HARDTANK

MASTERCLASS



SPECIALTY COFFEE ASSOCIATION
BEST NEW PRODUCT
COMMERCIAL COLD BREW COFFEE PREPARATION & SERVING
2021

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BEST NEW PRODUCT
MILAN 2022
COMMERCIAL COLD BREW COFFEE PREPARATION & SERVING

2023
WORLD COFFEE INNOVATION AWARDS
WINNER

HARD BEANS

Coffee Technology Hub

Hard Beans

*We specialize in developing **new technologies** for coffee industry since 2017.*

*The cornerstone of our business is **science** - all of our products are scientifically proven and data backed.*

We operate in 4 areas:

- *Coffee Roasting*
- *Hardtank Technology*
- *RTD Production*
- *Coffee Grounds Recycling*

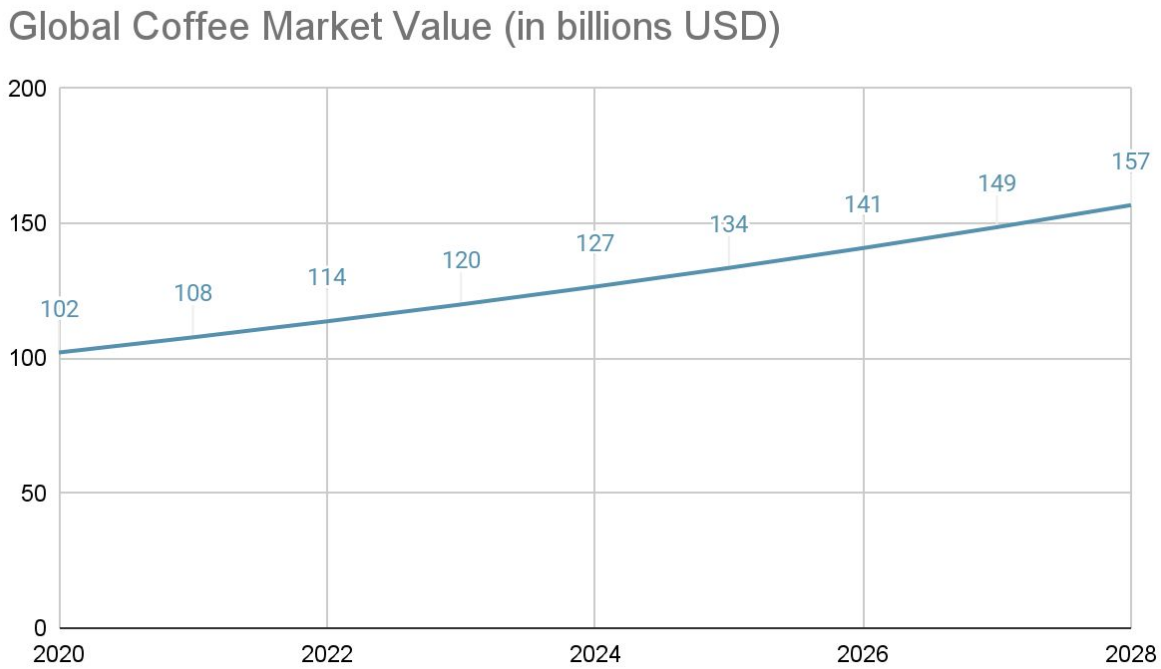
Global Coffee Market

The global coffee market was valued at approximately $102.15 billion in 2019.

It is expected to reach a value of around $155.64 billion by 2028.[1]

CAGR

5.5%



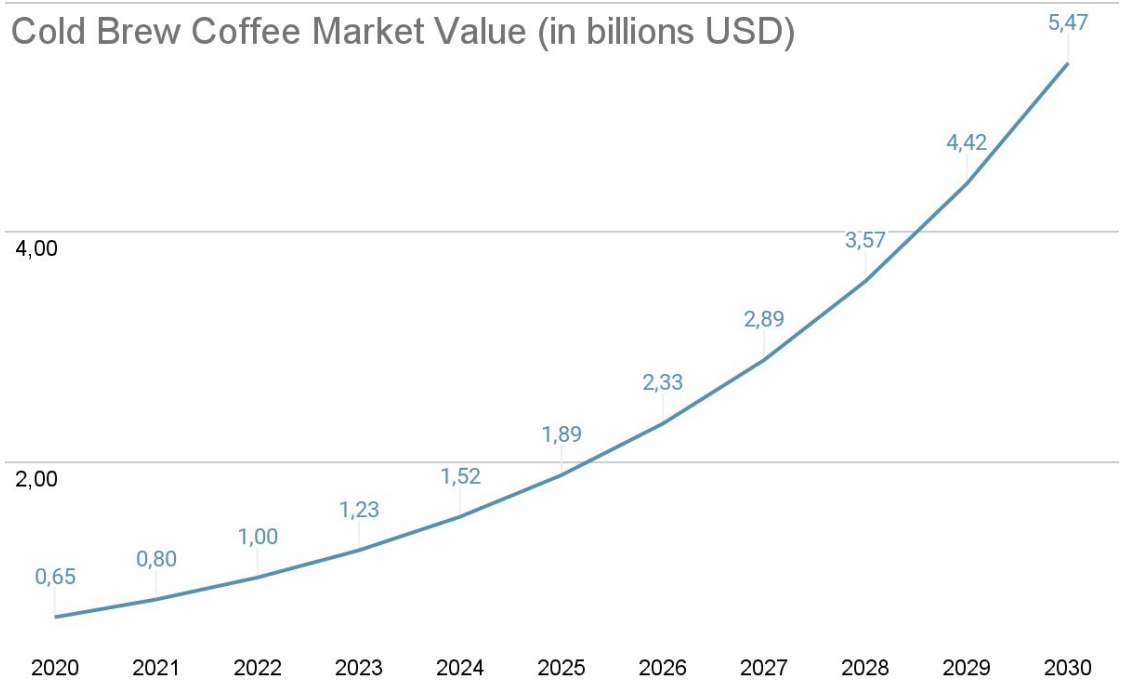
Global Cold Brew Market

The global cold brew coffee market was valued at USD 0.65 billion in 2021.

It is projected to reach USD 5,47 billion by 2030.

CAGR

23.7%



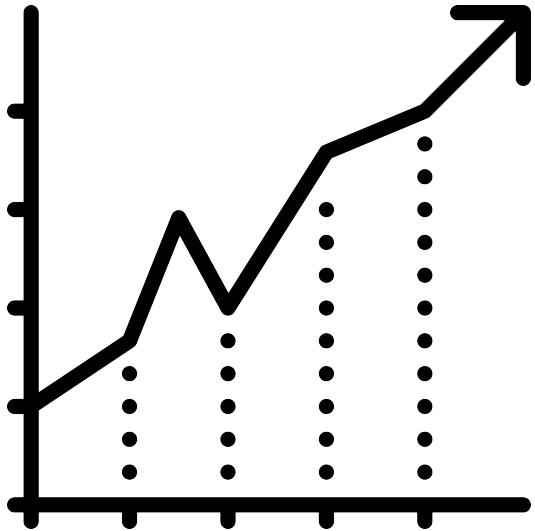
Source:
https://www.globenewswire.com/en/news-release/2023/08/10/2723028/0/en/Cold-Brew-Coffee-Market-to-Reach-USD-5478-01-Million-by-2032-Growing-Popularity-of-Ready-To-Drink-Coffee-to-Propel-Growth-The-Brainy-Insights.html

Cold Brew - the Main Driver of Growth

Cold Brew is the fastest growing market sector of coffee industry.
It is also connected with a global beverage market.

What are the key growing factors for the upcoming years?

1. **Climate change** - growing temperatures will increase demand for cold beverages.
2. **Mindful drinking** - Millennials & Gen Z consumers drink less alcohol.
3. **Mood Boosting Beverages** - tea, herbs, coffee. Products increasing the wellbeing of consumers.
4. **Staying Sharp** - Consumers are demanding formulations that help them optimise their mental performance at work, home through the noise and and play.
5. **Carbon footprint reduction** - replacing global with local.
6. **Cost optimization & automation** - beverage preparation in more effective way.



Cold Brew & Nitro Cold Brew

Cold Brew Coffee - steeped with a cold water. The beverage is refreshing, full of flavor, energizing, and lower in bitterness and acidity compared to the hot brewed coffee.

Nitro Cold Brew - a way of serving cold brew coffee. The beverage is saturated with nitrogen and served out of a special tap to achieve a ‘cascade effect’ known from a legendary Guinness beer. Nitro cold brew is incredibly creamy with a velvety mouthfeel and refreshing capabilities to chill you down during the hottest days.



Traditional Cold Brew Challenges

1. **Poor efficiency** - producing batch every 12-24 hours.

1. **Oxidation** - long extraction time increases spoilage of a product: microbiological & quality issues.

1. **High operation cost** - paper filtration, long draining & cleaning time, high waste levels.

1. **Poor hygiene** - manual cleaning leaves room for mistakes and microbiological growth.

1. **Lack of consistency** - oxidation & manual operations increase the risk of uneven quality.


ALTO



What's wrong with this picture?

Open tanks - oxidation, microbiological hazard

No control over the process - multiple buckets extracting for a long time

General hygiene - brewed in the backroom, final product on the ground, non-protected

Lot of space required - so many buckets to serve a day consumption of cold brew

Cleaning time - manually cleaning & sanitizing 8 20-liter buckets takes couple hours

Would you drink it?



Let’s talk an elephant in the room...



Microbial Risks

Cold brew production involves the use of water and coffee grounds over an extended period without heat treatment. This environment is conducive to the growth of various microorganisms, including bacteria, yeast, and molds.

The main concern is the growth of following bacteria:

- *Escherichia coli,*
- *Enterobacteriaceae (including Salmonella),*
- *coagulase-positive Staphylococcus aureus,*
- *Listeria monocytogenes (Listeria)*

Some bacteria, particularly acid-tolerant strains, can still survive and even proliferate in mildly acidic conditions. This includes certain pathogens that might cause foodborne illnesses. Moreover, the acidity might not be sufficient to inhibit the growth of all spoilage microorganisms, such as molds and yeasts.

Hard Beans Study at the University of Opole

The aim of the study was to determine, based on microbiological criteria, the suitability for consumption of cold brew coffee using the traditional 24-hour method.

The scope of the research was to assess the microbiological condition of cold macerated coffee and to define guidelines for microbiological safety.

Professor Agnieszka Dolhańczuk-Śródka
Director of the Institute of Biotechnology at the University of Opole



Results



During one of the studies, we've conducted the **coffee samples delivered to the laboratory in washed, but not sterilized KEGs were significantly contaminated.**

Immediately after extraction, the samples contained:

- **690 CFU/ml -** total mesophilic bacterial count
- 27 CFU/ml - mold count.

Samples were kept in temp. range of 5 - 25°C.

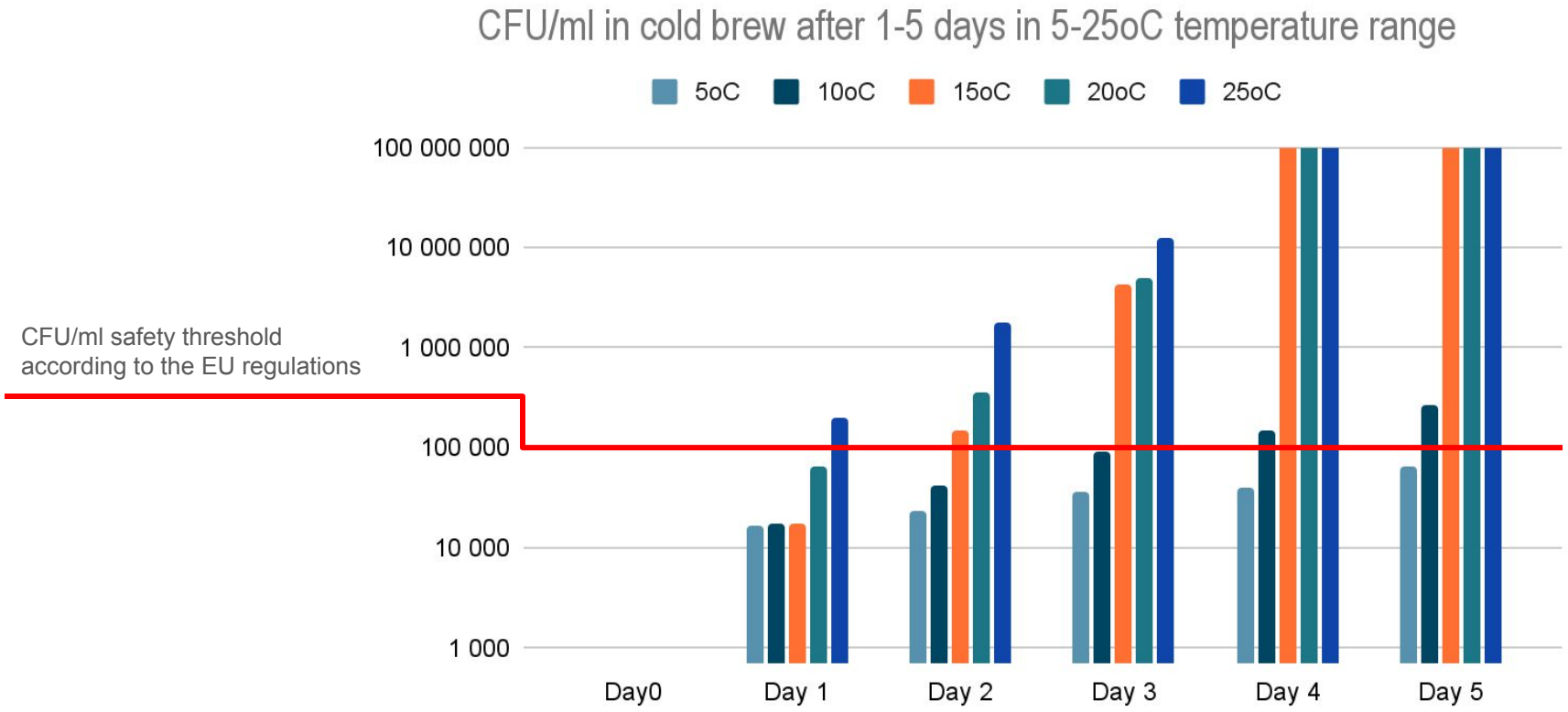
After 2 days of storage at 15°C, the bacterial count increased to:

- **150 000 CFU/ml.**

The European Union standards allow cold brew CFU/ml values to be **no higher than 100 000/ml.**

Results show that the only proper condition for unpasteurized cold brew storage is below 5°C.

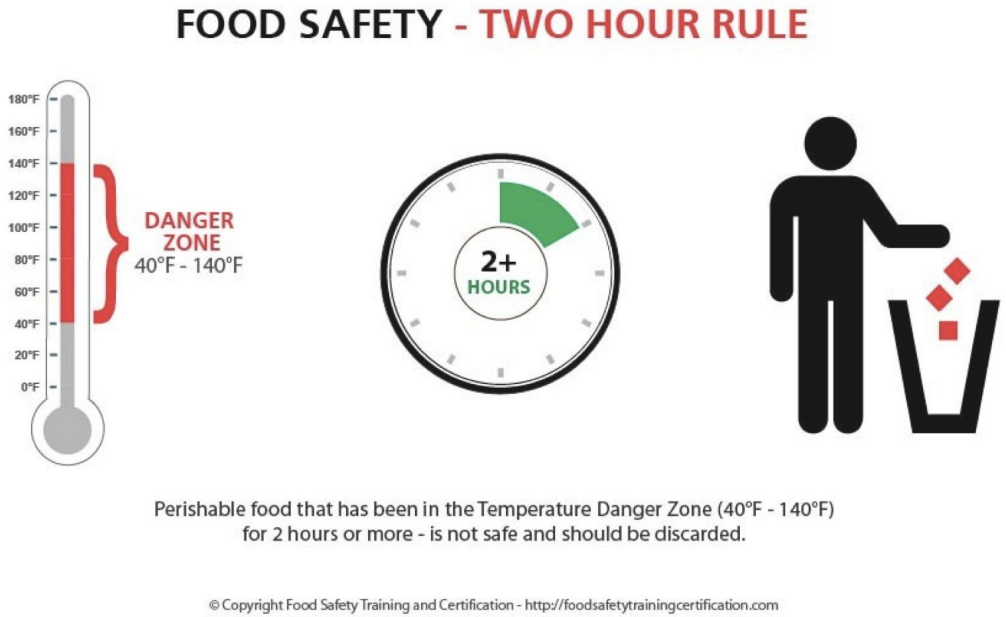
Regardless of the temperature and storage time


CFU/ml in cold brew after 1-5 days in 5-25oC temperature range
5oC
10oC
15oC
20oC
25oC
100 000 000
10 000 000
1 000 000
100 000
10 000
1 000
CFU/ml safety threshold according to the EU regulations
Day0
Day 1
Day 2
Day 3
Day 4
Day 5

Danger Zone

The "danger zone" which spans temperatures between **5°C** and **60°C**, is a critical range in which harmful microorganisms can rapidly proliferate in food, potentially causing foodborne illnesses.

Cold brew coffee, despite being a chilled beverage, is **not exempt from the risks** posed by this temperature range, especially during various stages of its production, storage, and service.



Contributors to microbial contamination

Microbial contamination in cold brew coffee can occur due to various factors and practices that compromise food safety.

It is correlated closely with hygiene practices:

1. **Inadequate Sanitization**
2. **Extended Brew and Storage Times**
3. **Inadequate Personal Hygiene Practices**
4. **Insufficient Training**
5. **Absence of HACCP Plans**





Is there any solution to that?

HARDTANK

Fast Cold Brew Maker

Developed since 2018, patented & scientifically proven technology for accelerated cold extraction.



Key Values of Hardtank

1. Unlimited efficiency - producing batch below 1 hour

2. Reduced Oxidation - short extraction time & closed environment

3. Low operation cost - no paper filtration, easy operation, automated extraction programs

4. Elevated hygiene - automatic cleaning & sanitation, dedicated cleaning product, stainless steel elements.

5. Variety of products - coffee / tea / herbs / lemonades / cocktails

Key Values of Hardtank

6. Consistency - pre-saved batch programs, automatic drain mode

7. Reduced product waste - longer shelf life & better product management

8. Small footprint - 30x30 cm

9. Visually appealing - extraction process in glass chamber

10. Cost efficiency - up to 45% lower cost per serving

So, can coffee chains, hotels, or restaurants make cold brew faster, easier, cheaper, more hygienic, while maintaining better health-promoting properties?



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Influence of coffee brewing methods on the chromatographic and spectroscopic profiles, antioxidant and sensory properties

Natalia Stanek[1✉], Magdalena Zarębska[1], Łukasz Biłos[2], Krzysztof Barabosz[3], Ewa Nowakowska-Bogdan[1], Izabela Semeniuk[1], Justyna Błaszkiewicz[2], Renata Kulesza[2], Rafał Matejuk[2] & Krzysztof Szkutnik[1]

Cold brewing coffee has gained increasing popularity as a novel brewing method. A completely different flavour profile during cold brewing extraction (smooth and mild) is a result of the low-energy process, prolonged water-grind contact times and long preparation time. The aim of our research was to compare coffee drinks obtained with an innovative device for a faster, dynamic cold coffee extraction process (Hardtank) to drinks prepared traditionally in 24 h and hot brewed drinks. This study investigated the differences in chemical composition (volatile, non-volatile and lipid compounds), sensory properties and antioxidant capacity of coffee drinks from various extraction processes carried out at variable brewing temperatures, times and percolation modes. The results showed that the new cold maceration technique using coffee bed percolation (Hardtank) improved the quality of cold coffee drinks, making them similar in taste to hot coffee drinks. Among the studied extractions, the combination of a lower temperature (19.3 °C) and percolation process appeared to be the ideal setting for the most efficient extraction of compounds such as chlorogenic acids, gallic acid, caffeine, trigonelline, 5-(hydroxymethyl)furfural and lipids and consequently for their intake. In addition, FTIR spectra indicated an even 4 times greater quantity of lipids in Hardtank drinks than in classic cold brew and up to 5 times more lipids than in hot brew coffee, which contribute to the formation of the aroma and flavour. The decreased extraction time and use of coffee bed percolation could be beneficial for the quality and taste of cold brew products.

Abbreviations

Coffee brewing methods

CB	Traditional 24-h cold brew method
HT	Innovative, fast and percolated cold extraction method (Hardtank)
P	Filter hot brew method (HarioV60 Switch)

Coffee sample labels

Gw	Guatemalan washed processed coffee
Sw	Salvadoran washed processed coffee
Bpn	Brazilian pulped natural processed coffee
Bn	Brazilian natural processed coffee
Spn	Salvadoran pulped natural processed coffee
Bow	Bolivian washed processed coffee

[1]Łukasiewicz Research Network- Institute of Heavy Organic Synthesis "Blachownia", Energetyków 9, 47-225 Kędzierzyn-Koźle, Poland. [2]Faculty of Production Engineering and Logistics, Opole University of Technology, Prószkowska 76, 45-758 Opole, Poland. [3]Hard Beans Coffee Roasters, Armii Krajowej 35, 45-071 Opole, Poland. ✉email: natalia.stanek@ico.lukasiewicz.gov.pl

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- 20% higher CQA isomer elution.
- 18% and 12% more caffeine than hot and cold extraction.
- 13% higher trigonelline content.
- 16% more 5-HMF (hydroxymethylfurfural).
- 12% more gallic acid.
- 4 times more lipids.



Values for your business

Short extraction time:

- 1+ batch / hour = flexibility in cold brew production
- Better waste management - brew on demand
- More products to offer - coffee, tea, herbs, cocktails
- Reduced oxidation - better product quality & consistency

Lower production cost:

- High extraction yield = lower foodcost
- Reduced labor cost - short preparation & cleanup time
- No disposable filters

Values for your business

Hygiene:

- Stainless steel elements - food grade
- Automatic cleaning & sanitation programs - hands-free maintenance
- Dedicated sanitation product - TBA

Ease of operation:

- Grind and go - no paper filters, no draining & manual filtration required
- Pre-saved recipes
- Automatic drain to keg





Hardtank Product Range

Hardtank20:

- Recommended for cafe chains, hotels, coffee roasteries
- Base variant for making cold brew automatically into 18-liter keg
- Automated cleaning and sanitation programs
- Programmable extraction time & automation steps
- Production capacity: 9l or 18l per batch

Hardtank All-in-One:

- Hardtank20 + built-in serving system
- Nitro on tap feature
- Nitrogen regulator on tap
- Creamy texture and cascade effect
- High efficiency in-flow cooler with temperature regulator

Hardtank Product Range

Baby Hardtank

- Designed for cafes, bars, restaurants, hotels and domestic users
- Small footprint - only 30x30 cm base diameter
- Versatility - brewing coffee, tea, herbs & spirits infusions
- Ease of use - controlled via touchscreen & mobile app, fully automated
- Capable of brewing 5 litres of cold brew in less than 1 hour



Hardtank vs. Immersion vs. Percolation

	Hardtank / Baby Hardtank	Immersion	Percolation
Batches / day / unit	8+	1	4
Daily servings / unit	648 / 128	72	176
Preparation time	5 min.	30+ min.	5 min.
Cleaning time	Automatic	10+ min.	15+ min.
Extraction control	YES	NO	YES
Sanitation time	Automatic	30 min. / device	30 min. / device

- 250 ml per serving
- 18 liters yield per batch
- 8 batches/day for Hardtank
- 8 hours working day

- TDS = 4%
- Yield volume: 4,5 l
- Dilution ratio: 2,6 : 1
- Max batch size: 11 l

Profitability - Hardtank vs. Immersion vs. Percolation

	COFFEE	COST: 1KG (Eur)	DRY GROUNDS WEIGHT	COST: USED DOSE (Eur)	BREWED COFFEE WEIGHT	ENTRY TDS	DILUTION	FINAL TDS	TOTAL WEIGHT	AMOUNT OF 250ml PORTIONS	COST PER PORTION (Eur)	SERVINGS PER YEAR (20/day)	TOTAL COST (Eur)
BABY HARDTANK	Nightjar Candyman	33	0,325 kg	11	4193 g	1,53%	0 g	**1,53%**	4193 g	16,77	**0,64**	7300	4 669
Immersion				11	910 g	3,85%	1375 g	**1,53%**	2285 g	9,14	**1,17**		8 566
Percolation			1,000 kg	33	4300 g	4,00%	6950 g	**1,53%**	11250 g	45,00	**0,73**		5 353
												SAVINGS Immersion	3 897
												SAVINGS Percolation	685

Hardtank ROI

	UNIT PRICE	COST PER PORTION (Eur)	RRP PRICE (Eur)	PROFIT PER SERVING	FOOD COST %	SERVINGS / DAY	ROI (DAYS)
Baby Hardtank	4 200	0,64	4,00	3,36	16,5%	20	**62,5**
Hardtank	13 000					60	**65**

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