



**COCTIO BONE BROTH
COOKER MODULE
DESIGNED FOR TASTE & QUALITY**



BONE BROTH TASTE AND QUALITY AT THE HEART OF COCTIO DESIGN

Consistently producing the finest bone broth by way of careful design, automation and traditional cooking methods

The Coctio Cooker module is designed to achieve the key characteristics of a great tasting broth by carefully controlling the traditional cooking process with the help of equipment designed for the production of bone broth and automation. Combined with the right recipe and great raw materials, this method has been tested and proven over a period of 25 years to consistently produce the best quality broth.

COCTIO METHOD: Bone Broth Quality

COCTIO MACHINE DESIGN: Production Efficiency

COCTIO AUTOMATION: End-product Consistency

What are some key characteristics of great tasting bone broth?



1. **Long lasting round taste** – Full of aromas
2. **Clarity** – No fat or other impurities
3. **Texture that envelops the palate** – extracting gelatine and retaining its gelling effect



**How does the Coctio Cooker consistently achieve the above characteristics?
This has all to do with Coctio design and automation.**

Long lasting round taste

The module is equipped with a closed cooking vessel that will retain all of the aromas released via evaporation within the cooking environment. In addition, a cooler jacket is located at the top that will help the evaporated aromas to condensate and drop back down into the cooking mixture to constantly intensify the taste. Finally, some unwanted gases which are produced by bones during the cooking process will be released through a venting valve to avoid any minor spoilage of the end-product's taste.

Clarity

In the cooking process, fat turns into liquid and naturally rises to the top. Organic and inorganic matter from the bones as well as nutrients, aromas and water contents from the meat and vegetables are released into the broth. Achieving clarity while ensuring that aromas and nutrients are properly released and mixed in the broth requires a careful balance that is difficult to accomplish.

The Coctio method ensures high clarity of the broth already inside the cooker and requires very little filtration when it is extracted from the vessel. This is achieved by carefully controlling the way the mixture is cooking inside the vessel. The broth is mixed only with the help of convection heat and bubbles that rise through the mixture. It is important that the mixture is not cooking too fast (i.e. high frequency of bubbles rising to the top) otherwise the fat that has risen to the top will start mixing with the rest of the mixture, or too slow otherwise the nutrients and aromas will not mix appropriately.

Coctio Cooker module enables this careful control of the cooking state with the help of 3 separate steam jackets located in the bottom hatch, the bottom cone as well as in the side of the vessel. These 3 jackets can be controlled separately and ensure systematic and consistent dissipation of heat throughout the mixture. Coctio Automation controls the heat given out to the mixture and is able to anticipate its heat inertia avoiding overcooking which could cause fat to mix with the rest of the contents and compromise the broth's clarity. In addition, the cooler jacket located at the top of the vessel helps the fat cool down and solidify slightly so that it remains at the top limiting its movement within the mixture.

Texture

The key element that provides texture to the broth is gelatine. Gelatine is converted from collagen present in the organic part of the bones and joints. Collagen can be converted into gelatine at low temperatures (i.e. 45°C) but the higher the temperature, the faster the



conversion process. This being said, once converted from collagen to gelatine, the gelatine's gelling effect starts to drop as a result of heat being applied to it. Over time, this drop is relatively linear for temperatures up to 100°C but becomes increasingly exponential for temperatures above that¹.

Coctio recommends cooking at 103°C which provides the right balance of taste and nutrient release, while maintaining the gelatine's gelling effect at the right level. The cooking vessel is rated 0.5 bar gauge which allows to cook the contents up to 111°C without boiling. This means that at 103°C, the mixture is simmering, letting few bubbles rise to the top that provide the right amount of movement inside the mixture. Simultaneously, collagen is efficiently converted to gelatine while minimizing the impact of heat on its gelling strength which will provide the right texture to the end-product.

Production steps

Once the ingredients are in the cooking vessel, the cooking process is started automatically by choosing the recipe set-up from the automation control panel. As soon as the recipe is selected, the cooker will heat up the steam jackets and cook the contents at the predetermined temperature, pressure and time. During the cooking process, the fat that has turned liquid will rise naturally to the surface where the cooler jacket will help it cool down and form a slightly more solid layer.

Once the cooking process is finished, the liquid contents are extracted automatically from the cooker module to the Coctio Filtration module. First, the broth is taken out of the cooking kettle through the filtration module and finally to the Coctio Raw Broth storage tank. As the broth is extracted, the fat that has remained on top slowly drops with the broth. At one point, the fat will start to mix with the broth at which stage, an automatic density measure will recognize the presence of fat and re-direct the rest of the liquids (mostly fat) to a different filter on the Coctio Filtration module and eventually to the Coctio Fat Separation line. Finally, the cooking ingredients are removed from the cooking vessel by electronically opening the bottom hatch and dropping into a screw conveyor located underneath that will transport the cooking ingredients out to the next step of the process (i.e. disposal or drying with Coctio SHS dryer module).

¹ *see 'Gelatin Manufacturers Institute of America', "Gelatin Handbook", http://www.gelatin-mia.com/images/GMIA_Gelatin_Manual_2012.pdf



Consistent and efficient production

Coctio automation enables the consistent production of high quality broths using the Coctio method. Every batch is produced with precision and carefully controlled to repeatedly cook the desired taste, texture and clarity. As the cooking process is automated, little supervision is required during that stage of production. Planned carefully, 1 operator could run up to 6 cooker modules at a time.

Also, the automated extraction process of the raw materials is fast and allows rapid turnover:

1. after the cooking process, ingredients are extracted by opening bottom hatch which lets cooking remains drop into a screw conveyor that subsequently transports them to the next process.
2. rotating mechanism inside the cooking vessel facilitates the extraction of the ingredients.

Hygienic and environmentally friendly

Coctio's closed production solution **minimizes**

1. the need for heavy and costly building ventilation required with open cooking systems
2. smells that may create a potentially uncomfortable working environment
3. potential microbial contamination during cooking processes and storage
4. water waste by retaining water evaporation in cooking environment and recuperating steam water used in the heating process





Batch capacity

Size of Cooker	Standard size	Small size
Batch Size	4,500 litres	2,200 litres
Bone requirement per batch	3,000 – 3,500 kg	Approx. 1,800 kg
Water requirement	3,500 litres	2,000 litres

End-product BRIX level

Type of bones	Beef & Pork	Chicken	Fish
BRIX range	7 - 12	4 – 8	3 - 7

Indicative batch processing time

Type of bones	Beef & Pork	Chicken	Fish
Roasting & Loading	2 hours	a) 2 hours incl. roasting b) 30 minutes excl. roasting	30 minutes
Cooking	8 - 12 hours	6 - 8 hours	4 hours
Unloading	30 - 45 minutes	30 - 45 minutes	30-45 minutes
Total	12 - 15 hours	7 - 12 hours	5 - 6 hours

**Module equipment components**

Component description	Standard	Small
Closed cooking vessel (maximum pressure: 0,5 bar gauge)	✓	✓
3 separate steam jackets on sides and bottom designed to optimize convection (steam pressure: 3 bar)	✓	✓
Cooling jacket located at the top	✓	✓
Openable hatch at bottom and top	✓	✓
Rotating mechanism to facilitate removal of bones	✓	✓
Control valves	✓	✓
Automation that controls temperature, pressure, release of unwanted gas	✓	✓
Fat density sensor at exit pipe	✓	Optional
Glass pipe section at exit pipe to visualize product as it exits the tank	✓	✓
Screw conveyor under kettle to transport remaining ingredients	✓	✓
200-mircron filter between cooker and storage tank	Separate equipment	✓



Standard Size

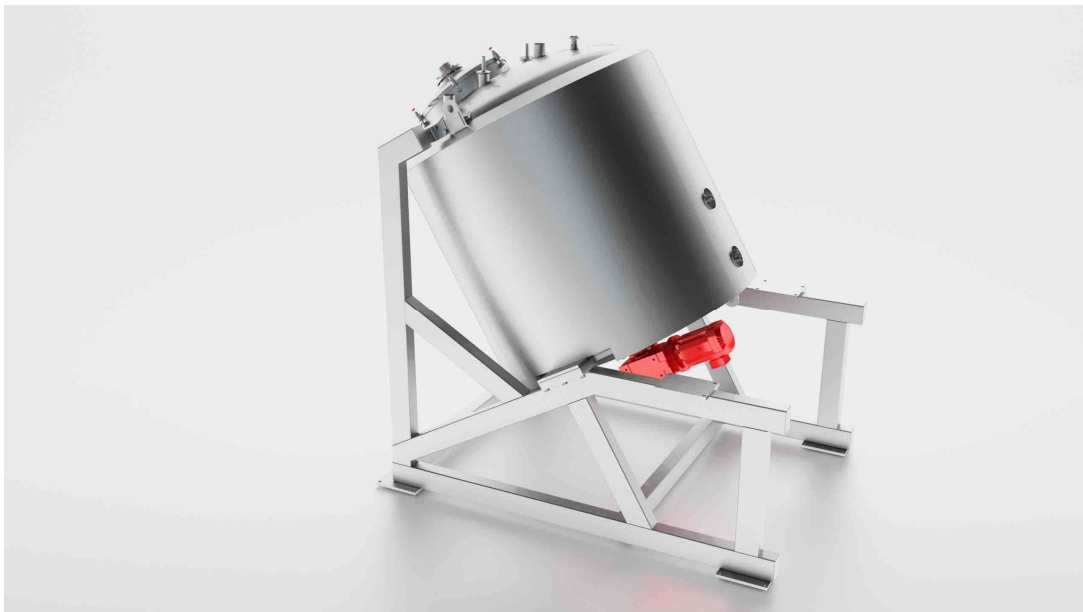
Standard size	Per cooker	2 cooker assembly
Height (mm)	4315	4315
Length (mm)	3061	6483
Width (mm)	2700	2700
Weight (kg)	3250 kg empty	8475 kg empty
Volume (m ³)	8,7 gross / 7,6 net	17,4 gross / 15.2 net
Steam requirement	Heating up: 500kg/hour/cooker (3bar) Maintain temperature: 50kg/hour/cooker (3bar)	
Electrical requirement	32A	25A / additional cooker





Small Size

	Per cooker module
Height (mm)	4050
Length (mm)	3000
Width (mm)	2500
Volume (m ³)	Cooker tank: 4300 litres
Steam requirement	Heating up: 170kg/hour/cooker (3bar) Maintain temperature: 20kg/hour/cooker (3bar)
Electrical requirement	4KW





Design standards

Hygienic design: EN 1672-2 : 2005

Mechanical design: EN SFS (European Norm- Finnish standard)

Electrical design: SFS-EN 50082-2, SFS EN 60204-1

If you have any questions, do not hesitate to contact us!

Kai Iiskola
Managing director
+358 40 556 3642
kai.iiskola@coctio.com

Mikko Rovamaa
Business Development
+358 40 152 6099
mikko.rovamaa@coctio.com

Tanja Immonen
Marketing and Export Services
+358 50 545 2519
tanja.immonen@coctio.com