Improvement in the anthocyanin content of purple-fleshed sweetpotato in Japan

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The anthocyanins from sweetpotato - promising natural food colorants -

- More stable to light and heat
- Superior in color tone to other anthocyanins
- The production estimated to be 160 tons (Its sales reached US $9 million)
- Physiological function
  - reduction of liver injury, antioxidative activities, antimutagenecity,
    antihypertension activity ……etc.

Samples provided by San-Ei Gen F.F.I.,Inc.
Processed products prepared by purple-fleshed sweetpotato

Improvement of high-anthocyanin variety in KONARC

A local variety “Yamagawamura-masaki”
the start of AN breeding

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<tbody>
<tr>
<td>Murasakimasari</td>
<td>Good root shape, high yields, Nematode resistance</td>
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<tr>
<td>Akamurasaki</td>
<td>Higher anthocyanins</td>
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<tr>
<td>Ayamurasaki, the first high-anthocyanin variety</td>
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Processed products prepared by purple-fleshed sweetpotato

Sweetpotato, Cabbage, Elderberry, Corn, Berry skin and juice
The second variety “Murasakimasari”

- Derived from a cross between “Ayamurasaki” and “Shiroyutaka (non-purple flesh)"
- Superior to “Ayamurasaki” in terms of storage root yield, root shape, and nematode resistance
- Not used for colorant production because of its slightly lower anthocyanin and slightly higher starch than that of “Ayamurasaki” (unfavorable for the process of anthocyanin extraction)
- Used mainly for food processing such as paste and alcohol (sweetpotato spirits)

The yields and traits of “Akemurasaki” in standard harvest

<table>
<thead>
<tr>
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<th>Akemurasaki</th>
<th>Ayamurasaki</th>
<th>Murasakimasari</th>
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<tbody>
<tr>
<td>Root yield (kg/a)</td>
<td>262</td>
<td>250</td>
<td>257</td>
</tr>
<tr>
<td>No. of root per hill</td>
<td>3.0</td>
<td>3.2</td>
<td>4.0</td>
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<tr>
<td>Average root size (g)</td>
<td>240</td>
<td>212</td>
<td>172</td>
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<tr>
<td>Starch content (%)</td>
<td>22.1</td>
<td>22.8</td>
<td>24.1</td>
</tr>
<tr>
<td>Color value (10%E)</td>
<td>7.9</td>
<td>6.7</td>
<td>6.4</td>
</tr>
<tr>
<td>Color value (10%E)</td>
<td>9.9</td>
<td>6.5</td>
<td>6.2</td>
</tr>
</tbody>
</table>

Insects and diseases resistance

- Root knot nematode: Resistant, Medium, Resistant
- Root lesion nematode: Resistant, Resistant, Resistant
- Black rot: Resistant, Medium, Slightly resistant

2) Early planting and late harvesting with vinyl mulching in 2002 and 2004.
Solvent systems: a linear gradient elution for 90 min from 15% to 50% solvent B (1.5% H3PO4, 20% CH3COOH, 25% CH3CN in H2O) in solvent A (1.5% H3PO4 in H2O).

Columns: Luna 3 µ C18 (2) (100 mm x 4.6 i.d., Phenomenex)

Detection: 520 nm at 35 °C, Flow rate: 1 ml min–1, Injection: 10 µL of the extract.

Comparison of three anthocyanin varieties with regard to paste color

Slightly less brightness as compared with ‘Ayamurasaki’ and ‘Murasakimasari’

Conclusion

1. “Akemurasaki” is the variety with the highest anthocyanin content.
2. “Akemurasaki” contribute to the stable production of food colorants.
3. It is a challenge to improve anthocyanin stability, elucidating the effect of anthocyanin composition and polyphenol content on the stability.