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**Fresh Innovation: Testing Fresh Processed Products to Increase Food Hub to School Sales**

Georgia Windhorst

*Iowa Food Hub*

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Fresh Innovation: Testing Fresh Processed Products to Increase Food Hub to School Sales

Abstract
The Iowa Food Hub (IFH) introduces locally grown foods, especially produce, to local schools and communities. Connecting young children with locally grown foods can help them develop lifelong healthy eating habits, and connect them to the agricultural practices of a region. The Leopold Center funding was used to expand on existing resources and partnerships, and incorporate specific tools and methods learned from the NE Iowa Food and Fitness Initiative. At the outset of the project, the hub had minimal connection with area Early Childcare centers, and had struggled with fresh cut processing. Over the course of 15 weeks, the food hub worked with four Early Childcare centers and made 45 deliveries of 10 different local fruits and vegetables.

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Fresh Innovation: Testing Fresh Processed Products to Increase Food Hub to School Sales

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Non-Technical Summary

M2017-04
Fresh Innovation: Testing Fresh Processed Products to Increase Food Hub to School Sales

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Q: Is lightly processed fresh produce commercially viable for a food hub, and does it meet the demands of Early Childcare Centers and Schools?

Yes. Our experience shows that by shortening the cycle from farm to kitchen to end user, a food hub or similar organization can coordinate and execute the production of fresh-cut, lightly processed snacks. Iowa Food Hub was able to produce fresh-cut processed snacks for four early childcare centers and one area school for 15 weeks.

Project Overview

The Iowa Food Hub (IFH) holds special interest in introducing locally grown foods, especially produce, to local schools and communities. Connecting young children with locally grown foods can help them develop lifelong healthy eating habits, and connect them to the agricultural practices of a region. This project built on lessons learned in past IFH projects to explore new ways to bring locally grown food to young children in our region.

The Leopold Center funding was used to expand on existing resources and partnerships, and incorporate specific tools and methods learned from the NE Iowa Food and Fitness Initiative. Funds were used to coordinate processing and delivery of local produce, purchase tools and materials for snacks, and partner with a local certified commercial kitchen to execute the processing.

At the outset of the project, the hub had minimal connection with area Early Childcare centers, and had struggled with fresh cut processing. It had determined that while some Early Childcare centers had interest in local foods, they lacked the tools and labor needed to properly prepare produce.

Over the course of 15 weeks, the food hub worked with four Early Childcare centers, all of whom were new partners for the Iowa Food Hub. During this funding period, IFH made 45 deliveries of 10 different local fruits and vegetables.

The Farm to School market is very important to the portfolio of the food hub, in both mission and action. By making locally grown vegetables more accessible through a fresh-cut program, it has expanded its ability to serve the local community and its growers.
DETAILED REPORT

Introduction

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PROJECT DESIGN, METHODS AND MATERIALS

The Iowa Food Hub used the funds from the Leopold Center to subcontract with Kymar Acres, a certified commercial kitchen, on this project. They partnered with ISU Extension and Outreach regional staff member Kayla Koether to coordinate with local Early Childcare Centers. This project was also partially funded by a Fayette County Community Foundation Grant.

This project was modeled after a program offered by the REAP group in Madison, WI. They offer locally grown snacks once a week as part of the Fresh Fruit and Vegetable Snack program in Madison elementary schools.

The IFH general manager worked with many local farmers, Early Childcare center directors, ISU Extension and Outreach, and a local certified kitchen to meet the following objectives:

1) Research commercial viability of fresh produce lightly processed by food hubs
2) Research school and daycare demand and use of lightly-processed fresh product and refine products that fit school needs

Selection of Early Childcare Centers

Based on interest and willingness to participate, four Early Childcare Centers were selected to receive 15 weeks of free, fresh cut produce for use in their snacks. These were located in three counties, with different size and number of classrooms. All four agreed to participate in weekly surveys to provide feedback on products, aiding in product evaluation. One local school district also elected to purchase the
processed snacks, choosing to incorporate them into taste-test activities conducted by an AmeriCorps service member in the classroom.

Selection of Certified Kitchen

From previous pilot studies, we knew a kitchen located near farmers and the food hub’s warehouse would be necessary. Of the three certified kitchens we considered using, one was on an existing IFH route, passing through on Monday mornings. A pickup early in the week meant that produce could be processed over the weekend and delivered to early childcare centers with plenty of time to serve the snacks. Although it is located 30 miles from the food hub, because it was on-route, it was convenient to incorporate into the hub’s existing activities. With these considerations in mind, it was determined that this kitchen would best suit our needs.

After selecting Kymar Acres as the site for processing, we evaluated options for labor. In discussion with the kitchen owner, it was determined that they would be able to both provide the space and perform the processing weekly. This was an ideal situation for the hub, as the kitchen was able to provide experienced labor, and was also able to help evaluate processing costs and materials used. Throughout the project, the kitchen owner evaluated the processing procedures, along with suitability of each crop for consumption as a fresh cut snack.

Purchase of Equipment

The food hub purchased a Robot Coupe food processor with funds from the Fayette County Community Foundation. This piece of equipment was observed in use at the REAP food group’s fresh cut program, and is able to quickly process high volumes of produce. Using Leopold Center funds, we purchased appropriately-sized cutting blades for the equipment, each used for a different type of produce.

We also focused on additional tools and supplies necessary for processing and packing. These included knives and vegetable peelers, cutting boards, vacuum sealer and bags, and boxes for packing. Some of these were selected after time was spent processing, and after evaluating tools used initially.

In addition to tools necessary for processing, we purchased produce throughout the project to provide the four Early Childcare Centers with snacks free of charge. We felt this arrangement would provide more thoughtful and objective feedback on the products provided.

Product Development

The Iowa growing season is at its peak for the beginning of the academic year, and then moves into predominantly storage crops. With this in mind, we coordinated with farmers to procure crops based on this availability, beginning with summer crops and finishing with winter storage crops. With this seasonal span we were able to provide a variety of products to the children in the four centers.

In addition to seasonal availability, we also needed to consider the produce suitability for processing and packing. Each selected item would need to stay fresh for up to a week post-processing, to optimize the time teachers were able to serve the snacks. Some items that have traditionally been popular in schools, like cantaloupe, watermelon or tomatoes, would not hold up to processing and packaging. Others that had not traditionally been popular in schools, like beets and kohlrabi, would be simple to process and have a long storage life, and were selected for the project. In total, the hub determined 10 types of produce to incorporate: cucumbers, radish, summer squash, peppers, broccoli, kohlrabi, beets, carrots, apples, and cabbage.
RESULTS AND DISCUSSION

Product Development

Following the REAP snack program model we determined the items, quantity and schedule of snacks to be delivered prior to the pilot's beginning. In this schedule, each week we would be process one type of produce. The Early Childcare centers did not choose specific snacks. This streamlined the "ordering" process for the food hub, and allowed for faster processing and delivery. Instead of waiting for orders, we utilized a "push" strategy to bring products to customers.

In initial planning, we considered training Americorps service members to implement the processing. However, the kitchen we used was able to provide labor, negating the necessity to find outside labor. This was an advantage for us, because the kitchen owner and employees were experienced with general produce processing, certified in food safety practices, and were able to use their industry knowledge to improve the project. Additionally, they used their own equipment, and helped us determine what tools worked best and proved necessary.

During the 15-week project we processed a variety of produce, with varying results. Turnaround to carry out each week's processing and deliveries took four days, on average. The food hub's truck picked up produce in the latter part of a week, and this produce would be delivered by IFH staff to a cross-dock location (rented cold storage) on a Friday afternoon. After kitchen staff transported produce from the cross-dock to their facility, they would process all of it on Sunday, to be ready for Monday pickup. Once processed, IFH's truck picked up at the kitchen, then delivered products to centers Monday afternoon or Tuesday, depending on the location. By processing on Sunday, we were able to provide centers with a snack they could use throughout the week, giving them more flexibility in serving.

Before beginning the project, we leveraged funds from the Fayette County Community Foundation to purchase a Robot Coupe food processor and necessary attachments to process large batches of produce. Kymar Acres, the certified kitchen, helped us to evaluate what tools were needed and which would be superfluous. We purchased cutting boards, vegetable peelers, knives, a vacuum sealer, hotel pans, and supplies for packaging and labeling (bags, boxes, stickers, etc). The Robot Coupe came equipped with one blade, however this was too narrow to cut snack-style vegetables. We purchased three new blades for this project - one 5/16" slicing disc, one 3/8x5/8" french fry kit, and one 3/8x3/8" french fry kit. These allowed for thicker slices that would store well for longer periods of time, and would be easier to eat by hand.

Early Childcare Center Feedback

Throughout the project we administered weekly surveys to each of the four participating Early Childcare Centers. Although we did not receive feedback from all teachers each week, we did receive feedback from multiple teachers for each product delivered. Some of the results surprised us.

Product Quality

Would fresh-cut fruits and veggies, vacuum sealed, maintain high product quality through our logistics chain to snack time, which ranged from two-six days? To evaluate this, we asked Early Childcare teachers to rate the freshness, flavor, and appearance of the products through the weekly survey.

Nearly all of the products we tested maintained high quality. Most products far exceeded or exceeded teacher expectations in all three categories of appearance, freshness, and flavor. Products were processed
on Sunday and were served before Friday. In addition to ratings, teachers were able to share comments on quality. Feedback on quality included positive remarks: “the carrots were very tasty,” or “[the cabbage was] crunchy and fresh.”

Only three products received low or mid-quality ratings. First, sliced apples (which were not treated with lemon juice or other preservation agents) initially held their color in the vacuum-sealed bag. But, by the time they reached classrooms, teachers commented they had browned. They received low marks on appearance and freshness, but satisfactory marks on flavor. In the future, it would be good to explore treating the apples with lemon juice or other anti-browning agents.

We also had quality issues with broccoli. Classrooms that served the broccoli on Monday rated it as satisfactory quality. But one center opened the broccoli on Wednesday, gave it low ratings, and commented that it smelled and tasted bad when teachers tried it. They thought it had spoiled, and did not serve it to the kids. Likely, the broccoli had off-gassed, either causing spoilage or severely damaging the product quality. We would therefore caution others to try a test batch or refrain from vacuum sealing off-gassing brassica vegetables. However, the two other brassicas we tried, kohlrabi and cabbage, both retained their quality, receiving good marks even when they weren’t served until Thursday or Friday.

The third item that received lower quality ratings, was, ironically, a non-processed item. We sent whole apples one week, to evaluate the size and ease of use in early childcare. Quality evaluations were low, and teachers commented that some apples were brown and spotting. In retrospect, these apples may have had some frost damage that appeared after the food hub distributed them.

**Product Size and Shape**

We asked teachers to evaluate the products’ size and shape, giving us insight into whether the sizes were appropriate for the classroom. Survey results showed that the processing sizes we used (which can be found in the results: product development section of this report) worked well. Teachers evaluated all but one snack as easy to serve and easy for students to eat. In addition, teachers reported that they liked the size and shape the snack was cut into for nearly every snack. Broccoli was the only exception, with some teachers rating it lower and one comment that the pieces were too large.

**Children’s preferences**

In addition to teacher’s assessments of products, we asked them to poll the students to see how kids liked the snacks each week and whether they had positive or negative reactions to different items. Children’s top four most liked products were sliced apples, carrots, whole apples, and kohlrabi. Of kohlrabi, one teacher reported, "Several kids commented they really liked the food and had never had it before."

We were surprised by the relative popularity of red beets and summer squash. Over 50% of students liked these raw vegetables. One teacher reported that a few of her students requested seconds of summer squash.
Figure 1. Percentage of Children who liked these snacks

Teacher's preferences

Ultimately, teachers and center directors will make the decision about what snacks to serve. Four teachers completed the post-survey and shared what snacks they would serve again. Interestingly, teacher's preferences were different than those that were most popular with students, as is demonstrated in Figures 1 & 2. Although their preferences did not always align with those of the students, all four teachers surveyed did express interest in continued participation in this program, if made available. Teachers were surveyed to collect data regarding future pricing and their willingness to pay for similar products. However, we did not receive adequate information to judge what an appropriate price point would be for this or a similar setting. To determine this, it may be necessary to offer these products for sale and evaluate pricing at that time.

Figure 2. Percentage of teachers who would serve these snacks again
Viability of Fresh-Cut Processing

All of the products initially chosen were successfully processed for the participating classrooms. However, not each of these is viable when the factors of produce cost, space rental, labor costs, and processing time are factored in. Because of this, not all products would be suitable in a real-world application of this project.

One primary objective of this pilot was to determine what the cost of a similar product would be in real-time, and whether it would be a viable option for hubs and kitchens on a larger scale. Each produce item has unique processing procedures, and different base costs. A static cost for each is the price per hour for processing – this includes setup time, processing, packaging, and cleanup. Although the cost per hour is the same no matter what processing is done, it is important to keep in mind that each type of produce requires different preparation, which can greatly affect total time spent processing.

We found that those products that need more hand-processing prior to using the Robot Coupe took far longer to process overall, which greatly increased the processing cost. This included activities like peeling carrots, coring and halving peppers, peeling kohlrabi or beets, and hand-cutting broccoli. In contrast, other produce was very easy to process and took very little primary processing – these included cucumbers, zucchini and cabbage. One anomaly we found was with carrots – the carrots used in our pilot were small “snack size” carrots, and required hand-processing. This dramatically increased processing time and our cost. If you had access to large, utility-sized carrots, these could be processed with the Robot Coupe, and drastically decrease processing time. The difference in processing time for these "simple" vegetables and their more complex counterparts was astounding – some took roughly half the time. It is possible that at higher volumes some of these differences would be less noticeable, however further research is needed to determine this.

Another part of processing that took more time than expected was the portioning and packaging. Each of the four Early Childcare centers required a different number of servings to be delivered each week, which then had to be split into classrooms. This highly detailed partitioning, weighing, and packaging took a significant amount of time, especially in early weeks when staff was growing accustomed to quantities needed. In future execution of a similar project, it may be preferable to pack in standard weights or quantities, to allow for more rapid packing. This could decrease the overall cost of processing per pound, making these products more accessible and marketable.

<table>
<thead>
<tr>
<th>Product</th>
<th>Processing Volume</th>
<th>Output</th>
<th>Hours</th>
<th>Output per</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Style</td>
<td>Processed (lbs)</td>
<td>after Loss</td>
<td>Spent</td>
<td>Hour (lbs)</td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------</td>
<td>------------</td>
<td>-------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>Bell Peppers</td>
<td>Strips</td>
<td>40</td>
<td>71%</td>
<td>4</td>
<td>6.14</td>
</tr>
<tr>
<td>Cucumbers (English)</td>
<td>Coins</td>
<td>25</td>
<td>78%</td>
<td>2.75</td>
<td>7.58</td>
</tr>
<tr>
<td>Summer Squash</td>
<td>Coins</td>
<td>50</td>
<td>91%</td>
<td>2.75</td>
<td>16.58</td>
</tr>
<tr>
<td>Kohlrabi</td>
<td>Slices</td>
<td>90</td>
<td>62%</td>
<td>4.5</td>
<td>12.38</td>
</tr>
<tr>
<td>Broccoli</td>
<td>Florets</td>
<td>45</td>
<td>50%</td>
<td>5.5</td>
<td>4.18</td>
</tr>
<tr>
<td>Carrots</td>
<td>Sticks</td>
<td>30</td>
<td>68%</td>
<td>6</td>
<td>3.67</td>
</tr>
<tr>
<td>Beets</td>
<td>Sliced</td>
<td>45</td>
<td>84%</td>
<td>3.75</td>
<td>10.26</td>
</tr>
<tr>
<td>Cabbage</td>
<td>Sliced/</td>
<td>65</td>
<td>84%</td>
<td>2.5</td>
<td>22.45</td>
</tr>
<tr>
<td>Shredded</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radish (Easter Egg, with</td>
<td>Sliced</td>
<td>60</td>
<td>55%</td>
<td>5.5</td>
<td>6.06</td>
</tr>
<tr>
<td>greens)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radish (Beauty Heart)</td>
<td>Sliced</td>
<td>30</td>
<td>78%</td>
<td>3.25</td>
<td>7.95</td>
</tr>
</tbody>
</table>

Figure 3. Processing inputs and results.

**CONCLUSIONS**

1. Partnering with a local certified kitchen that is near to a food hub and easy to incorporate into an existing route is ideal. Working with a kitchen closer to the hub alleviated many logistical challenges IFH faced in past processing projects.

2. Offering a pre-selected "menu" of processed snacks was ideal for logistical planning on the food hub's behalf, and was easy for Early Childcare Centers to incorporate into snack menus.

3. We learned that we would have to provide all of the packaging equipment, and so purchased bags, boxes, and other packaging equipment. Expect to provide your own packaging materials.

4. In regards to achievable processing costs, the most promising snacks found in this project were cucumbers, summer squash, and cabbage. These products were easy to process, and had high output rates after processing. While cucumber was popular with both children and teachers, summer squash and cabbage was not universally accepted. It's important to note, however, that products were tested without any dips or dressings. Cabbage and summer squash might be more popular if dressed at snack.

5. For children and teachers, the most favored snacks were carrots, kohlrabi and cucumbers. By selecting more uniform and appropriately sized produce, processing time could be decreased, thereby decreasing cost. By improving processing procedures on these products, a desirable and cost-effective product could be found.

6. Packing specific quantities proved to be cumbersome in this case. Packing in standard sizes would yield more swift packaging time, and ease of packing for labor.

7. Although we initially thought #2 produce would be suitable for fresh-cut snack presentation, some blemishes led to longer processing time as well as degradation of overall snack quality. This leads us to believe that to decrease processing time and increase output quality, it is preferable to use higher-quality produce.

**IMPACT OF THE RESULTS**

*Were the project objectives achieved?*

Yes. We executed this pilot following the REAP food group's model to process produce with the help of a local commercial kitchen. Our processing projects were able to assess and evaluate the viability of projects...
similar to this in a real-world setting. Without access to pre-cut vegetables, many early childcare centers face challenges in preparing and making available fresh produce.

When fresh cut snacks were made available, Early Childcare centers were happy to incorporate them into snack schedules, and were willing to adhere to a set schedule. This model can be beneficial for the planning and procurement schedules of both the childcare centers and food hubs alike.

How will this project affect future marketing of fresh-cut products in Iowa?

Based on this project, we can assume that adhering to a set schedule is preferable to processing to order, and that focusing on simple processing procedures can optimize inputs. By communicating with Early Childcare Centers and local schools about the availability of these or similar products, a similar project could greatly increase accessibility of local food to Iowa youth.

How will this project affect food system development in Iowa?

A similar project could be implemented to absorb seasonal produce surplus. Because early access to healthy foods is an important part of children's development, this program can benefit Iowa farmers and Iowa youth simultaneously, by increasing markets and making healthy snacks more accessible. It could also be applied to larger food service settings, where further preparation of some foods is possible. Communities interested in strengthening local foods and increasing local food access will be able to use this information to build their own programming.

OUTREACH AND INFORMATION TRANSFER

1) "Pilot project launch: Local snacks for early childcare in northeast Iowa" ISU Extension and Outreach Local Foods Program, Kayla Koether, September 2017
2) Project progress discussion with W.K. Kellogg site visitors
3) Full report can be found on ISU Extension and Outreach resource pages, Northeast Iowa Food and Fitness resource pages, and Iowa Food Hub website.
4) Findings made available to Iowa's Food Hub Manager Working Group

LEVERAGED FUNDS

This grant was supplemented with funds from the Fayette County Community Foundation.

- FCCF: $2216.00
  - Fund to purchase processing supplies – Robot Coupe, other equipment

EVALUATION

Evaluation of the project objectives and results have been discussed in previous sections of this report.

BUDGET REPORT

A. Total Requested Funds: $19,095
   a. Expenditures for year one: $19,095

B. Primary Expenditures
   a. The primary expenditures for this grant were wages for food hub staff /ISUEO staff, equipment and supplies for fresh-cut processing, space rental and labor costs, and transportation.

C. Agencies or additional funding and approximate value:
   a. Fayette County Community Foundation Grant - $2216