Consumer Willingness To Pay for Strawberries Grown on Biodegradable Plastic Mulch

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U.S. Consumption of Strawberries

U.S. per capita use of strawberries

Pounds per person*

$ per dry pint (12 oz)

Retail price (right axis)

Fresh

Frozen

* Fresh-weight equivalent basis.
Plastic Mulch

• Advantages
  – Reduce weed growth
  – Increase crop yield
  – Maintain soil moisture

• Disadvantages
  – Costly removal and disposal
  – Air, water, and soil pollution
Biodegradable Plastic Mulch (BDM)

- An alternative to polyethylene (PE) mulches.
- Tilled into the soil at the end of the growing season.
- Benefits: same function as PE mulches, reduce plastic pollution.
- Costs: more expensive than PE mulches, but mulch removal and disposal are eliminated.
Objectives

- Explain the relationship between market information, consumer characteristics, and willingness to pay (WTP) for strawberries grown on BDM.

- Evaluate consumers’ premium for strawberries grown on BDM with or without the provision of information on BDM.
1,510 survey respondents across the US

- Socio-demographic characteristics
- Strawberries purchasing and consumption behavior
- Consumer’s attitudes towards environmental friendliness

- Two groups:
  - Control group – Without information about BDM (n = 761)
  - Treatment group – With information about BDM (n = 749)
Willingness to Pay (WTP)

Environmentally Friendly Attitudes

Consumer Purchasing Habits

Consumer Demographics

WTP for Strawberries Grown on BDM
Market information, consumer characteristics, and WTP

<table>
<thead>
<tr>
<th>Variable</th>
<th>Change</th>
<th>WTP ($/lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>+</td>
<td>0.11</td>
</tr>
<tr>
<td>Presence of child under 18</td>
<td>+</td>
<td>0.07</td>
</tr>
<tr>
<td>Higher income</td>
<td>+</td>
<td>0.08</td>
</tr>
<tr>
<td>More knowledgeable</td>
<td>+</td>
<td>0.12</td>
</tr>
<tr>
<td>Stronger environmental attitudes</td>
<td>+</td>
<td>0.33</td>
</tr>
<tr>
<td>Price importance</td>
<td>-</td>
<td>0.35</td>
</tr>
<tr>
<td>Eco-production importance</td>
<td>+</td>
<td>0.20</td>
</tr>
<tr>
<td>Provision of information</td>
<td>+</td>
<td>0.08</td>
</tr>
</tbody>
</table>

Note: Base price of strawberry is $3.50/lb.
## WTP Estimates for Strawberries Grown on BDM

<table>
<thead>
<tr>
<th>Group of Respondents</th>
<th>Mean WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both groups (n = 1,510)</td>
<td>$3.86 *</td>
</tr>
<tr>
<td>Control group (n = 761)</td>
<td>$3.80 *</td>
</tr>
<tr>
<td>Treatment group (n = 749)</td>
<td>$3.94 *</td>
</tr>
</tbody>
</table>

Notes: The base price of conventional strawberry is $3.50/lb.
* Statistically significant at 1%.
Partial Budget Analysis

- Used to evaluate if returns due to price premium can cover higher production costs and incentivize sustainability by increasing the use of BDM.

- Assumptions
  - Used WA strawberries enterprise budget as baseline
  - Return of $3.25/lb (based on 8.6% premium added to $2.99/lb retail price minus marketing costs)
  - BDM average cost at $118 per 1,000 ft
  - Mulch removal (11 hours/acre) and disposal cost savings
  - BDM tillage cost (about $180/acre = 6 hours/worker times $15/hour for 2 workers)
Partial Budget Results: Strawberries

Given the assumptions, there is a gain of $2,254/acre in profit when using BDM. Benefits = 95% price premium + 5% cost savings

<table>
<thead>
<tr>
<th>Additional Revenue</th>
<th>$2,969.97</th>
<th>Additional Costs</th>
<th>$882.76</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due to price premium</td>
<td>$2,969.97</td>
<td>Plastic BDM</td>
<td>$638.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BDM tillage (labor)</td>
<td>$180.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other (overhead, interest)</td>
<td>$64.01</td>
</tr>
<tr>
<td>Reduced Costs</td>
<td>$166.46</td>
<td>Reduced Revenue</td>
<td>$0.00</td>
</tr>
<tr>
<td>Mulch removal</td>
<td>$145.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mulch disposal</td>
<td>$21.39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Total additional revenue and reduced costs =</td>
<td>$3,136.43</td>
<td>B. Total additional costs and reduced revenue =</td>
<td>$882.76</td>
</tr>
</tbody>
</table>

Net Change in Profit (A minus B) = $2,253.57
Conclusions

- Respondents who are female, earn a higher income, more environmentally conscious, or know more about BDMs = willing to pay a premium for strawberries grown on BDM.

- Informing consumers about the benefits of BDM → greater financial return.

- Consumer WTP = 8.6% to 12.6% premium for strawberries grown on BDM over the average market price ($3.50/lb).

- A price premium can enable strawberry growers to cover the additional input costs associated with BDM adoption.
Additional Resources

• Project’s Website: www.biodegradablemulch.org
  ➢ Basic Information Resources, Scientific Publications, Videos


• Important Considerations for the Use of Biodegradable Mulch in Crop Production - BDM dimension, cost and machine application, labor requirements, and mulch cost calculator http://cru.cahe.wsu.edu/CEPublications/FS304E/FS304E.pdf

• The Economics of Adopting Biodegradable Plastic Mulch Films – economic factors to know before adopting BDM www.biodegradablemulch.org ➢ Basic Information Sources