



Beekeeping Multiproduct Costs and Break-even Calculations

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Introduction

This fact sheet provides information regarding the production and pricing of honey and related products. This paper specifically discusses the potential for lip balm and lotion. More generally, we aim to aid beekeepers in the creation, budgeting and marketing of bee-related products. Costs associated with production may vary by location, and breakeven prices may exceed what consumers are willing to pay. This fact sheet is to serve as an information guide and includes an interactive Excel sheet located at extension.okstate.edu/fact-sheets/print-publications/agec/bee_enterprise_budget_multiproduct_4-25-23.xlsx. Information regarding the startup costs associated with beekeeping can be found in fact sheet [AGEC-2002](#)¹. To fill out the budget for this fact sheet, you will need to first complete the interactive Excel sheet from fact sheet [AGEC-2002](#) found at extension.okstate.edu/programs/honeybees/index.html. Alternatively, you can use the example startup cost of \$684.20 from the example calculations. If you need information about how to harvest honey, it can be found in fact sheet [AGEC-272](#).

For many beekeepers, the goal each year is for your bees to produce enough honey that you have some to sell. Other products can be made and sold using the wax your bees produce. Deciding to use wax to make products may depend on your management style and stage of beekeeping. Many beekeepers keep the wax harvested for use in their own hives². Wax is valuable to help bees start on new frames. It is often recommended to add wax to plastic frames to encourage bees to build comb. If you have sufficient wax, you may choose to sell wax in blocks to other beekeepers. Further processing your wax can allow you to create creams, candles and natural cosmetics. Of course, this further processing takes time, some skill and practice.

As a producer, it is important to consider the liability you face when selling products. Farmers Market insurance is a great way to combat legal repercussions and protect personal property. There are numerous options for insurance plans that can be found by calling local insurance companies or doing a search online. You should find an insurance plan that best suits the annual income of your enterprise as well as the

coverage you may need. This analysis used Flip's farmers market insurance as an example coverage plan³.

At an estimated cost of \$300 a year, this plan provides up to \$2 million in product liability, \$1 million in personal and advertising injury, \$300,000 in damages to rented premises, \$300,000 in workers compensation and \$5,000 in business personal property.

Lip Balm and Lotion Bars

The general directions for making lotion bars is as follows. Exact recipes vary greatly, and the following information is provided to give the reader a general feel for production requirements. A simple internet search gives numerous options on how to customize both products to fit a wide variety of tastes. This analysis used the lotion bar recipe from SoapQueen.com⁴. To make one batch of lotion bars yielding approximately six bars, you will need 3½ ounces of olive oil, 3½ ounces of shea butter, 2½ ounces of wax, 3 milliliters of essential oil (or your fragrance choice) and a 6-cavity silicone wax mold. In a heat-safe container, combine the olive oil and wax and microwave in 30-60 second increments until completely melted. Once melted, add shea butter and stir until incorporated. If needed, place back into the microwave in 15-20 second increments until all the ingredients are fully melted. Many other recipes recommend the use of a double boiler to melt the main ingredients. After adding in the essential oils, the molds are ready to be filled. Allow the bars to set in a cool place overnight to solidify. There are many molds available, allowing for the creation of holiday specific lotion bars. Many beekeepers choose bee-themed molds as a nod to the product contents.

Like lotion bars, there are many lip balm recipes available on the internet. The lip balm recipe used in this example was found at whatgreatgrandmaate.com and yields approximately 18 tubes of lip balm⁵. To make the lip balm you will need two ounces of beeswax, two ounces of shea butter, 1 tablespoon of coconut oil, 40 drops of essential oil and empty lip balm tubes. Combine the beeswax, coconut oil and shea butter in

a double boiler and heat for 10 minutes or until completely melted. Alternatively, other recipes recommend the use of a microwave. Remove from heat and add the essential oils. Carefully pour the mixture into the empty lip balm containers and allow cooling for 30 minutes before putting on the cap.

The Food and Drug Administration has guidelines for cosmetic labeling. It is important to note that if your cosmetics alter the structure or function of the body, such as sunscreen, they are also considered a drug and have additional labeling requirements. The ingredients used in the lotion bar and lip balms used in this discussion are solely cosmetic. Additional information on cosmetic labeling can be found in the [FDA's cosmetic labeling guide](#)⁶. A cosmetic product label should include a principal display panel on the outside of the product or packaging. The display panel should include the name of the product, identification of the product or its intended use, a warning label for misuse and the net quantity of ingredients. The product must also include an information panel. The information panel is to be printed directly on the product. The information panel must include directions for safe use, warnings, name and address of business, and a list of ingredients ordered by prominence⁵.

Interactive Excel Sheet

The companion Excel sheet to this fact sheet includes an example analysis of two different scenarios. The first scenario is producing 8-ounce containers of honey and the other is producing 1-pound containers. Select the tab of the Excel sheet associated with the scenario you are considering. For these scenarios, it is assumed the wax harvested will be used to create lotion bars and lip balm. The general structure of the Excel sheet includes an example with example values and areas for you to fill in your own numbers.

The first section of the Excel sheet provides cells where you can enter the startup cost associated with your beekeeping enterprise (Figure 1). This number can be calculated using the fact sheet AGECE-2002. If you do not provide a number for the startup costs, the example number will be used.

Moving to the next section (Figure 2), you will list the pounds of honey harvested. You may estimate the number of pounds harvested by inputting the number of frames you harvested. For more precise results, you may weigh your honey and list the pounds harvested. For more details about the honey portion of this fact sheet, please visit [AGECE-272](#). On average you will get 1-2 pounds of wax for every 100 pounds of honey harvested. In our example calculation, we split the difference and assume 1½ lbs of wax per 100 pounds of honey (converted to ounces). Alternatively, you can weigh your wax and provide an exact amount in the space: total oz wax. If you are running different scenarios, you may want to put the number provided in estimated total wax. Next, you will type the amount of wax in ounces you are allocating to lotion bars and lip balm. If the total wax used for making lip balm and lotion bars is greater than the total ounces of wax produced, a warning will appear saying "insufficient wax."

In the fixed cost section (Figure 3), you will list the number and purchasing price of each piece of equipment used for general honey production, as well as general fixed costs associated with lip balm and lotion production.

Similarly in the variable costs section (Figure 4), you will list the number and production costs per unit for honey produced.

If you make lotion bars, the next part of the Excel sheet is where you include the number of ingredients and the cost (Figure 5). We have suggested common ingredients, but there is the option to add other costs. We include the option of including the price of wax. You could put the value of the wax you would receive from using the wax in another way, such as selling to another beekeeper. Including a cost for wax accounts for the opportunity cost of using this wax for another purpose. The variable cost per bar is calculated in this section after you provide the number of bars made (toward the bottom of the Excel sheet).

The same information is needed to calculate the variable cost per lip balm in the next section (Figure 6).

Although you can estimate how many bottles of honey you will produce, there may be product loss. For example, although you may expect 40 pounds of honey to produce 80 8-ounce jars, there may be less once you are done bottling. To account for this, there is a section to record how many bottles of honey, lotion bars and lip balms you produced (Figure 7). The total fixed cost, total variable cost and total cost are calculated in this section as well.

To calculate the Annual Ownership Cost (AOC), depreciation was calculated using the straight-line method over five years with a salvage value of zero (Figure 8)⁷. This is a conservative assumption; with good hive care, equipment should last beyond five years. Note, depreciation is a way of spreading the fixed (sunk) costs over a period of time, hence recovery of those fixed costs is spread over the years of depreciation. Interest, or the opportunity cost of investing your money elsewhere, was assumed at 10% for the example. You can put your own interest rate under the Your Values column. Repairs were assumed at 5% per year. Insurance was based on Flip's farmer's market plan and was estimated at \$300 per year. Under the Your Values column, you can put your actual insurance cost.

Break-Even Prices

Calculating the break-even price when considering multiple products is more difficult than the calculations for a single product. We present two scenarios. In the first scenario, you set the price for honey and lip balm and calculate the breakeven price for lotion bars. In the other scenario, you set the price for honey and lotion bars and calculate the breakeven price for lip balms. It is important to remember that the breakeven price for any product may exceed what a consumer is willing to pay. To generate breakeven prices, provide the expected price for two of the three products. In the first section, you provide the honey and lip balm prices and the breakeven lotion bar price will be calculated. In the second section, you provide the honey and lotion bar prices and the breakeven lip balm price will be calculated. In both scenarios, you provide the price for honey. The price of honey is an easier price to estimate because it is likely dependent on the local and commercial price of honey.

It is likely that you are estimating the price for honey and a second product. You may not know the highest price a consumer would pay for honey, and you may be interested in how increasing or decreasing the price will impact the breakeven calculations. Therefore, we provide a table on the right-hand side of the Excel sheet that gives a range of break-even calculations. In the example above, we put in an \$8 price for honey and a \$5 price for lip balm, resulting in a

break-even price of \$13.77 for a lotion bar. Across the top of Figure 10, the given honey price is varied in \$1 increments. For the lip balm on the left-hand side, the price is varied in \$0.50 increments. To consider another combination, pick a honey price, a lip balm price and follow across to find the lotion bar breakeven. So, using Figure 10, if honey was priced at \$8 for 8 ounces and lip balm was priced at \$5.50 each, the breakeven price for lotion bars would be \$11.82.

Figure 11 is a screenshot of what your break-even table could look like. Notice some combinations of prices say "VC." This means you have already made enough money from the other products to cover your costs. It is recommended to at least charge the variable cost for your product. The variable cost is the cost used to produce one more unit of that product. The variable cost is calculated for you in this Excel sheet, and the location is shown in Figure 12.

Figure 12 pulls the number from the table you should charge to breakeven based on the numbers you provided. Notice, in this example the costs of production are already covered, so the recommendation is to charge at least variable cost. The variable cost will appear to the right of the table. In this example, the beekeeper should charge at least \$3 for their lotion bars.

Once you have decided the prices you will charge and the number of products you are selling, Figure 13 will help you calculate potential profit. You just need to indicate how much you charged for each product and the number of units sold. The Excel sheet calculates your total revenue, profit with total fixed costs and profit accounting for AOC. The profit with total fixed costs would be used if you anticipate paying off all of your fixed costs in the first year of production. If fixed costs are high, it is unlikely you will be paying them off your first year of honey production. Another way to consider your fixed costs is to take into account your AOC. Profit accounting for AOC does not include your total fixed costs but instead the annual ownership cost.

Conclusion

There are many opportunities for a beekeeper to produce products in addition to honey. The decision to include other products will depend on your time and interest in creating such products. When considering breakeven prices, it is important to remember if you want to make a profit, you will need to charge a price higher than the breakeven. Keep in mind consumers may or may not be willing to pay the break-even cost calculated.

References

* All figures listed in text can be found on pages 4-6.

- 1 Bir, C., Talley, J., & Jones, J. (2021, August). Beginning Honey Beekeeping Equipment and Associated Costs (AGEC-2002). Oklahoma State University. <https://extension.okstate.edu/fact-sheets/beginning-honey-beekeeping-equipment-and-associated-costs.html>
- 2 Blackiston, Howland. Beekeeping for dummies. 5th edition. John Wiley and Sons inc: Hoboken, NJ, USA.
- 3 Flip (Food Liability Insurance Program). FLIP Food Insurance Program. (2022, March 16). <https://www.flipprogram.com/>
- 4 Berry, B. (2017, January 24). Beeswax & Honey Lotion Bars DIY. Soap Queen. <https://www.soapqueen.com/bath-and-body-tutorials/lotion/beeswax-lotion-bars-diy/>
- 5 Choi, J. (2019, November 19). Homemade Beeswax Lip Balm (All-Natural and Toxin Free!) + 5 Ingredients to Avoid in Store-Bought Lip Balm. What Great Grandma Ate. <https://whatgreatgrandmaate.com/homemade-beeswax-lip-balm/>
- 6 Center for Food Safety and Applied Nutrition. (2022, February 25). Cosmetics Labeling Guide. U.S. Food and Drug Administration. <https://www.fda.gov/cosmetics/cosmetics-labeling-regulations/cosmetics-labeling-guide>
- 7 Beierlein, J. G., Schneeberger, K. C., & Osburn, D. D. (1986). Principles of Agribusiness Management. Prentice-Hall.

budget for Eight Ounce Multiproduct Honey Production

Example Number Your Number

Start up costs: enter number from cell G44 on Fact Sheet AGE-2002 684.20 _____

Figure 1. Excel area for startup costs.

Example Values			Your Values		
	Frames harvested	lbs Honey harvested	Frames harvested	Projected lbs harvested	lbs Honey harvested
Langstroth deep frame	0	0	_____	0	_____
Langstroth medium frame	10	40	_____	0	_____
Langstroth shallow frame	0	0	_____	0	_____
	Example Total	40	Total	0	0
	Example total oz wax 9.6			Estimated total wax	Example total lbs honey 40
				Total oz wax _____	Total lbs honey 0.00
					Wax allocated to lotion bars _____
					Wax allocated to lip balm _____

Figure 2. Excel area for honey and wax production.

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Production Feed Costs		Example Values			Your Values				
	Example Number		Example Prices		Your Number	Your price per unit		Your total cost	
Extractor	1	units	254.00	\$/unit	_____	_____	\$/unit	\$0.00	\$/unit
Uncapping Knife	1	units	75.00	\$/unit	_____	_____	\$/unit	\$0.00	\$/unit
Uncapping Scratcher	1	units	7.00	\$/unit	_____	_____	\$/unit	\$0.00	\$/unit
Strainer	1	units	34.00	\$/unit	_____	_____	\$/unit	\$0.00	\$/unit
Bottling Bucket	1	units	25.00	\$/unit	_____	_____	\$/unit	\$0.00	\$/unit
Other	0		0.00	\$/unit	_____	_____	\$/unit	\$0.00	\$/unit
Multi-Products Fixed Costs		Example Values			Your Values			Your total cost	
					Your number	Your price per unit			
Double Boiler	1	units	26.00	\$/unit	_____	_____	\$/unit	\$0.00	\$/unit
Silicone Molds	11	units	0.85	\$/unit	_____	_____	\$/unit	\$0.00	\$/unit
								Example fixed cost	Your fixed cost
								\$1,114.55	\$684.20

Figure 3. Excel area for fixed costs.

Honey Production Variable Costs		Example Values			Your Values				
					Your Number	Your price per unit		Your total cost	
Harvesting Labor	15	hours	7.25	\$/hr	_____	_____	\$/hr	\$0.00	\$/unit
Management Labor	3.5	hours	7.25	\$/hr	_____	_____	\$/hr	\$0.00	\$/unit
1 lb Containers	120	containers	1.50	\$/unit	_____	_____	\$/unit	\$0.00	\$/unit
Water	4	gallons	0.0015	\$/gal	_____	_____	\$/gal	\$0.00	\$/unit
								Example variable cost	Your variable cost
								\$314.13	\$0.00

Figure 4. Excel area for honey production variable costs.

Multi-Products Variable Costs					Example Values					Your Values					
Lotion bar										Your Number		Your price per unit		Your total cost	
Wax	4.80	oz	1.40	\$/oz	_____	oz	_____	\$/oz	\$0.00	\$/unit					
Shea Butter	6.72	oz	0.70	\$/oz	_____	oz	_____	\$/oz	\$0.00	\$/unit					
Olive Oil	6.72	oz	0.21	\$/oz	_____	oz	_____	\$/oz	\$0.00	\$/unit					
Essential Oils	0.49	oz	9.00	\$/oz	_____	oz	_____	\$/oz	\$0.00	\$/unit					
Labor	1.00	hours	7.25	\$/oz	_____	hours	_____	\$/oz	\$0.00	\$/unit					
Water	4.00	gallons	0.0015	\$/gal	_____	gallons	_____	\$/gal	\$0.00	\$/unit					
									Other costs _____						
									Example	Your values					
Lotion Bar variable cost									\$24.47	\$0.00					
Bars produced									11	0					
Cost per bar									\$2.22	—					

Figure 5. Excel area for lotion bar variable costs.

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Lip Balm										Your Number		Your price per unit		Your total cost	
Wax	4.80	oz	1.40	\$/oz	_____	oz	_____	\$/oz	\$0.00	\$/unit					
Shea Butter	4.80	oz	0.70	\$/oz	_____	oz	_____	\$/oz	\$0.00	\$/unit					
Coconut Oil	0.80	oz	0.50	\$/oz	_____	oz	_____	\$/oz	\$0.00	\$/unit					
Essential Oils	0.80	oz	9.00	\$/oz	_____	oz	_____	\$/oz	\$0.00	\$/unit					
Lip Balm Container	43	unit	0.20	\$/mold	_____	unit	_____	\$/mold	\$0.00	\$/unit					
Labor	1	hours	7.25	\$/hr	_____	hours	_____	\$/hr	\$0.00	\$/unit					
Water	4	gallons	0.0015	\$/gal	_____	gallons	_____	\$/gal	\$0.00	\$/unit					
									Other costs _____						
									Example	Your values					
Lip balm variable cost									\$33.53	\$0.00					
Lip Balms produced									43	0					
Cost per lip balm									\$0.78	—					

Figure 6. Excel area for lip balm variable costs.

	Example	Your Values
8 oz bottles of Honey Produced	80	
Lotion Bars Produced	11	
Lip Balms Produced	43	
Total Fixed Cost	\$1,114.55	\$684.20
Total Variable Cost	\$372.14	\$0.00
Total Cost	\$1,486.69	\$684.20

Figure 7. Excel area for production numbers as well as fixed, variable and total costs.

Annual Ownership Cost (AOC)	Example	Your Values
Interest rate	10%	
Depreciation	\$222.91	\$136.84
Interest	\$55.73	\$0.00
Repairs	\$55.73	\$34.21
Taxes	\$0.00	\$0.00
Insurance	\$300.00	
Annual Total Cost	\$634.37	\$171.05

Figure 8. Excel area for annual ownership costs.

Break-even Prices	Example	Your Values
Honey Selling Price	\$8.00	
Lip Balm Selling Price	\$5.00	
Calculated Lotion Bar Price	\$13.77	
Honey Selling Price	\$8.00	
Lotion Bar Selling Price	\$15.00	
Calculated Lip Balm Price	\$4.69	

Figure 9. Excel area for inputing prices and calculation of break-even price for third product.

Example Lotion Bar Breakeven								
		8oz Honey Prices						
		5.00	6.00	7.00	8.00	9.00	10.00	11.00
Lip Balm Prices	3.50	41.45	34.18	26.91	19.64	12.36	5.09	-2.18
	4.00	39.50	32.23	24.95	17.68	10.41	3.14	-4.14
	4.50	37.55	30.27	23.00	15.73	8.45	1.18	-6.09
	5.00	35.59	28.32	21.05	13.77	6.50	-0.77	-8.05
	5.50	33.64	26.36	19.09	11.82	4.55	-2.73	-10.00
	6.00	31.68	24.41	17.14	9.86	2.59	-4.68	-11.95
	6.50	29.73	22.45	15.18	7.91	0.64	-6.64	-13.91

Figure 10. Breakeven.

Your Lotion Bar Breakeven								
		Honey Prices						
		2.00	3.00	4.00	5.00	6.00	7.00	8.00
Lip Balm Prices	13.50	5.07	4.40	3.74	3.07	2.40	1.74	1.07
	14.00	3.40	2.74	2.07	1.40	0.74	0.07	VC
	14.50	1.74	1.07	0.40	VC	VC	VC	VC
	15.00	0.07	VC	VC	VC	VC	VC	VC
	15.50	VC	VC	VC	VC	VC	VC	VC
	16.00	VC	VC	VC	VC	VC	VC	VC
	16.50	VC	VC	VC	VC	VC	VC	VC

Figure 11. Example breakeven.

Break-even Prices	Example	Your Values
Honey Selling Price	\$8.00	\$10.00
Lip Balm Selling Price	\$5.00	\$3.00
Calculated Lotion Bar Price	\$42.86	Charge Variable Cost
		Variable Cost
		\$3.00
Honey Selling Price	\$8.00	
Lotion Bar Selling Price	\$15.00	
Calculated Lip Balm Price	\$12.13	

Figure 12. Table that shows the break-even combination of prices.

Profit Calculation			
	Revenue per unit	Units Sold	Total
Honey		1 lb bottles	0
Lotion Bar		4oz container	0
Lip Balm		1oz con-	0
Total Revenue			
Profit with Total Fixed Costs			
Profit Accounting for AOC			

Figure 13. Profit calculations.

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