

Evaluating Value Added Grape Seed Oil Research Project for Sustainable Viticulture

Final Report for FNC12-859

Project Type: Farmer/Rancher

Funds awarded in 2012: \$22,336.96

Projected End Date: 12/31/2013

Region: North Central

State: Iowa

Project Coordinator:

[Douglas Grave](#)

Victorian Vineyards

Project Information

Summary:

For the 2013 grape harvest, we were again able to obtain the pomace from approximately 48 tons of whole grapes. Each weekend from the first week of August until the first week of October, we obtained and processed the pomace from approximately 5 tons of whole grapes.

During last year's harvest we used hand-screens, such as an individual winery might use to hold down costs, to separate the seeds from the skins. For this year's harvest we decided to try to automate the screening process, such as a regional cooperative might use to handle a larger volume of pomace from multiple wineries in their surrounding area.

To automate this process, we obtained a used Seed Cleaner (see project photos and power point presentation) that we repurposed as a trommel. These Seed Cleaners are widely available throughout the Midwest and are used to clean corn or soybeans before they are delivered to the elevator. Most of these Seed Cleaners have an inner screen and an outer screen. When used for cleaning corn or soybeans the seed passes through the first screen and any debris larger than the seed is separated and passed out the machine. The seed stays within the second screen and any debris smaller than the seed falls out the bottom.

For our purpose of separating grape seeds from skins, we use both the inner screen and the outer screen to separate the seeds from skins. We needed to replace both the inner and outer screens with a smaller mesh (hardware cloth) to suit our purposes. After several trials, the sizes we found to work best were #4 mesh for the inner screen and #5 mesh for the outer screen. We also had to reduce the pulley size on the electric motor that turns the trommel to reduce its rotation rate because centrifugal force was not allowing all of the seed to pass through the second screen given its much closer tolerance. These modifications consisting of new inner and outer screens and smaller pulley cost around \$400 and were relatively simple to make. On our Seed Cleaner model the screens are held in place with 4 long metal

bands along the length of both the inner and outer screen. We simply removed the bands, pulled out the existing screens and replaced them with our new screen and then replaced the metal bands. We purchased our new screen from the internet (<http://www.twpinc.com>) and it comes in long rolls that we then had to cut to length after measuring the circumference of each screen tube.

After making all of the modifications we were very pleased with the result. The inner screen separates about 80% of the skins and the outer screen separates another 10% to 15%. Our new trommel reduced the labor from 1 hour (2 persons) for hand screening down to just 20 minutes and only requiring 1 person. Once the seeds were separated we employed the same solar drying method used in year 1 and described in our Initial Report.

- [Grape Seed/Skin Separator](#)
- [Red and White seeds solar drying](#)
- [Seed Dryer](#)
- [Hand Screen](#)
- [Seed Cleaner repurposed as grape seed/skin separator](#)

Introduction:

In 2013 we were finally able to start using our Grape Seed Oil (GSO) Press. We purchased the M-70 Seed Oil Press from the AgOilPress Company which is an American company located in Wisconsin. After many hours of research on various different presses we selected the M-70 because of its cost, throughput, and its technical support. They were one of the few company's that we were able to speak to on the phone and were willing to answer any of our questions. This tech support proved to be crucial to the success of this project as I will describe below.

When we first attempted to use the press, we would initially start to produce Grape Seed Oil but usually within 30 minutes to an hour the press would jam and we would need to tear the press apart to clean it out and start over. It turns out that grape seed is extremely difficult to press because it is a very hard seed and contains a low amount of oil as compared to other seeds such as soybeans. Over the next several months we basically entered into an informal product development process to improve the M-70s ability to process grape seed oil. During this time, AgOilPress made several modifications including a reengineered crush plate, reengineered the press screw with a ball bearing to focus axial load in the center of the shaft so the bearings would not burn out, increased the size of the press nozzle and increased the horsepower of the motor. With these modifications we have now been able to process the grapeseeds from over 100 tons of whole grapes without the press seizing up. AgOilPress now sells a grapeseed version of the M-70 model. With the press now able to function properly, we were able to process the seed from both 2012 and 2013.

- [M-70 Press](#)

Project Objectives:

Throughout the process of pressing the grapeseed to produce grapeseed oil we documented several lessons learned.

(1) If you are pressing on a cold day it is good to preheat the seed (without

exceeding 125F for definition of cold pressed) prior to pressing. AgOilPress produced a heater for us that the seed would pass through prior to going into the press. We typically would warm the seed to about 90F with good results.

(2) Shiny parts equal less friction. Buffing all of the internal parts prior to commencing press operations is time well spent.

(3) Soybeans are your friend. Running soybeans through the press for the first 10 minutes warms up all of the parts and because soybeans contain a lot of oil all of the parts are well lubricated.

(4) Do not allow your seeds to dry below 10% moisture or they will be difficult to press.

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Research

Materials and methods:

Once we were able to produce GSO without seizing the press we were able to produce about 1.5 liters of GSO per hour and we averaged anywhere from 1.5 to 2 liters per ton of whole grapes depending on the variety. We typically did not run the press 24 hours a day preferring to run it throughout the day where we could check on it every 3 hours. If run 24hrs a day it would produce 36 liters/9 gallons of GSO a day and could process 1260 lbs of seed per day/37,800 lbs per month or 540 tons of whole grapes per month producing 1080 liters. We were very impressed with the quality of our oil as compared to what is available on the market. Our GSO is a very dark green (like virgin olive oil) with a pleasant earthy and fruity aroma and a flavorful nutty taste. While commercial GSO is typically a pale yellow color with no taste or aroma. In order to maintain the high quality of our oil we elected to use a centrifugal oil filter that AgOilPress company produces so that we would not strip out any of the color, taste or aroma.

Research results and discussion:

Based on our analysis an individual winery could make a modest profit and add a small additional revenue stream to their business by producing GSO. A 5000 gallon winery crushes approximately 33 tons of whole grapes which would produce 66 liters of GSO or 264 bottles (250ml) equaling \$5280 retail (\$20 bottle) or \$3630 profit (minus labor and material cost). Assuming the winery already has things like macrobins and equipment to move the bins around, the additional equipment to produce GSO (press, dryer, moisture meter, handscreen, tarps, buckets, etc) would cost approximately \$10K. With an annual profit of \$3.5K it would take approximately

2.85 years to break even.

However, for regions that have a cluster of wineries within short driving distance the model that makes the most sense is a regional cooperative. With a slightly higher entry cost for purchasing a seed cleaner (repurposed into a grape skin/seed separator) to handle a larger volume of pomace from multiple wineries, a regional cooperative could significantly increase their profit while reducing the break even point. A regional cooperative with ten 5000 gallon wineries participating would crush approximately 330 tons of whole grapes which would produce 2,640 bottles (250ml) equaling \$52,800 retail (\$20 bottle) or \$36,300 of profit (minus labor and material cost). Assuming the regional cooperative would be a larger winery with macrobins and the equipment to move the bins around, the additional equipment to produce GSO (press, trommel, macrobin rotator, filter, etc) as a regional cooperative would cost approximately \$20K. With an annual profit of \$36K it would take less than 1 year to break even. Also, we believe there is a value to GSO production that goes beyond the business math discussed above. We have found that people are fascinated with GSO production and this new value added product that can be produced right here in the Midwest. It is also a green business in that a waste product is being kept out of the landfill and turned into a very high quality value added product. Properly marketed and advertised, the GSO business will undoubtedly help drive wine sales in the tasting room!

Impact of Results/Outcomes

With persistence we were able to achieve all of our objectives of developing a low cost method of separating grape skins and seeds, drying the seeds and ultimately producing the grape seed oil. By far, our greatest challenge was the final step in the process which is pressing the seed to produce oil. Undoubtedly there are greater efficiencies that can be achieved throughout all phases of this process but we have proved that it is possible for even a small winery to produce their own grape seed oil! Based on the success of our research we have decided to establish the Midwest's first commercial Grape Seed Oil Regional Cooperative with an initial 8 participating local wineries.

Participation Summary

Educational & Outreach Activities

PARTICIPATION SUMMARY:

Education/outreach description:

Hundreds of vineyards and wineries throughout the midwest have been made aware of our Grape Seed Oil research project through our on-farm demonstrations, presentations at the Iowa Wine Growers Association (IWGA) annual conference and the Western Iowa Grape Growers Association (WeiGGA) annual conference and through IWGA and WeiGGA newsletters. Also, our Grape Seed Oil Research presentation is available on IWGA and WeiGGA websites (http://www.weigga.org/GSO_Power_Point_IWGA.pdf).

- [GSO Presentation](#)

Project Outcomes

Recommendations:

Potential Contributions

We have responded to inquiries from vineyards and wineries throughout the Midwest and even California. We are currently working with and advising 5 wineries in Nebraska, Iowa, Illinois, Michigan and Wisconsin that were inspired by our research to start their own Grape Seed Oil production. We expect each of these efforts to further inspire others to begin their own Grape Seed Oil production.

Future Recommendations

During the 2014 season we are interested in improving the seed drying process and will be experimenting with several new methods that will hopefully reduce the drying time without increasing costs. We are also very interested in producing additional value added products from the grape seed press cake and also from the grape skins. With each additional value added product the grape pomace processing business becomes a more attractive business. We will continue to share our research and results with those interested.

Information Products

- [Grape Seed Oil Research Presentation](#) (Conference/Presentation Material)

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