FRACTION FINDER™

Case Studies: Return on Investment for Short-Path Distillation

Introduction: Refinement departments refine extracted plant material into more concentrated products. One of the final refinement processes is short-path distillation. This process is popular as it produces distillate, a highly potent, marketable product. The potency outcome of short-path distillation is based heavily on the operator's skill in determining fraction changes, changing collection flasks, and ultimately separating molecular fractions in order to achieve the most potent product possible. We define the two methods for short-path distillation as the *Traditional Method* and the *Fraction Finder Assist Method.*

We define the *Traditional Method* as using temperature, vacuum, flow, and color changes to determine fraction changes. We define the *Fraction Finder Assist Method* as referencing the same process controls but in combination with a real-time molecule monitor that directly analyzes the distillation and indicates fraction changes to the operator. The cost of this add-on tool (Fraction Finder) is $4,000 USD. Here, we present two different case studies from businesses that have applied each of the aforementioned methods. This document was the result of multiple requests from clients, consultants, and resellers that wanted to understand and express the benefits of the *Fraction Finder* to business owners from a financial perspective. In order to estimate the financial impact of this method, we surveyed two different users about the *Traditional Method* and the *Fraction Finder Assist Method.* We then built two formulas that would translate these benefits into dollars, specific to each user and user's state.

AROMETRIX

Case Study A: Increased Batch Potency and Revenue in CBD Distillate

Testimonial: Adam Tangarone is an Extraction Technician who processes Hemp in Prospect, Maine. Adam runs two passes of a short-path distillation of CBD crude oil, then sells CBD distillate at wholesale using a mid-low pricing strategy. We surveyed Adam about each SPD method. His direct quote: *"The Fraction Finder has helped so far in increasing our output purity and maintaining our consistency, which are both very valuable. It definitely assures highest possible purity. With the Fraction Finder's insight, we get at least an extra 3% of cannabinoids… Locally, prices range from $4,000 per liter on the low end to $7,000 per liter on the high end." - Adam Tangarone (10/04/2019)*

Method: In order to estimate the impact of this potency increase, we built an incremental revenue formula. We incorporated Adam's figures from his testimonial: output potency for each method (*Traditional* and *Fraction Finder Assist*). Next, we requested that Adam provide more information about his process, including output potency, yield, and prices for each method. This allowed us to estimate the revenue of batches with each method. Finally, we compared the difference. See Table 1.

Table 1

	Traditional	**Fraction Finder**
Crude Batch Size	2.5 (L)	2.5 (L)
Crude CBD % (by mass)	74%	74%
% Yield	72%	70%
Yield Size	1.80 (L)	1.75 (L)
Distillate CBD %	89%	92%
CBD Distillate Price (Wholesale)	$4,750/L	$5,500/L
CBD Distillate Revenue (Wholesale)	$8,550/batch	$9,625/batch
	Est. Additional Revenue	**$1,075/batch**

Table 1 Notes: If you are reading this digitally, request access to our full formula by clicking here.

Results: Adam's additional revenue with the *Fraction Finder Method* is an estimated $1,075 per batch. For Adam, the *Fraction Finder Assist Method* resulted in an increase in potency, which resulted in higher product revenue for the manufacturing facility. This customer covered the cost of their Fraction Finder acquisition in under four (4) runs, and made a profitable return for all subsequent runs.

Case Study B: Decreased Training Time and Cost for Entry-Level Technicians

Testimonial: Macalister Bunbury is a Laboratory Manager who runs a refinement department in Phoenix, Arizona. We surveyed Macalister about each SPD method. His direct quote: *"I have trained two technicians - one with the Fraction Finder and one without. It took about two months before the person with the Fraction Finder was doing runs on their own, compared to three without... Our technicians spend about 80% of their time learning about running short paths when they are in training. I spend around 20-40% of my time working with them." - Macalister Bunbury (10/07/2019)*

Method: In order to estimate the impact of this training time reduction, we built a cost reduction formula. We incorporated Macalister's figures: training time lengths for each method (*Traditional* and *Fraction Finder Assist*), and the percent of time training for the personnel involved. Next, we found local wage and salary approximations for each position in Phoenix on Indeed. This allowed us to estimate the cost of training with each method, and lastly, compare the difference. See Table 2.

Table 2

	Traditional	**Fraction Finder**
Entry Level Lab Technician Training Time	3 months	2 months
% of Work Time on SPD training	80%	80%
Entry Level Lab Technician Cost	$4,102/month	$4,102/month
Cost to Train	$9,846/training	$6,564/training
	Lab Tech Training Cost Reduction	$3,282
	Traditional	**Fraction Finder**
Lab Manager Training Time	3 months	2 months
% of Work Time on SPD training	30%	30%
Lab Manager Cost per Month	$5,581/month	$5,581/month
Cost to Train	$5,023/training	$3,349/training
	Lab Manager Training Cost Reduction	$1,674
	Est. Training Cost Reduction	**$4,956/training**

Table 2 Notes: To request access to our full formula, click here. To visit the referenced Indeed page for Laboratory Technician, click here. To visit the Laboratory Manager Indeed page, click here.

Results: Macalister's training cost reduction with the *Fraction Finder Method* is an estimated $4,956 per training. He saved enough HR cost in training new personnel that he covered the cost of his Fraction Finder unit with that time savings. Every subsequent training will result in a profitable return on his investment by using this method to train.

Conclusion

Case Study A analyzed CBD distillate potency with each short-path distillation method. This increase translated to increased batch revenue in CBD distillate. We estimate that Adam made an incremental $1,075 per batch by using the *Fraction Finder Assist Method.* This means that he was able to cover the cost of acquiring the Fraction Finder in roughly four (4) short-path distillation runs. This is strong evidence for a potency advantage with the *Fraction Finder Assist Method*.

Case Study B analyzed personnel training times and training cost of each method. We estimate that Macalister saved $4,956 in training costs per training by using the *Fraction Finder Assist Method.* This means that he was able to cover the cost of acquiring the Fraction Finder in one (1) short-path distillation training. This is strong evidence for the training time savings with the *Fraction Finder Assist Method.*

Limitations

Please note the limitations to these case studies. In **Case Study A**, wholesale CBD prices are approximates, strongly dependent on the region within Maine, and can significantly be affected by a surplus. In **Case Study B**, Macalister's team is small and trained heavily in short-path distillation; most other facilities likely spend less of their training time on SPD, as it might only be part of their post-extraction process. Additionally, training time length is dependent on experience level. While we aimed to be as accurate as possible in our estimates, these estimates are not exact, generalizable, nor do they aim to prove any sort of statistical significance. Furthermore, these estimates are subject to influence from a wide variety of variables; while we did our best to consider all important factors, there are potentially factors that could impact these formulas that we did not consider. However, these case studies provide strong support for the financial advantages of using the *Fraction Finder Assist Method* over the *Traditional Method* for short-path distillation.

Future Work

We intend to conduct more case studies that explore the potential ROI of the *Fraction Finder Assist Method*. Case Study A analyzed the additional revenue of processing for wholesale purposes; we would like to conduct a case study that analyzed the impact on retail prices, which would likely be much higher. Furthermore, Case Study A analyzed CBD prices; investigating the impact on Delta-9 prices would be of interest. Lastly, we would like to conduct case studies on using this method for other processes, such as ethanol extraction and wiped film evaporation.

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