45.4<br>(64.1)  | 0                     | 0.5<br>(0.6)           | 0.1<br>(0.04)       | 0.5<br>(0.3)         | 0.2<br>(0.08)      | 0.3<br>(0.2)     | < 0.1<br>(0.05)               | 0.7<br>(0.7)    | 48.4<br>(60.5)                      | 2.6<br>(2.2)       | 1.3    |
|                       | Partial crops | 18.9<br>(26.6)  | < 0.1<br>(0.003)      | 0.6<br>(0.3)           | 2.5<br>(0.65)       | 0.6<br>(0.03)        | 0.2<br>(0.07)      | 3.0<br>(3.2)     | 0.4<br>(0.4)                  | 1.4<br>(0.17)   | 61.5<br>(17.9)                      | 10.3<br>(4.62)     | 0.9    |
|                       | Whole crops   | 0.5<br>(0.6)    | < 0.1<br>(0.01)       | 3.0<br>(1.3)           | 2.6<br>(1.4)        | 0.6<br>(0.3)         | 0.4<br>(0.3)       | 2.2<br>(1.7)     | 2.0<br>(2.8)                  | 0.8<br>(1.0)    | 75.1<br>(9.71)                      | 7.8<br>(2.9)       | 5.0    |
| 86                    | Seeds         | 34.3<br>(47.3)  | 0                     | 0.8<br>(0.9)           | 10.6<br>(1.68)      | 4.2<br>(1.5)         | 1.8<br>(1.7)       | 2.6<br>(0.79)    | 0.6<br>(0.4)                  | 13.3<br>(15.8)  | 19.6<br>(18.7)                      | 1.7<br>(1.7)       | 10.5   |
|                       | Partial crops | 0.3<br>(0.2)    | < 0.1<br>(0.03)       | 1.2<br>(1.2)           | 4.8<br>(3.5)        | 0.4<br>(0.2)         | 0.2<br>(0.07)      | 7.8<br>(5.2)     | 0.1<br>(0.08)                 | 0.3<br>(0.03)   | 73.6<br>(4.05)                      | 9.6<br>(5.1)       | 1.8    |

Relative abundances based on amplicon sequence variants (ASVs) and are given as percent of total bacteria. Maturity stages are encoded according to Meier (45). In one case among the shown, *Enterobacteriaceae* could not be classified beyond the rank of family. Bacteria with relative abundance lower than 5% are added up under the term “others”. Analyses were performed using one sample per variant, unless otherwise indicated. Means of two biological replicates per variant are highlighted grey; means of three replicates per variant are highlighted blue. The standard deviation of means is given in brackets.

**Table S8.** Crude nutrient and detergent fiber composition of pea seeds, partial crop peas, and whole crop peas at harvesting (native material), after ensiling with addition of bacterial inoculant (+), and after ensiling without addition of inoculant (–), at five maturity stages.

| Maturity (BBCH) | Crop variant  | Treatment     | DM             | CA             | CP            | AEE           | CF             | NDF           | ADF            | ADL           |             |
|-----------------|---------------|---------------|----------------|----------------|---------------|---------------|----------------|---------------|----------------|---------------|-------------|
| 76              | Seeds         | Native        | 294            | 35             | 231           | 14            | 77             | 103           | 98             | 6             |             |
|                 |               | +             | 319            | 32             | 244           | 12            | 82             | 97            | 99             | 2             |             |
|                 |               | –             | 287            | 36             | 272           | 16            | 93             | 110           | 116            | 3             |             |
|                 | Partial crops | Native        | 257<br>(6.22)  | 53<br>(2.1)    | 196<br>(9.89) | 10<br>(2.5)   | 135<br>(5.90)  | 188<br>(3.81) | 165<br>(9.66)  | 14<br>(2.3)   |             |
|                 |               | +             | 247            | 58             | 177           | 12            | 191            | 238           | 234            | 27            |             |
|                 |               | –             | 254            | 57             | 173           | 15            | 193            | 242           | 210            | 26            |             |
|                 | Whole crops   | Native        | 256<br>(15.7)  | 87<br>(0.27)   | 129<br>(1.13) | 14<br>(1.1)   | 283<br>(7.28)  | 359<br>(9.52) | 315<br>(6.11)  | 45<br>(1.1)   |             |
|                 |               | +             | 245            | 75             | 148           | 13            | 249            | 321           | 280            | 39            |             |
|                 |               | –             | 236            | 83             | 149           | 12            | 291            | 337           | 323            | 46            |             |
| 77              | Seeds         | Native        | 385<br>(1.65)  | 28<br>(0.45)   | 228<br>(16.1) | 8<br>(0.7)    | 58<br>(6.7)    | 97<br>(4.3)   | 75<br>(3.8)    | 1<br>(0.03)   |             |
|                 |               | Partial crops | Native         | 312            | 66            | 171           | 12             | 210           | 266            | 236           | 31          |
|                 |               |               | +              | 294            | 61            | 197           | 14             | 165           | 237            | 220           | 26          |
|                 | Whole crops   | Native        | –              | 286            | 61            | 178           | 13             | 152           | 237            | 236           | 24          |
|                 |               |               | Native         | 308<br>(0.548) | 73<br>(1.4)   | 147<br>(6.55) | 9<br>(2)       | 241<br>(3.20) | 309<br>(16.8)  | 276<br>(24.6) | 40<br>(5.3) |
|                 |               | +             | 274            | 76             | 150           | 13            | 277            | 332           | 305            | 40            |             |
|                 |               | –             | 279            | 72             | 150           | 13            | 264            | 314           | 265            | 37            |             |
| 78              | Seeds         | Native        | 401<br>(23.4)  | 31<br>(0.62)   | 207<br>(5.25) | 15<br>(0.72)  | 63<br>(1.5)    | 161<br>(81.6) | 99<br>(1.9)    | 2<br>(0.8)    |             |
|                 |               | +             | 415<br>(0.446) | 30<br>(0.17)   | 220<br>(2.41) | 13<br>(3.6)   | 67<br>(3.6)    | 93<br>(14)    | 84<br>(4.4)    | 2<br>(0.05)   |             |
|                 |               | –             | 404            | 32             | 229           | 12            | 65             | 89            | 85             | 1             |             |
|                 | Partial crops | Native        | 325<br>(11.6)  | 62<br>(0.47)   | 158<br>(8.74) | 18<br>(0.057) | 198<br>(0.140) | 273<br>(7.98) | 233<br>(9.39)  | 37<br>(1.7)   |             |
|                 |               | +             | 333            | 61             | 157           | 18            | 198            | 279           | 258            | 43            |             |
|                 |               | –             | 321            | 56             | 160           | 16            | 168            | 230           | 287            | 46            |             |
|                 | Whole crops   | Native        | 347<br>(6.19)  | 72<br>(2.9)    | 120<br>(3.20) | 15<br>(1.3)   | 281<br>(9.73)  | 365<br>(4.10) | 312<br>(5.02)  | 47<br>(0.77)  |             |
| +               |               | 371           | 55             | 146            | 19            | 150           | 295            | 268           | 39             |               |             |
| –               |               | 329           | 76             | 133            | 20            | 320           | 393            | 328           | 46             |               |             |
| 79              | Seeds         | Native        | 542            | 31             | 225           | 15            | 62             | 132           | 78             | 11            |             |
|                 |               | +             | 532            | 32             | 233           | 10            | 61             | 94            | 92             | 7             |             |
|                 |               | –             | 523            | 32             | 240           | 12            | 69             | 102           | 82             | 5             |             |
|                 | Partial crops | Native        | 432            | 52             | 186           | 14            | 120            | 150           | 150            | 13            |             |
|                 |               | +             | 467            | 49             | 187           | 16            | 98             | 151           | 129            | 9             |             |
|                 |               | –             | 458            | 49             | 187           | 15            | 101            | 137           | 119            | 9             |             |
|                 | Whole crops   | Native        | 426            | 69             | 173           | 15            | 161            | 223           | 239            | 32            |             |
| +               |               | 453           | 58             | 167            | 17            | 142           | 211            | 187           | 20             |               |             |
| –               |               | 433           | 66             | 161            | 16            | 156           | 202            | 206           | 24             |               |             |
| 86              | Seeds         | Native        | 733<br>(4.76)  | 31<br>(0.18)   | 224<br>(2.86) | 13<br>(0.050) | 63<br>(1.3)    | 96<br>(2.36)  | 105<br>(0.925) | 7<br>(0.8)    |             |
|                 |               | +             | 733            | 31             | 219           | 13            | 62             | 97            | 71             | 4             |             |
|                 |               | –             | 740            | 32             | 227           | 12            | 64             | 112           | 69             | 6             |             |
|                 | Partial crops | +             | 613            | 58             | 193           | 14            | 137            | 186           | 165            | 21            |             |
|                 |               | –             | 550            | 67             | 170           | 13            | 175            | 247           | 188            | 26            |             |

ADF = acid detergent fiber, ADL = acid detergent lignin, AEE = acid ether extract, CA = crude ash, CF = crude fiber, CP = crude protein, DM = dry matter, n.a. = not analyzed (sample

material was not available for these analyses), NDF = neutral detergent fiber; NDF was assayed with amylase, ADF and NDF are expressed exclusive of residual ash.

DM is given in g/kg, all other analytes are given in g/kg DM. Maturity stages are specified in Table 1 and are encoded according to Meier (45). Analyses were performed using one sample per variant, unless otherwise indicated. Means of two biological replicates per variant are highlighted grey; means of three replicates per variant are highlighted blue; the standard deviation of means is given in brackets.



**Table S9.** Amino acid composition of pea seeds, partial crop peas, and whole crop peas at harvesting (native material), after ensiling with addition of bacterial inoculant (+), and after ensiling without addition of inoculant (–), at five maturity stages.

| Maturity stage (BBCH) | Plant part    | Treatment | Arg              | Ile           | Leu             | Lys             | Met             | Phe             | Thr           | Trp            | Val            | Ala              | Asp              | Cys            | Glu             | Gly            | Pro            | Ser             |
|-----------------------|---------------|-----------|------------------|---------------|-----------------|-----------------|-----------------|-----------------|---------------|----------------|----------------|------------------|------------------|----------------|-----------------|----------------|----------------|-----------------|
| 76                    | Seeds         | Native    | 28.2             | 9.2           | 15.7            | 14.5            | 1.9             | 9.9             | 9.3           | 2.0            | 10.4           | 13.3             | 22.8             | 2.2            | 36.9            | 8.6            | 8.4            | 10.7            |
|                       |               | +         | 11.4             | 9.2           | 15.2            | 13.3            | 1.7             | 9.4             | 8.2           | 0.9            | 10.1           | 12.8             | 22.4             | 1.9            | 31.5            | 8.2            | 7.7            | 7.6             |
|                       |               | –         | 9.0              | 10.1          | 16.8            | 11.9            | 1.8             | 10.1            | 6.3           | 1.4            | 11.5           | 16.0             | 17.3             | 1.6            | 29.4            | 9.2            | 8.5            | 6.1             |
|                       | Partial crops | Native    | 15.1<br>(1.1)    | 6.0<br>(0.66) | 10.2<br>(1.01)  | 8.4<br>(0.83)   | 1.4<br>(0.13)   | 6.2<br>(0.66)   | 7.0<br>(0.48) | 1.7<br>(0.11)  | 6.9<br>(0.67)  | 8.0<br>(0.55)    | 18.4<br>(1.23)   | 1.4<br>(0.093) | 21.6<br>(2.00)  | 6.0<br>(0.51)  | 5.8<br>(0.65)  | 7.3<br>(0.56)   |
|                       |               | +         | 5.0              | 7.0           | 11.1            | 8.1             | 1.5             | 6.3             | 7.5           | 1.0            | 8.3            | 10.3             | 19.4             | 1.2            | 12.2            | 7.0            | 6.5            | 6.1             |
|                       |               | –         | 3.6              | 7.0           | 11.2            | 7.5             | 1.5             | 6.7             | 7.5           | 1.0            | 8.1            | 10.0             | 16.9             | 1.1            | 7.7             | 6.8            | 6.4            | 5.3             |
|                       | Whole crops   | Native    | 7.8<br>(1.7)     | 4.2<br>(0.84) | 7.1<br>(1.6)    | 5.3<br>(1.3)    | 1.1<br>(0.18)   | 4.4<br>(0.92)   | 8.2<br>(4.5)  | 1.3<br>(0.25)  | 5.0<br>(1.0)   | 5.4<br>(0.86)    | 12.7<br>(2.01)   | 0.9<br>(0.2)   | 12.7<br>(3.02)  | 4.6<br>(0.75)  | 4.4<br>(0.87)  | 4.8<br>(0.86)   |
|                       |               | +         | 3.6              | 5.5           | 8.8             | 6.4             | 1.3             | 5.3             | 6.0           | 1.3            | 6.8            | 8.0              | 16.1             | 0.9            | 11.8            | 5.8            | 5.5            | 5.1             |
|                       |               | –         | 2.1              | 5.6           | 8.9             | 5.0             | 1.3             | 5.1             | 5.6           | 1.3            | 6.5            | 8.1              | 9.8              | 0.8            | 6.0             | 5.9            | 5.1            | 4.5             |
| 77                    | Seeds         | Native    | 21.9<br>(0.0360) | 8.8<br>(0.23) | 14.9<br>(0.388) | 14.2<br>(0.279) | 1.8<br>(0.093)  | 9.6<br>(0.17)   | 7.9<br>(0.15) | 1.9<br>(0.042) | 9.5<br>(0.24)  | 10.4<br>(0.0500) | 22.3<br>(0.534)  | 2.6<br>(0.016) | 34.9<br>(0.800) | 8.3<br>(0.13)  | 8.2<br>(0.047) | 9.9<br>(0.18)   |
|                       | Partial crops | Native    | 11.2             | 5.3           | 8.9             | 7.5             | 1.1             | 5.6             | 5.1           | 1.6            | 6.1            | 6.1              | 15.8             | 1.5            | 17.9            | 5.5            | 5.7            | 6.1             |
|                       |               | +         | 7.0              | 8.5           | 13.4            | 10.5            | 1.6             | 8.1             | 8.0           | 1.4            | 9.7            | 11.1             | 23.1             | 1.7            | 26.0            | 8.4            | 8.2            | 7.6             |
|                       |               | –         | 3.2              | 8.3           | 12.6            | 8.6             | 1.6             | 7.8             | 7.4           | 1.0            | 9.3            | 10.4             | 21.7             | 1.7            | 23.4            | 8.1            | 7.8            | 7.0             |
|                       | Whole crops   | Native    | 10.5<br>(0.564)  | 5.3<br>(0.17) | 8.8<br>(0.37)   | 7.3<br>(0.39)   | 1.1<br>(0.0097) | 5.6<br>(0.23)   | 4.9<br>(0.13) | 1.5<br>(0.054) | 5.9<br>(0.12)  | 5.8<br>(0.26)    | 14.8<br>(0.0640) | 1.4<br>(0.038) | 17.7<br>(1.01)  | 5.4<br>(0.11)  | 5.4<br>(0.14)  | 5.8<br>(0.31)   |
|                       |               | +         | 4.2              | 6.1           | 9.4             | 7.5             | 1.2             | 5.7             | 5.7           | 1.1            | 7.0            | 8.1              | 16.2             | 1.1            | 15.8            | 6.2            | 6.0            | 5.5             |
| –                     |               | 3.0       | 6.1              | 9.3           | 6.5             | 1.2             | 5.6             | 5.5             | 0.6           | 6.9            | 7.8            | 16.0             | 1.2              | 15.8           | 6.1             | 6.0            | 5.7            |                 |
| 78                    | Seeds         | Native    | 17.4<br>(0.516)  | 8.8<br>(0.23) | 15.0<br>(0.493) | 14.7<br>(0.745) | 1.8<br>(0.087)  | 9.9<br>(0.40)   | 7.7<br>(0.31) | 2.0<br>(0.060) | 9.5<br>(0.26)  | 9.6<br>(0.33)    | 22.9<br>(1.48)   | 2.8<br>(0.21)  | 35.0<br>(1.28)  | 8.6<br>(0.35)  | 8.4<br>(0.29)  | 10.2<br>(0.449) |
|                       |               | +         | 13.4<br>(0.393)  | 9.2<br>(0.24) | 15.2<br>(0.474) | 14.8<br>(0.479) | 1.7<br>(0.073)  | 10.0<br>(0.275) | 7.7<br>(0.31) | 1.1<br>(0.022) | 9.9<br>(0.30)  | 10.8<br>(0.360)  | 23.5<br>(0.694)  | 2.7<br>(0.13)  | 33.1<br>(1.04)  | 8.8<br>(0.28)  | 8.7<br>(0.41)  | 8.8<br>(0.35)   |
|                       |               | –         | 10.4             | 9.9           | 16.2            | 15.2            | 1.8             | 10.8            | 8.0           | 2.0            | 10.6           | 12.1             | 24.2             | 2.8            | 32.1            | 9.5            | 9.2            | 9.3             |
|                       | Partial crops | Native    | 11.8<br>(0.168)  | 6.1<br>(0.11) | 10.4<br>(0.105) | 8.8<br>(0.12)   | 1.3<br>(0.026)  | 6.7<br>(0.047)  | 5.5<br>(0.14) | 1.7<br>(0.086) | 6.8<br>(0.039) | 6.6<br>(0.081)   | 16.5<br>(0.131)  | 1.7<br>(0.054) | 21.3<br>(0.566) | 6.4<br>(0.057) | 6.2<br>(0.054) | 6.9<br>(0.054)  |
|                       |               | +         | 3.6              | 6.8           | 10.8            | 8.9             | 1.3             | 6.7             | 6.0           | 1.5            | 7.6            | 7.7              | 16.8             | 1.4            | 17.8            | 6.9            | 6.7            | 6.4             |
|                       |               | –         | 3.2              | 7.0           | 10.9            | 9.1             | 1.3             | 6.6             | 6.1           | 0.9            | 7.7            | 8.2              | 16.8             | 1.6            | 20.1            | 7.2            | 6.1            | 4.8             |

|    |               |        |                  |                 |                 |                 |                |                |                |                |                |                |                 |                |                 |                |                |               |
|----|---------------|--------|------------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|----------------|-----------------|----------------|----------------|---------------|
|    | Whole crops   | Native | 7.2<br>(2.4)     | 4.5<br>(1.2)    | 7.6<br>(2.0)    | 6.4<br>(1.9)    | 0.9<br>(0.3)   | 4.8<br>(1.4)   | 4.1<br>(0.81)  | 1.3<br>(0.14)  | 5.0<br>(1.2)   | 4.9<br>(0.98)  | 11.6<br>(3.01)  | 1.3<br>(0.32)  | 14.9<br>(4.97)  | 4.8<br>(0.93)  | 4.5<br>(0.96)  | 5.1<br>(1.3)  |
|    |               | +      | 2.4              | 5.3             | 8.2             | 7.3             | 1.0            | 5.0            | 4.8            | 1.1            | 5.9            | 6.3            | 13.1            | 1.2            | 15.2            | 5.7            | 5.0            | 4.0           |
|    |               | –      | 1.9              | 5.1             | 7.7             | 6.4             | 1.0            | 4.7            | 4.4            | 0.6            | 5.7            | 6.0            | 12.2            | 1.2            | 14.5            | 5.4            | 4.6            | 3.8           |
| 79 | Seeds         | Native | 18.1             | 9.0             | 15.5            | 15.3            | 1.9            | 10.2           | 8.0            | 2.1            | 9.8            | 9.5            | 24.4            | 3.0            | 35.7            | 9.2            | 8.8            | 10.5          |
|    |               | +      | 16.4             | 9.7             | 16.1            | 15.8            | 1.9            | 10.7           | 8.4            | 1.8            | 10.5           | 10.7           | 25.8            | 3.0            | 37.1            | 9.9            | 9.2            | 10.2          |
|    |               | –      | 14.0             | 9.7             | 16.2            | 15.3            | 1.9            | 10.8           | 8.2            | 2.0            | 10.4           | 11.6           | 24.4            | 2.9            | 37.2            | 9.9            | 9.0            | 10.3          |
|    | Partial crops | Native | 10.3             | 5.9             | 9.6             | 9.0             | 1.2            | 6.3            | 5.2            | 1.6            | 6.5            | 6.1            | 15.5            | 1.9            | 20.5            | 6.1            | 5.4            | 6.6           |
|    |               | +      | 7.1              | 7.0             | 11.1            | 10.7            | 1.3            | 7.3            | 5.9            | 1.5            | 7.6            | 7.3            | 17.9            | 1.8            | 23.5            | 7.0            | 6.8            | 6.1           |
|    |               | –      | 6.8              | 7.5             | 12.3            | 11.9            | 1.4            | 8.0            | 6.4            | 1.7            | 8.4            | 8.1            | 19.6            | 1.9            | 20.8            | 7.7            | 7.2            | 7.2           |
|    | Whole crops   | Native | 9.7              | 5.5             | 9.2             | 8.7             | 1.2            | 6.1            | 5.1            | 1.5            | 6.1            | 5.9            | 14.8            | 1.7            | 20.1            | 5.9            | 5.3            | 6.4           |
|    |               | +      | 2.2              | 4.2             | 6.4             | 6.7             | 0.9            | 3.9            | 4.1            | 1.0            | 4.9            | 5.1            | 11.1            | 1.0            | 13.0            | 4.9            | 4.3            | 3.2           |
|    |               | –      | 5.5              | 5.7             | 9.3             | 8.3             | 1.1            | 6.0            | 4.9            | 1.1            | 6.3            | 6.2            | 14.9            | 1.4            | 19.3            | 5.8            | 5.4            | 6.0           |
| 86 | Seeds         | Native | 17.8<br>(0.0311) | 8.6<br>(0.0041) | 14.2<br>(0.105) | 14.3<br>(0.128) | 1.7<br>(0.028) | 9.5<br>(0.058) | 7.3<br>(0.048) | 1.9<br>(0.019) | 9.3<br>(0.017) | 8.6<br>(0.061) | 23.1<br>(0.264) | 2.8<br>(0.068) | 33.4<br>(0.325) | 8.7<br>(0.060) | 7.8<br>(0.021) | 9.4<br>(0.14) |
|    |               | +      | 19.3             | 9.3             | 15.4            | 15.7            | 1.9            | 10.3           | 8.0            | 2.0            | 10.1           | 9.3            | 25.1            | 3.0            | 36.2            | 9.4            | 8.8            | 10.2          |
|    |               | –      | 17.7             | 9.0             | 14.8            | 12.2            | 1.8            | 9.9            | 7.6            | 1.9            | 9.7            | 9.2            | 23.9            | 2.4            | 33.7            | 9.1            | 8.6            | 9.8           |
|    | Partial crops | +      | 13.1             | 8.3             | 13.5            | 11.9            | 1.6            | 8.9            | 6.9            | 1.7            | 9.0            | 8.7            | 22.1            | 2.1            | 29.8            | 8.3            | 7.8            | 8.5           |
|    |               | –      | 8.9              | 6.6             | 10.8            | 9.1             | 1.2            | 7.1            | 5.5            | 1.4            | 7.3            | 6.9            | 17.5            | 1.7            | 23.1            | 6.6            | 6.4            | 7.1           |

n.a. = not analyzed (sample material was not available for this analysis). Amino acid concentrations are given in g/kg dry matter. Maturity stages are encoded according to Meier (45). Analyses were performed using one sample per variant, unless otherwise indicated. Means of two biological replicates per variant are highlighted grey; means of three replicates per variant are highlighted blue. The standard deviation of means is given in brackets.

**Table S10.** Ensiling characteristics and concentrations of ammonia, ammonia nitrogen (NH<sub>3</sub>-N), lactic acid, acetic acid, and alcohols of silages of pea seeds, partial crop peas, and whole crop peas, harvested at five maturity stages, with or without addition of bacterial inoculant.

| Maturity (BBCH) | Crop variant  | Inoculant | pH              | pH <sub>AS</sub> | ASTA          | Ammonia      | NH <sub>3</sub> -N | Lactic acid    | Acetic acid   | Methanol      | Propanol     | Ethanol        | Butanol      |
|-----------------|---------------|-----------|-----------------|------------------|---------------|--------------|--------------------|----------------|---------------|---------------|--------------|----------------|--------------|
| 76              | Seeds         | +         | 4.2<br>(0.043)  | n.a.             | n.a.          | 3.5          | 7.3                | 85.0           | 4.9           | 0.6           | 0.7          | 2.8            | 8.7          |
|                 |               | -         | 5.7<br>(0.23)   | n.a.             | n.a.          | 6.1          | 11.8               | 2.7            | 8.9           | 0.7           | 0.8          | 3.3            | 21.9         |
|                 | Partial crops | +         | 4.1<br>(0.0071) | 8.3<br>(0.078)   | 30<br>(2.9)   | 2.9          | 8.2                | 143.8          | 8.1           | 0.7           | 0.9          | 4.3            | 11.3         |
|                 |               | -         | 4.1<br>(0.0071) | 7.4<br>(0.42)    | 104<br>(1.07) | 4.0          | 11.6               | 153.6          | 14.3          | 0.7           | 0.7          | 4.2            | 5.0          |
|                 | Whole crops   | +         | 4.1<br>(0)      | 8.6<br>(0)       | 25<br>(6.1)   | 2.3          | 7.8                | 129.8          | 5.5           | 0.7           | 0.7          | 4.5            | 2.2          |
|                 |               | -         | 4.2<br>(0.029)  | 6.6<br>(1.8)     | 123<br>(9.90) | 4.1          | 14.0               | 140.3          | 18.1          | 0.7           | 0.8          | 4.7            | 3.6          |
| 77              | Partial crops | +         | 4.2<br>(0)      | 7.0<br>(2.2)     | 112<br>(29.4) | 2.9          | 7.5                | 123.2          | 11.6          | 0.6           | 0.6          | 3.7            | 6.4          |
|                 |               | -         | 4.3<br>(0.015)  | 4.5<br>(0.015)   | 144<br>(8.49) | 2.0          | 5.6                | 112.7          | 13.0          | 0.7           | 0.7          | 3.7            | 10.8         |
|                 | Whole crops   | +         | 4.3<br>(0.015)  | 7.5<br>(1.5)     | 111<br>(19.5) | 3.2          | 10.9               | 112.7          | 12.1          | 0.7           | 0.6          | 4.0            | 4.2          |
|                 |               | -         | 4.3<br>(0.022)  | 7.1<br>(0.036)   | 126<br>(1.07) | 2.3          | 8.0                | 115.1          | 15.8          | 0.6           | 0.5          | 3.7            | 4.6          |
| 78              | Seeds         | +         | 4.3<br>(0.015)  | 4.4              | 152           | 1.0<br>(0.2) | 2.3<br>(0.40)      | 53.5<br>(7.10) | 3.7<br>(0.54) | 0.4<br>(0.02) | 0.6<br>(0.2) | 2.0<br>(0.034) | 7.5<br>(1.7) |
|                 |               | -         | 4.6<br>(0.18)   | 4.9              | 168           | 2.4          | 5.4                | 43.4           | 7.2           | 0.4           | 0.5          | 2.1            | 14.4         |
|                 | Partial crops | +         | 4.4<br>(0.036)  | 6.2<br>(2.4)     | 156<br>(17.4) | 2.5          | 8.0                | 50.0           | 16.7          | 0.5           | 0.5          | 3.2            | 3.6          |
|                 |               | -         | 4.4<br>(0.0071) | 4.9<br>(0.64)    | 138<br>(42.5) | 2.0          | 6.3                | 43.2           | 11.7          | 0.6           | 0.7          | 3.0            | 6.8          |
|                 | Whole crops   | +         | 4.4<br>(0.0071) | 6.4<br>(2.8)     | 146<br>(31.5) | 1.8          | 6.4                | 72.3           | 13.6          | n.d.          | n.d.         | 2.4            | 3.2          |
|                 |               | -         | 4.5<br>(0.0071) | 4.5<br>(0.050)   | 168<br>(0)    | 2.1          | 8.2                | 89.1           | 14.3          | n.d.          | n.d.         | 2.9            | 4.2          |
| 79              | Seeds         | +         | 4.3             | n.a.             | n.a.          | 0.7          | 1.4                | 35.7           | 4.1           | 0.5           | 0.2          | 1.5            | 9.6          |
|                 |               | -         | 4.6             | n.a.             | n.a.          | 1.0          | 2.2                | 22.9           | 3.5           | 0.5           | 0.2          | 1.5            | 18.2         |

|    |               |   |                 |                 |             |      |      |      |      |     |     |     |     |
|----|---------------|---|-----------------|-----------------|-------------|------|------|------|------|-----|-----|-----|-----|
|    | Partial crops | + | 4.5<br>(0.0071) | 4.5<br>(0.022)  | 168<br>(0)  | 1.3  | 3.4  | 43.2 | 9.8  | 0.4 | 0.5 | 1.9 | 3.3 |
|    |               | - | 4.7<br>(0.015)  | 4.8<br>(0.0071) | 168<br>(0)  | 1.8  | 4.8  | 31.8 | 16.8 | 0.4 | 0.4 | 2.0 | 6.0 |
|    | Whole crops   | + | 4.6<br>(0.029)  | 4.6<br>(0.043)  | 168<br>(0)  | 1.4  | 4.2  | 30.5 | 16.5 | 0.3 | 0.4 | 2.2 | 3.4 |
|    |               | - | 4.7<br>(0)      | 4.8<br>(0)      | 168<br>(0)  | 1.4  | 4.4  | 66.2 | 15.1 | 0.4 | 0.6 | 2.3 | 3.9 |
| 86 | Seeds         | + | 5.9<br>(0.14)   | 6.8<br>(0.021)  | 67<br>(2.1) | n.d. | n.d. | n.d. | 0.6  | 0.3 | 0.1 | 1.0 | 2.0 |
|    |               | - | 6.1<br>(0.012)  | 6.7<br>(0.12)   | 87<br>(4.1) | 0.1  | 0.1  | 2.2  | 0.5  | 0.3 | 0.1 | 1.0 | 1.3 |
|    | Partial crops | + | 4.7<br>(0.0071) | 4.8<br>(0.0071) | 168<br>(0)  | 0.7  | 2.0  | 45.2 | 8.9  | 0.4 | 0.1 | 1.6 | 4.7 |
|    |               | - | 5.0<br>(0.064)  | 6.2<br>(1.5)    | 168<br>(0)  | 0.8  | 2.5  | 16.5 | 4.9  | 0.4 | 0.2 | 1.8 | 3.4 |

AS = aerobic storage (i.e., silages were stored 7 d under aerobic conditions), ASTA = aerobic stability, n.a. = not analyzed (sample material was not available for these analyses), n.d. = not detected,  $\text{pH}_{\text{AS}}$  = pH measured immediately after 7 d of aerobic storage.

Concentrations of ammonia, lactic acid, acetic acid, and volatile alcohols are given in g/kg dry matter,  $\text{NH}_3\text{-N}$  is given as % of total nitrogen, ASTA is given in h until the temperature difference between material and environment exceeds 3 K. Maturity stages are specified in Table 1 and encoded according to Meier (45). Analyses were performed using one sample per variant, unless otherwise indicated. Means of two biological replicates per variant are highlighted grey; means of three replicates per variant are highlighted blue; the standard deviation of means is given in brackets.