Product development of sola plant (Aeschynomene aspera Linn.) for economic benefit of the community

Udomlaksana Muchjajib¹, Laongsri Sirikesorn¹, Suwanchai Sinpho², Nanthapad Nittayapongchais³, Pinthip Suphap⁴ and Surachai Muchjajib⁴

Abstract
Sola plant (Aeschynomene aspera Linn.) is an aquatic broad-leaved weed in deep water rice paddy fields. It is native to South and Southeast Asia. Its cortex pith is an excellent raw material for several types of handicrafts. The handicraft product from sola plant in Thailand is paper-pith flower e.g. jasmine, sunflower, chrysanthemum, gerbera, red ginger, poppy and lotus. This research is aimed at establishing models with various diversity of products from stem pith and stem bark of sola plant to promote economic benefit to the community enterprise via women’s OTOP (one tumbon one product) group in the central provinces: Ayutthaya, Angthong, Suphanburi, Nonthaburi and Pathumthani. The peeling machine was developed to help reduce time of peeling. It took a day to finish 1000 g of sola stem peeling process. The scores of customer satisfaction on the new models ranged from 4.05 to 4.88 regarding a scale of one to five with a score of one representing ‘very dissatisfied’ and five representing ‘very satisfied’.

Keywords: Sola plant (Aeschynomene aspera), product development

¹ Faculty of Agriculture Technology and Agro-Industry, Rajamangala University of Technology Srinakharinwirot, 13000. Thailand
² Faculty of Industrial Education, Rajamangala University of Technology Srinakharinwirot, 13000. Thailand
³ Faculty of Business Administration and Information Technology, Rajamangala University of Technology Srinakharinwirot, 13000. Thailand
⁴ Chonburi Vocational College, Chonburi, 20160. Thailand.
* Corresponding author. E-mail: udomluck489@hotmail.com
Sola plant is commonly called sano-hangkai in Thailand as their new shoot looks like hen’s tail. There are several species of sano plants in Thailand, most of them are leguminous common weeds in rice paddy fields. They are, for example, sano-hangkaiyai (*Aeschynomene aspera* Linn.), sano-hangkailek (*Aeschynomene indica* Linn.), sano-kindok (*Sesbania javanica* Miq.), sano-kangkoak (*Sesbania pinosa* Faw. & Rendle), and sano-african (*Sesbania rostrata* Bern. & Oldm.). The promising species are sano-kindok and sano-hangkai (Figure 1 and 2).

Sano-kindok (*Sesbania javanica* Miq.) or commonly known as sano, a semi-aquatic plant of marsh and temporarily wet land, is native to tropical Asia. The name “kindok” is derived from their edible flowers. The fresh unopened racemose inflorescence with 5-7 florets is picked up early in the morning so as to endure transportation. It was found that the sano flower bloom in the afternoon not in the morning as it was said. The petals start to open in the afternoon from 1-2 pm until dark, they close at night. Thai people consume both unopened and full bloom but the unopened is preferable. A number of traditional recipes from the yellow sano flowers are popular among Thai people in the central: sano omlette, stir fried, spicy sour soup, spicy salad and sano dessert.

There is a potential possibility for product development, including herbal tea from sano flower, bolete ectomycorrhizal fungi inoculation in the root zone of sano plant and microgreen production from sano seed (Muchjajib and Sirikesorn, 2010). Sano flower is the symbolic flower of Ayutthaya Province, the old capital city of Thailand.

Sano-hangkaiyai (*Aeschynomene aspera* Linn.) or sola plant is an aquatic broad-leaved weed in lowland rice paddy fields which is native to Bangladesh, Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Pakistan, Thailand and Vietnam. Its cortex pith is an excellent raw material for several types of handicrafts, sunhats and artificial flowers (Mehra *et al*., 1975; Datta and Banerjee, 1978; Nesbitt *et al*., 2010). The potential product in Thailand is paper-pith flower e.g. jasmine, chrysanthemum, gerbera, red ginger, poppy and lotus (Muchjajib and Nittayapongchai, 2009). This study is aimed at establishing models with various diversity of products from the stem pith and the bark of sola plant to promote economic benefit to the community enterprise via women’s OTOP (one tambon one product) group in the central Provinces: Ayutthaya, Angthong, Suphanburi, Nonthaburi and Pathumthani.
The optimal temperature was 70-100 hours. Thailand is a mixed-intercropping with rice A. afraspera one tumbon one product (OTOP) exhibition in April. Nodules were formed on the stem of developed with aspects of new design and Ayutthaya and Prachinburi Province. Satisfactory studies on morphological characteristics, the peeling machine development and carried out in the central region of Thailand; breaking dormancy of sola seed was done the high germinating percentage seed is the product development for sola plant were field was carried out in Prachinburi. Seed percentage; the gray yellow seed gave the customer preferable. The sola seeds with different seed characteristics, the peeling machine development and preferability.
The peeling machine was developed to help reduce time of peeling (Figure 3). The comparative results are shown in Table 1. It took a day to finish 1000 g of sola stem peeling process while it took 3-7 days by hand peeling but the quality of sola sheet was not as smooth as hand peeling. An improvement needed to be done to achieve a long and smooth sola sheet from the peeling machine.

![Sola plant](image1)

**Sola plant**

![Sola stems ready to be transported](image2)

**Sola stems ready to be transported**

![Sola cortex pith](image3)

**Sola cortex pith**

**Figure 2** Sola plant (*Aeschynomene aspera* Linn.).

![Hand peeling and machine peeling for sola plant](image4)

**Hand peeling and machine peeling for sola plant.**

**Table 1** A comparison method between hand-sola sheet and machine-sola sheet.

<table>
<thead>
<tr>
<th>Peeling method</th>
<th>Pith pad (g)</th>
<th>Duration of peeling (day)</th>
<th>Cost of peeling (baht)</th>
<th>Returns (baht)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand peeling</td>
<td>800-900</td>
<td>3-7</td>
<td>800-1000</td>
<td>3000-4000</td>
</tr>
<tr>
<td>Machine peeling</td>
<td>400-600</td>
<td>1-2</td>
<td>700-800</td>
<td>2000-3000</td>
</tr>
</tbody>
</table>
There were several models for product development of sola plant to be used in special occasions i.e. Arranged Jasmine for Mother’s Day, Valentine Rose, Blessing Baisee for decoration, Floating Sano for Loykrathong Festival, Altar Offering Panpoom for royal ceremonies and mobile sano for decoration. The customer satisfaction score of the new products is shown in Table 2. Satisfaction data were collected through a questionnaire developed with aspects of new design and usage. The satisfaction score of customers for 6 models were as follows: 4.88, 4.47, 4.45, 4.38, 4.25 and 4.05 on a 1 to 5 scale. The income of sola handicraft women group of Klong Suanplu District in Ayutthaya is 9,000 baht per month.

### Table 2 Customer satisfaction score of the new products from solar pith and sola bark.

<table>
<thead>
<tr>
<th>Production Items</th>
<th>Satisfaction score</th>
<th>Product Price (baht)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jasmineon Mother’s Day</td>
<td>4.88</td>
<td>240</td>
</tr>
<tr>
<td>Valentine Rose</td>
<td>4.47</td>
<td>180</td>
</tr>
<tr>
<td>Blessing Baisee</td>
<td>4.45</td>
<td>140</td>
</tr>
<tr>
<td>Floating Krathong</td>
<td>4.38</td>
<td>170</td>
</tr>
<tr>
<td>Altar Offering Panpoom</td>
<td>4.25</td>
<td>570</td>
</tr>
<tr>
<td>Hanging Sano</td>
<td>4.05</td>
<td>740</td>
</tr>
</tbody>
</table>
Conclusions

Sola (*Aeschynomene aspera* Linn.) is a promising local plant for handicraft production in central Thailand. The sola sowing system is a mixed-intercropping with rice cultivation. It takes 5 months from seed sowing to stem harvesting. The machine is developed to help reduce time of peeling. It takes a day to finish 1000 g of sola stem peeling. The satisfaction scores of customers for the developed products range from 4.05-4.88 on a 1 to 5 scale. The members of sola handicraft women group, Klong Suanplu Ayutthaya earn 9,000 baht per month.

References


