

## Organic Apple Production for Processing Pilot Project

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### Introduction

A collaborative effort by local growers, Agriculture & Agri-Food Canada (AAFC) scientists and Avon Foods Inc. has resulted in the production of transition applesauce in Nova Scotia's Annapolis Valley. Conceived in the spring of 2002, this pilot project has had both rewards and challenges and will hopefully serve as a guide to a future larger scale organic project. Current markets exist for a transition product from orchards moving from conventional to organic production.

The catalyst for this project was the 'Idared' market. The market demanded between 2500 and 3000 tonnes of apples; however, local acreage was capable of producing 5000 tonnes. Thus providing an ample supply for development of a new product and another potential market.

### How did this project get started?

Avon Foods Inc. was looking for a product to take into the future. Mr. Allie Craswell attended the 2002 ACORN conference in Moncton hoping to develop a scenario addressing organics and a processed product. In Moncton, Mr. Craswell and associate Mr. Paul Gervason visited the Organic Agriculture Centre of Canada (OACC) booth and talked with Dr. Ralph Martin and Charlie Embree (AAFC). They proceeded to develop a project that addressed a potential organic niche market which would utilize Avon Foods Inc. technology in specialized short run production. The product goal would be organic apple slices and organic applesauce.

Upon returning from the ACORN conference, Mr. Embree and Mr. Craswell met with the Nova Scotia Fruit Growers' Association Board of Directors (April 2002). They contacted the OACC, which is located in Truro, and met with Dr. Av Singh and Dr. Derek Lynch. With the cooperation of OACC, a summer student, Margaret Chase, was hired to assist with numerous aspects required to develop the project. They talked to many researchers and invited local growers to participate in the initial study beginning in April 2002. Following this meeting, monthly meetings and regular orchard tours were organized throughout the summer for the growers and researchers. The tours were organized by Bill Craig of AgraPoint International.

### Avon Foods Inc. - Berwick, Nova Scotia

The plant has been in operation and processing now for more than 60 years. In 1993, the plant was taken over by the Carriere family from Montreal. There are 94 permanent and 60 seasonal employees at the Avon Foods Inc. Berwick location. The plant produces a variety of products, including: applesauce, apple slices, baked beans, string beans, cubed potatoes and cubed carrots.

Mr. Craswell has 35 years experience in the food processing business and 17 years in Berwick. Avon Foods Inc. has a well trained staff at the Berwick plant and over the last few years they have received several awards for a number of innovations regarding workplace education. A great portion of the Avon Foods Inc. production goes to private store agencies.

There were two main factors which facilitated the addition of an organic product to Avon Foods Inc. product line:

- (1) Avon Foods Inc. is certified as Kosher and can clean the line several times during the year in order to provide a Kosher product.
- (2) Avon Foods Inc. employs people with the skills and knowledge to prepare and deliver specialty products.

Another requirement for an organic product is identification and tracking. Avon Foods Inc. already has a highly developed tracking system. In fact, if you go to a store and look at a can of peas that was produced in April 2002 you can see a number that represents which field the peas in that can were grown.

Finally, the plant had to be certified as an organic processor. The Organic Crop Processors of Ontario, better known in industry as OCPRO was chosen to certify the Avon Foods Inc. plant as they are qualified to certify products for national and international sale and seemed to be the most experienced to accept this situation.

### Challenges in the Orchard

For Agriculture and Agri-Food Canada Kentville researchers, organic apple production is not a new concept. Dr. Gordon Braun who is one of the research cooperators published an Organic Apple Production Guide for Nova Scotia in 1991. Dr. Rob Smith has years of experience in Integrated Pest Management and developed standards for Integrated Fruit Production in PEI and provided major contributions to the local and National IFP guidelines. We have also been interested in mulching and alternative methods of controlling weeds and replant disease so this has given our research group an environmentally sustainable focus. With this total orchard perspective it has made the transitional step to organic fruit production a little easier. Even with all this we fully understand the magnitude of, and constant potential of, a pest outbreak. With one major pest outbreak, the crop is either immediately lost, or, if the outbreak is identified as over the economic threshold, and a clean-up spray is applied, the block must be removed from the organic process for a three-year period.

Dealing with the question of which products are acceptable is still a challenge as the 'acceptable' list is quite limited. In the United States, there is a new Organic Materials Review Institute so this would indicate research is underway on new products. In Canada the question of materials is under review by the National Standards Board. They met in November so we are at the early stages of this standardization process.

Local growers, including; Brian Boates, Craig Nichols, Doug Nichols, Andrew Bishop, Blair Embree and J.W. Mason and Sons, accepted the challenge of moving one or part of an orchard block from conventional to transition organic year one. The next step was to find a certifying agency. OCPRO was also selected as the certifying body by the growers who had orchard blocks in the transition year one phase. Their specifications for acceptable production methods had to be learned and procedures documented. It was the grower's responsibility to approach a certifying body concerning the inspection process. A number of blocks at the research station were also converted. Mark Rogers supervised the spraying process following pre-spray inspection of each block for levels of disease and insects. This enabled timely application of allowed products. Some of these blocks included experiments with conventional treatments as controls so will not be eligible, but others are and have qualified for transition year one of the certification process.

Disease and insect control questions for the project were addressed by Dr. Gordon Braun and Dr. Rob Smith respectively. They also conducted disease and insect damage assessments for

each of the orchards involved. Their combined experience and willingness to participate in all aspects of the project were invaluable. Although it is not easy, it is clear to all those involved that constant vigilance and flexibility are necessary for success in the transition to an organic system.

To control weeds various mulches like hay, wood chips or straw were applied or the orchards were kept close mown. This approach to weed control is a very labour intensive operation. The group looked to Dale Hebb for mechanization advice on this question and other questions.

Soil nutrition, is another important aspect in the organic process. For advice and counsel on this topic the group turned to Keith Fuller. In most cases it was possible to locate suitable sources of compost. The poultry compost which had 4 % nitrogen was dry and had just the right particle size to allow bulk spreading. A trial was set up to evaluate four sources of nutrients on 13 year old Novamac at the AAFC Kentville Research Centre. There were three different sources of compost compared with Ammonium Nitrate as the control. The dry flowable poultry manure was from the same source as that used on other blocks of the AAFC orchards, Kentville. A compost made of fish-plant waste, pulp mill waste and sawdust was made by Dr. John MacLeod and Mr. Roger Henry at AAFC Charlottetown. In Kings County, the municipality requires house holders to separate all biodegradable waste products which are composted into an easy to handle product. The field work and data collection for this separate trial was contracted to AgriLogic Research Services in cooperation with the Nova Scotia Tree Fruit Research Foundation.

Crop load is another major issue because oversetting needs to be controlled or the trees will become biennial. Current research on thinning materials is being supervised by Mr. Doug Nichols who is employed on an MII project to study crop load management and fruit quality. He is addressing the organic question as well by searching for and evaluating products that are environmentally friendly or are already acceptable as organic thinners in other countries.

The next big challenge is the harvest operation. The apples from the organic block must be kept separate from non-organic fruit. They must all be properly labelled and daily records kept; each bin of fruit must be traceable. The grower is responsible for preparing his application



**Weekly orchard visits and monthly meetings kept the group up to date, in this figure insect control measures are being discussed at Doug Nichols orchard in Factorydale.**

and contacting the inspector from a certifying body to come and carry out a detailed inspection of the orchard.

At the AAFC orchards in Kentville, David Baldwin supervised field operations including harvest and record keeping. Robert Gammon and Jackie Russell managed the harvest crew, recorded yields and collected samples. Mark Rogers and Sonya Shaw coordinated the inspection process and provided the documentation required. There were no formal trials arranged to evaluate the storage and post harvest aspects organic apples. Dr. Robert Prange and Dr. John DeLong joined the group offering to assist should this aspect of the project develop. The authors would like to acknowledge that the commitment of all those involved contributed to the success of this project in the field and the processing plant.

### Organic Applesauce: The Process



**Organically produced apples on the production line at Avon Foods Inc., Berwick, Nova Scotia.**

Record-keeping that can be audited for the whole process, i.e., from orchard through the processing plant, is required. For example, the bins must be properly washed, and where, when and who washed them must all be documented. The bins must be kept segregated in the orchard. Then the crop is transported to the processing plant.

In the processing plant yard, the organic fruit is kept separate from the other - the bins are marked, tagged and thus traceable throughout the process. Inside the processing plant, the line goes through its regular cleaning process then there is a special purging of the lines with a certified organic cleaning product. The line is then rinsed three times with water (no chlorine in water) - either three separate rinses or three times the volume of water in one rinse. On the processing line in Berwick, there are six peelers. Each peeler picks up the apples, and they are peeled individually. Each one of those peelers will operate at an average of about 110 apples per minute.

The applesauce is produced after the apples are peeled, inspected, sliced and cooked in live steam. There is an inspection table at the plant - a lighted glass top which the hot applesauce passes over. An inspector picks out specks and vacuums out other unwanted materials.

### Organic Applesauce: The Product

The actual date of the organic processing run was November 15, 2002. The apple sauce peaked at the top of the jar as illustrated in the figure below. Peaking is a sign of quality for apple sauce and indicates that there is a nice granular texture. Also, while this was unsweetened applesauce, the sugar level was approximately 2 brix higher than conventional applesauce, indicating that the organic environment is producing a sweeter product.

This product was considered by all the people in the plant to be the best quality applesauce produced in 2002. The appearance and the quality of the fruit from which the sauce was made was described as “equal to conventional”. As far as the transition applesauce is concerned, Mr. Craswell has said it is equal to or better than the conventional applesauce. The plant staff, who have been involved with apple production for many years, were very impressed by the quality of the organic apples received.



**Filling of glass jars with the applesauce from pilot project orchards.**

The growers involved produced 148 bins of transition apples. In the first assessment of grades from apples produced at AAFC Kentville, the fruit were smaller than those from conventional orchards, and thus more apple may have to be used. From this fruit, 1920 cases of 12×28oz glass jars of applesauce were produced.

### Market for Organic Transition Applesauce

There are a variety of things that can be done with the applesauce. It is Mr. Craswell’s hope and plan to supply local farm markets with this product this year. There are still a few hundred cases available, and they are of excellent quality.

Custom labels are recommended for this product. This will keep the product within our own county at the present time.

### Conclusion

Growers, researchers and Avon Foods Inc., are in agreement that this project was a very successful learning experience. With the first year’s transition to organic production now completed, the experience and knowledge gained and shared can only serve to strengthen the potential for organic apple production in the Annapolis Valley.