

Supplementary Tables

Supplementary Table 1. Changes in free amino acid composition of 'Jinmaekcho' according to the fermentation period

| Vinegar | Fermentation periods (weeks, mg/mL) | | | | | |
|--------------|-------------------------------------|------------------|-----|------|-------|------|
| | 0 | 1 | 3 | 5 | 7 | |
| 'Jinmaekcho' | Phosphoserine | 0.1 | 0.1 | 0.1 | 0.2 | 0.17 |
| | Aspartic acid | 0.1 | 0.1 | 0.1 | 0.03 | 0.04 |
| | Threonine | ND ¹⁾ | 0.1 | 0.1 | 0.1 | 0.49 |
| | Serine | 0.1 | 0.1 | 0.1 | 0.23 | 0.27 |
| | Glutamic acid | ND | 0.1 | 0.2 | 0.35 | 0.43 |
| | Proline | 0.1 | 0.1 | 0.1 | 0.83 | 0.98 |
| | Glycine | 0.1 | 0.1 | 0.1 | 0.1 | 0.13 |
| | Alanine | 0.1 | 0.1 | 0 | 0.13 | 0.16 |
| | Valine | ND | 0.1 | 0.1 | 0.5 | 0.6 |
| | Methionine | ND | ND | 0.1 | 0.23 | 0.27 |
| | Isoleucine | 0.1 | 0.1 | 0.1 | 0.2 | 0.28 |
| | Leucine | 0.1 | 0.2 | 0.4 | 0.4 | 0.47 |
| | Tyrosine | ND | 0.1 | 0.1 | 1.28 | 1.52 |
| | Phenylalanine | ND | 0.1 | 0.3 | 0.35 | 0.44 |
| | γ -Aminobutyric | ND | 0.1 | 0.2 | 0.7 | 0.77 |
| | Histidine | ND | 0.1 | 0.1 | 0.68 | 0.75 |
| | Ornithine | ND | 0.1 | 0.2 | 0.18 | 0.22 |
| | Lysine | 0.3 | 0.4 | 0.7 | 0.4 | 0.47 |
| | Ammonia | 0.1 | 0.1 | 0.2 | 1.43 | 1.61 |
| | Arginine | ND | ND | 0.3 | 0.43 | 0.48 |
| Total | 1.2 | 2.2 | 3.6 | 8.75 | 10.55 | |

¹⁾ND, not detected.

Determination of quality characteristics by the reproduction of traditional grain vinegars

Supplementary Table 2. Changes in free amino acid composition of ‘Mugukcho’ according to the fermentation period

| Vinegar | Fermentation periods (weeks, mg/mL) | | | | | |
|------------|-------------------------------------|------------------|-----|-------|-------|------|
| | 0 | 1 | 3 | 5 | 7 | |
| ‘Mugukcho’ | Phosphoserine | ND ¹⁾ | 0.1 | 0.1 | 0.03 | 0.03 |
| | Aspartic acid | ND | 0.1 | 0.2 | 0.65 | 0.88 |
| | Threonine | ND | 0.1 | 0.1 | 0.43 | 0.57 |
| | Serine | ND | 0.1 | 0.1 | 0.63 | 0.81 |
| | Asparagine | ND | 0.1 | 0.1 | 0.35 | 0.44 |
| | Glutamic acid | ND | 0.2 | 0.2 | 1.08 | 1.33 |
| | Proline | ND | 0 | 0.1 | 0.15 | 0.22 |
| | Glycine | ND | 0.1 | 0.1 | 0.45 | 0.57 |
| | Alanine | ND | 0.2 | 0.2 | 0.85 | 1.06 |
| | Valine | ND | 0.1 | 0.1 | 0.48 | 0.65 |
| | Methionine | ND | 0 | 0.1 | 0.2 | 0.26 |
| | Isoleucine | ND | 0.1 | 0.2 | 0.63 | 0.83 |
| | Leucine | ND | 0.2 | 0.3 | 1.15 | 1.5 |
| | Tyrosine | ND | 0.2 | 0.2 | 0.88 | 1.14 |
| | Phenylalanine | ND | 0.2 | 0.2 | 0.88 | 1.14 |
| | γ -Aminobutyric | ND | 0.3 | 0.4 | 2.83 | 3.67 |
| | Histidine | 0.3 | 0.1 | 0.1 | 0.4 | 0.54 |
| | Ornithine | 0.1 | 0.1 | 0.1 | 0.18 | 0.2 |
| | Lysine | ND | 0.6 | 0.7 | 1.98 | 2.64 |
| | Ammonia | ND | 0.1 | 0.1 | 0.25 | 0.31 |
| Arginine | 0.4 | 0.7 | 0.9 | 4.05 | 5.14 | |
| Total | 0.8 | 3.7 | 7.6 | 18.53 | 23.93 | |

¹⁾Not detected.

Supplementary Table 3. Changes in free amino acid composition of ‘Sajeolcho’ according to the fermentation period

| Vinegar | Fermentation periods (weeks, mg/mL) | | | | | |
|-------------|-------------------------------------|------------------|------|-------|-------|------|
| | 0 | 1 | 3 | 5 | 7 | |
| ‘Sajeolcho’ | Phosphoserine | ND ¹⁾ | 0.02 | 0.04 | 0.1 | 0.10 |
| | Aspartic acid | ND | 0.13 | 0.17 | 0.01 | 0.01 |
| | Threonine | ND | 0.07 | 0.08 | 0.65 | 0.75 |
| | Serine | 0.05 | 0.09 | 0.11 | 0.33 | 0.38 |
| | Asparagine | ND | 0.02 | 0.03 | 0.44 | 0.50 |
| | Glutamic acid | 0.05 | 0.18 | 0.22 | 0.11 | 0.11 |
| | Proline | ND | 0.05 | 0.05 | 1.06 | 1.17 |
| | Glycine | ND | 0.06 | 0.08 | 0.2 | 0.22 |
| | Alanine | ND | 0.21 | 0.24 | 0.29 | 0.32 |
| | Valine | ND | 0.1 | 0.11 | 0.8 | 0.93 |
| | Methionine | ND | 0.05 | 0.06 | 0.32 | 0.36 |
| | Isoleucine | 0.05 | 0.11 | 0.12 | 0.24 | 0.26 |
| | Leucine | 0.05 | 0.24 | 0.28 | 0.5 | 0.53 |
| | Tyrosine | ND | 0.12 | 0.14 | 1.1 | 1.22 |
| | Phenylalanine | 0.05 | 0.18 | 0.2 | 0.56 | 0.63 |
| | γ -Aminobutyric | 0.05 | 0.23 | 0.23 | 0.73 | 0.80 |
| | Histidine | ND | 0.04 | 0.05 | 1.24 | 1.31 |
| | Ornithine | ND | 0.18 | 0.22 | 0.2 | 0.23 |
| | Lysine | 0.15 | 0.37 | 0.44 | 0.85 | 0.90 |
| | Ammonia | 0.05 | 0.13 | 0.15 | 1.65 | 1.86 |
| Arginine | ND | 0.09 | 0.15 | 0.33 | 0.35 | |
| Total | 0.5 | 2.67 | 3.17 | 11.71 | 12.94 | |

¹⁾ND, not detected.

Determination of quality characteristics by the reproduction of traditional grain vinegars

Supplementary Table 4. Changes in free amino acid composition of ‘Dongjucho’ according to the fermentation period

| Vinegar | Fermentation periods (weeks, mg/mL) | | | | | |
|-------------|-------------------------------------|------|------|------------------|------|------|
| | 0 | 1 | 3 | 5 | 7 | |
| ‘Dongjucho’ | Phosphoserine | 0.01 | 0.01 | ND ¹⁾ | ND | ND |
| | Aspartic acid | 0.01 | 0.01 | ND | ND | ND |
| | Threonine | 0.01 | 0.01 | 0.01 | 0.09 | 0.05 |
| | Serine | 0.01 | 0.01 | 0.01 | 0.04 | 0.02 |
| | Asparagine | 0.01 | 0.01 | ND | ND | ND |
| | Glutamic acid | 0.02 | 0.02 | 0.01 | 0.09 | 0.05 |
| | Proline | 0.01 | 0.01 | ND | ND | ND |
| | Glycine | 0.01 | 0.01 | 0.01 | 0.07 | 0.04 |
| | Alanine | 0.03 | 0.03 | 0.03 | 0.21 | 0.11 |
| | Valine | 0.01 | 0.01 | 0.01 | 0.06 | 0.03 |
| | Methionine | 0.01 | 0.01 | ND | 0.01 | 0.04 |
| | Isoleucine | 0.01 | 0.01 | 0.01 | 0.07 | 0.03 |
| | Leucine | 0.02 | 0.02 | 0.01 | 0.06 | 0.01 |
| | Tyrosine | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 |
| | Phenylalanine | 0.02 | 0.01 | 0.01 | 0.04 | 0.03 |
| | γ -Aminobutyric | 0.01 | 0.01 | 0.01 | 0.17 | 0.12 |
| | Histidine | 0.01 | 0.01 | ND | 0.05 | 0.03 |
| | Ornithine | 0.01 | 0.01 | 0.01 | 0.06 | 0.04 |
| | Lysine | 0.05 | 0.04 | 0.03 | 0.05 | 0.05 |
| | Ammonia | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Arginine | 0.07 | 0.06 | 0.04 | 0.04 | 0.03 | |
| Total | 0.36 | 0.33 | 0.22 | 1.14 | 0.7 | |

¹⁾ND, not detected.

Supplementary Table 5. Changes in free amino acid composition of ‘Daemackcho’ according to the fermentation period

| Vinegar | Fermentation periods (weeks, mg/mL) | | | | | |
|--------------|-------------------------------------|------------------|------|-------|-------|-------|
| | 0 | 1 | 3 | 5 | 7 | |
| ‘Daemackcho’ | Phosphoserine | ND ¹⁾ | 0.01 | 0.02 | 0.23 | 0.23 |
| | Taurine | ND | 0.01 | 0.01 | 0.03 | 0.03 |
| | Aspartic acid | ND | 0.05 | ND | 0.04 | 0.06 |
| | Threonine | ND | 0.04 | 0.1 | 0.87 | 0.96 |
| | Serine | ND | 0.03 | 0.07 | 0.62 | 0.66 |
| | Asparagine | ND | 0.01 | ND | ND | ND |
| | Glutamic acid | ND | 0.13 | 0.33 | 2.95 | 0.29 |
| | Proline | 0.05 | 0.04 | 0.06 | 0.52 | 0.57 |
| | Glycine | ND | 0.03 | 0.06 | 0.5 | 0.58 |
| | Alanine | ND | 0.08 | 0.26 | 1.73 | 1.88 |
| | Valine | ND | 0.07 | 0.1 | 0.81 | 0.96 |
| | Methionine | ND | 0.03 | 0.06 | 0.45 | 0.48 |
| | Isoleucine | 0.05 | 0.1 | 0.16 | 1.23 | 1.36 |
| | Leucine | 0.05 | 0.2 | 0.32 | 2.27 | 0.45 |
| | Tyrosine | ND | 0.01 | 0.04 | 0.4 | 2.42 |
| | Phenylalanine | ND | 0.13 | 0.21 | 1.61 | 1.82 |
| | γ -Aminobutyric | 0.05 | 0.26 | 1.37 | 7.35 | 11.76 |
| | Histidine | ND | 0.02 | 0.05 | 0.41 | 0.39 |
| | Ornithine | ND | 0.03 | 0.08 | 0.63 | 1.18 |
| | Lysine | 0.15 | 0.15 | 0.35 | 2.61 | 3.11 |
| Ammonia | 0.1 | 0.09 | 0.17 | 0.53 | 0.55 | |
| Arginine | ND | ND | 0.05 | 0.86 | 0.44 | |
| Total | 0.45 | 1.52 | 3.87 | 26.65 | 30.18 | |

¹⁾ND, not detected.

Determination of quality characteristics by the reproduction of traditional grain vinegars

Supplementary Table 6. Changes in free amino acid composition of ‘Sokmigukcho’ according to the fermentation period

| Vinegar | Fermentation periods (weeks, mg/mL) | | | | | |
|---------------|-------------------------------------|------------------|------|------|------|------|
| | 0 | 1 | 3 | 5 | 7 | |
| ‘Sokmigukcho’ | Phosphoserine | 0.05 | 0.01 | 0.01 | 0.12 | 0.15 |
| | Taurine | ND ¹⁾ | 0.01 | 0.01 | 0.02 | 0.03 |
| | Threonine | ND | 0.01 | 0.03 | 0.18 | 0.22 |
| | Serine | ND | 0.01 | 0.02 | 0.23 | 0.21 |
| | Asparagine | ND | 0.01 | 0.02 | 0.1 | 0.05 |
| | Glutamic acid | ND | 0.02 | 0.01 | 0.33 | 0.23 |
| | Proline | ND | 0.01 | 0.05 | 0.06 | 0.05 |
| | Glycine | ND | 0.01 | 0.01 | 0.12 | 0.14 |
| | Alanine | ND | 0.02 | 0.02 | 0.46 | 0.51 |
| | Valine | ND | 0.01 | 0.06 | 0.17 | 0.2 |
| | Methionine | ND | 0.01 | 0.03 | 0.19 | 0.17 |
| | Isoleucine | ND | 0.01 | 0.02 | 0.29 | 0.37 |
| | Leucine | ND | 0.02 | 0.03 | 0.7 | 0.72 |
| | Tyrosine | ND | 0.01 | 0.07 | 0.07 | 0.06 |
| | Phenylalanine | ND | 0.02 | 0.02 | 0.42 | 0.36 |
| | γ -Aminobutyric | 0.05 | 0.03 | 0.06 | 2.23 | 3.5 |
| | Histidine | ND | 0.01 | 0.1 | 0.07 | 0.16 |
| | Ornithine | ND | 0.01 | 0.01 | 0.3 | 0.84 |
| | Lysine | 0.15 | 0.04 | 0.03 | 0.89 | 0.11 |
| | Ammonia | 0.05 | 0.02 | 0.11 | 0.12 | 0.09 |
| Arginine | ND | 0.01 | 0.03 | ND | ND | |
| Total | 0.3 | 0.31 | 0.75 | 7.07 | 8.17 | |

¹⁾ND, not detected.

Supplementary Table 7. Changes in free amino acid composition of 'Chunyeoncho' according to the fermentation period

| Vinegar | Fermentation periods (weeks, mg/mL) | | | | | |
|---------------|-------------------------------------|------|------|------------------|-------|-------|
| | 0 | 1 | 3 | 5 | 7 | |
| 'Chunyeoncho' | Phosphoserine | 0.05 | 0.05 | ND ¹⁾ | 0.14 | 0.13 |
| | Aspartic acid | 0.05 | ND | ND | 0.04 | 0.03 |
| | Serine | 0.05 | ND | ND | 0.21 | 0.24 |
| | Asparagine | 0.05 | ND | ND | 0.11 | 0.14 |
| | Glutamic acid | 0.05 | ND | ND | 0.17 | 0.2 |
| | Proline | 0.05 | 0.05 | 0.05 | 0.07 | 0.07 |
| | Glycine | 0.05 | ND | ND | 0.12 | 0.29 |
| | Alanine | 0.05 | ND | 0.05 | 0.31 | 0.31 |
| | Valine | 0.05 | ND | ND | 0.18 | 0.19 |
| | Isoleucine | 0.05 | ND | ND | 0.45 | 0.48 |
| | Leucine | 0.05 | ND | 0.05 | 0.19 | 0.18 |
| | Tyrosine | 0.05 | ND | ND | 0.15 | 0.17 |
| | Phenylalanine | 0.05 | ND | 0.05 | 0.06 | 0.08 |
| | γ -Aminobutyric | 0.05 | 0.35 | 0.55 | 0.22 | 0.25 |
| | Histidine | 0.05 | ND | ND | 0.37 | 0.46 |
| | Ornithine | ND | ND | 0.05 | 0.14 | 0.18 |
| | Lysine | 0.2 | 0.15 | 0.2 | 0.21 | 0.27 |
| | Ammonia | 0.1 | 0.05 | 0.1 | 7.12 | 6.91 |
| | Arginine | 0.05 | ND | ND | 0.35 | 0.31 |
| | Total | 1.1 | 0.65 | 1.1 | 10.61 | 10.89 |

¹⁾ND, not detected.