

Kingdom of Morocco



Ministry of Agriculture
and Maritime Fisheries



Department of Maritime Fisheries
B.P 476, Agdal, Rabat, Morocco
Phone : (+212) 537 688 295 - Fax : (+212) 537 688 294
E-mail : contact@moroccanseafood.com
Web site : www.moroccanseafood.com



Moroccan Octopus

Buyer's Guide







Capital : Rabat
Area : 710 850 sq km
Littoral Length : 3500 sq km
Maritime area : 1,2 millions sq km
Inhabitants : 33,8 millions
Currency : Moroccan Dirham (MAD)
Local Time : UTC + 0; + 1 in summer





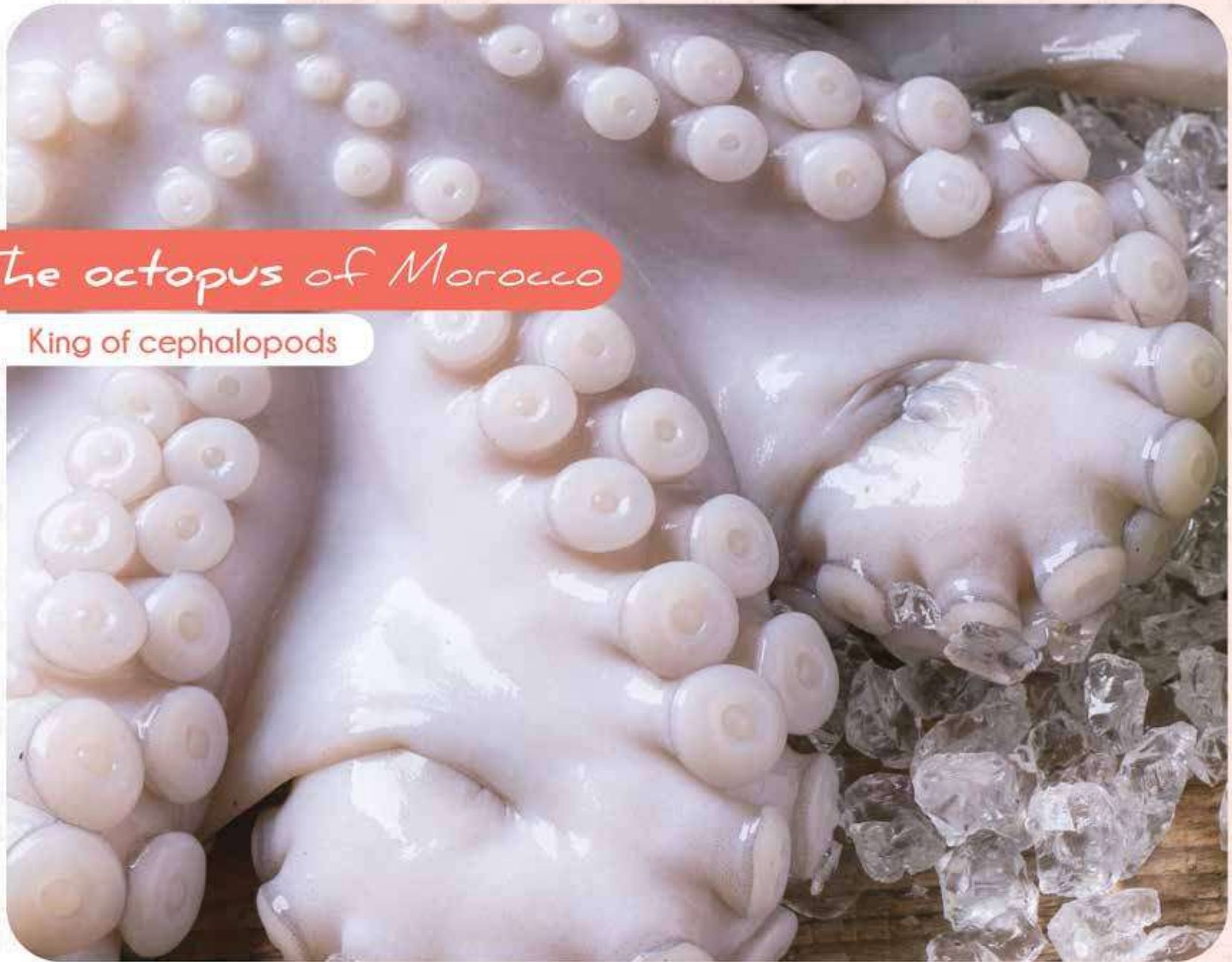
The background of the entire page is a close-up, high-resolution photograph of octopus tentacles. The tentacles are a pale, pinkish-white color and are covered in numerous small, circular suckers. They are arranged in a dense, overlapping pattern, creating a textured, almost abstract background. The lighting is soft, highlighting the moist surface of the skin.

Table of contents

The octopus of Morocco	P 06
Moroccan octopus	P 08
Life cycle	P 12
Geographical repartition	P 15
Fishing and exploitation	P 16
Valuation industry	P 20
Nutritional quality	P 24
Practical tips	P 27
Octopus recipes	P 30

The octopus of Morocco

King of cephalopods



➤ *Octopus*, a moroccan diversity

It is a treasure of the Moroccan fishing heritage, which occupies a high place among iconic species of the kingdom. The octopus remains among the most popular in Moroccan coasts, with two species, namely:

Octopus vulgaris

It is called octopus or common octopus, and it is a benthic species with two rows of suckers on the arms and a black ink pocket.

Its coat is muscular and can go up to **23cm** long. Its lateral arms are longer than the ventral and dorsal ones.



Eledone cirrhosa

It is also called white octopus, a benthic whose length of the coat reaches **16cm** long. Its arms possess only one row and it has no black spot on the coat.



Moroccan Octopus

Famous worldwide



The common octopus, *Octopus vulgaris* is a cephalopod that comes in second in marine animals as to his intelligence, after the dolphins. It leads a solitary life in rocky and sandy bottoms.

The octopus has cold blue blood because of the absence of the haemoglobin which is replaced by keyhole. it has the capacity to change colour according to changes in the environment for camouflage, he throws one or more ink clouds secreted in its black ink pocket to escape his pursuers.

The octopus also astonishes us by its three hearts, a principal or systemic heart, and two branchial hearts which pump the oxygenated blood through the gills.

It has also the capacity of growing its arms if some of them are severed.

› Systematic ranking

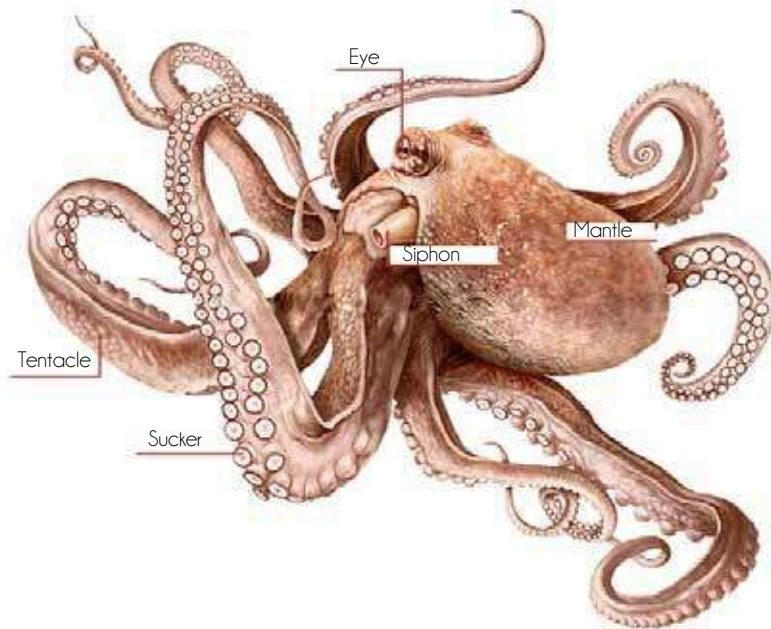
The common octopus (*Octopus vulgaris*) is a cephalopod that belongs to a suborder of Incirrina.

Local names	Octopus, Azaiz, Charlotte, Rottala
Scientific names	<i>Octopus vulgaris</i>
Branch	Molluscs
Category	Cephaloda
Family	Octopodidae
Type	Octopus

➤ Morphological description

The common octopus globular body narrows slightly at the junction with the head. It is characterized by the attachment of the arms (tentacles) to the head. It's got eight arms which are located around the mouth, it also has two rows of suckers.

The third arm to the right is the reproductive organ for the male, it comprises a gutter which serves to transmit spermatophore (hectocotylus arm). Its eyes and nervous system are exceptionally developed.



Legend

Siphon: muscular organ, tubular and conical that allows renewal of the water in the mantle cavity. It is used for breathing during contractions and weak movement during heavy contractions.

Mantle: formed by a thick tissue fold that protects its inner shell.

Eye: very developed organ of the vision.

Tentacle: muscular appendix, with two rows of suckers, for locomotion and grasping.

Sucker: adhesive disc placed on the inner face which serves for fixing and suction.

➤ All-terrain food

With an exceptional capacity to adapt, the octopus is considered a generalist omnivore: it proves that it is an opportunist, adapting its diet according to the availability of prey in its environment. Unlike other species, octopus diet does not differ according to gender, but rather to the size and sexual maturity.

The immature feed more on plankton crustaceans, while the sub-adults and adults tend to catch benthic crustaceans, cephalopods and fishes. Thanks to its mouth which has a radula and its mandibles shaped parrot beak, it is able to get the better of any shell.



Life cycle

Ephemeral life

In spite of its intelligence and its three hearts, the octopus has an ephemeral life. It belongs to the type of species called (semelparous), that reproduce only once in their lifetime. The octopus life cycle last one to two years and comes to an end with the reproduction. This reproduction can happen throughout a whole year on the continental shelf with highest concentrations in coastal areas. A phenomenon of aging after sexual reproduction affects the demographic structure of the population which contains only few individuals aged 2 to 3 years.

Spawning

The spawning occurs after a period which depends on the water temperature and season. This period seems to go from May to October mainly, with a maximum of two clutches. In Morocco, the main spawning occurs in the spring, across all the continental shelf.

The eggs are laid in groups on the bottom. The female covers the laying with her body and occasionally renews water around the eggs by relaxing the mantle. The duration of egg incubation time varies depending on the temperature, from 22 days at 25 °C and 125 days at 13 °C in the Mediterranean.



Hatching eggs (tied in clusters on the shell)



› The hatching and larval development

The eggs hatch and release planktonic larvae somewhat different from adults. They are pelagic and appear to feed mainly on crustacean larvae. Pelagic larvae reach the morphology of the adult where the total length is about 7 to 8mm. In the southern Moroccan Atlantic, larvae adjust to benthic life 40 days after hatching, after reaching a size of about 12mm.

The larval period is a critical phase in the life cycle of octopus. Primary production is highly dependent on environmental conditions; survival is linked to the predation of plankton species and the dispersion phenomena may have very important implications for the survival of the octopus. Subsequently, juveniles concentrate in strata shallow depths of less than 50m where they are recruited. The transition to benthic life is accompanied by a change in diet to cause a very rapid growth.

› Recruitment

Octopus reaches the recruitment phase in Moroccan waters in two main peaks. The main peak is between August and November and the minor one is in the spring. At a spatial scale, the distribution takes place near the coast during recruitment; the mature octopus stocks occupy homogeneously the continental shelf with a concentration in the southern area for slightly known reasons.

Stock	Jan	Feb	Mar	Apr	Mai	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Dakhla												
Cap blanc												
Dakhla												
Cap blanc												



Secondary Recruitment



Spawning



Main recruitment

* **Dakhla stock** : laying knows a peak between April and July, while recruitment appears in June and has a peak between August and October.

* **Cap Blanc stock** : laying has a peak between June and September and recruitment has a main peak between August and November and a secondary peak between April and May.

➤ The first maturity

Males reach sexual maturity early compared to females. The size at first maturity is about 8 cm mantle length for males and 12 to 13cm for females. Octopuses maturing and mature join the coast, performing movements that seem to be related to food or looking for shelter for triggering a new cycle.

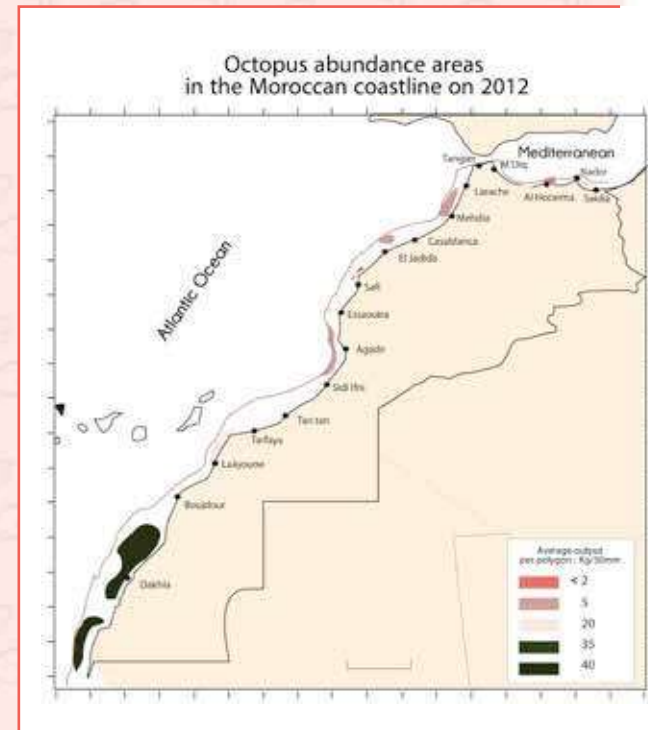
Geographical repartition

A strong concentration in the South of Morocco

The octopus has a very broad distribution area including tropical marine waters. Worldwide, we mostly find it in the Central Atlantic stretching from Morocco to Angola, in the Mediterranean and the Japanese waters. The importance of its existence in Morocco may probably be explained by the scarcity of potential predators (Serranidae, Sparidae) and favourable hydro-climatic conditions.

The octopus is generally on the very coastal land located between the coast and the upper limit of the continental shelf along the entire Moroccan coast, up to 200m. This mollusc is benthic, neritic and lives in all types of depths (rocks, caves ...) with a preference for soft sediments of sand to coarse. This preference would be linked to a food factor. The largest octopus concentrations are situated between Cap Boujdour (26 ° 00'N) and Cap Blanc (20 ° 50'N), especially between latitudes 23° N and 25° N.

North of Sidi Ifni, octopus knows a variable distribution and uneven depending on the bathymetry. In the Mediterranean, it is more abundant in Al Hoceima and in the east of Nador.



➤ Fishing and exploitation

Tailor made for a sustainable management

The history of the Moroccan cephalopod fishery started in 1976 by an offshore fleet mainly targeting the octopus (*Octopus vulgaris*), the cuttlefish (*Sepia hierradda*) and squid (*Loligo vulgaris*). In the late 90s, the artisanal fishery developed along with a seasonal specialty in the coastal fishery.

The attraction is that octopus fishing has led to the development of scientific expertise and technical and adequate operating instruments.

This allowed the emergence of a considerable octopus fishing activity, meeting the expectations of a demanding international clientele.

Moroccan production of octopus is around 50 000 tons, representing 3.6% of total production by volume and 28% in value.

➤ Fishing techniques

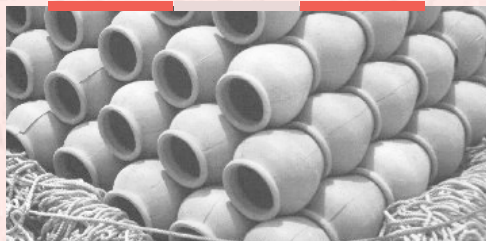
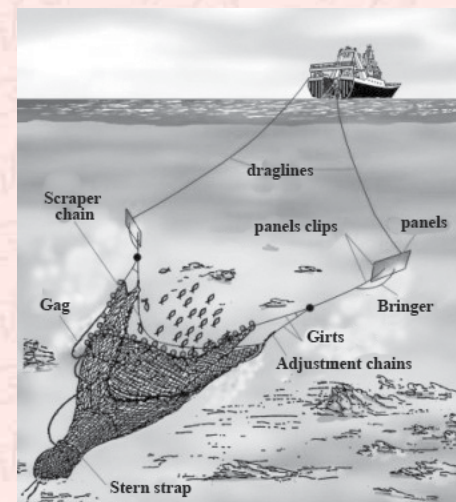
The octopus is caught by three segments, deep sea, coastal and artisanal; using different types of gear:

The bottom trawl for cephalopod fishing freezers and coastal trawlers:

The bottom trawl is a cone-shaped net towed by a ship. It is connected to the boat by steel cables called warps. Divergent panels located in front of the trawl allow its horizontal opening. Cables called arms link the trawl to the panels.

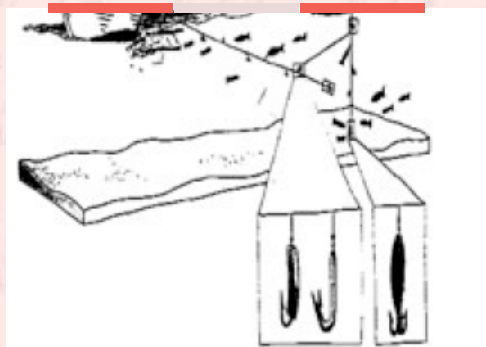
The vertical opening of the trawl is ensured by floats attached to the top rope, called back rope. A bead fixed on the front part of the lower layer keeps the trawl in contact with the bottom. This bead's shape and weight vary depending on the nature of the bottom.

The mesh pocket Recovery is suitable for the target species, it is 60mm for coastal and 70mm for cephalopod freezer, according to regulations.



Octopus pots: for artisanal boats

The octopus pot (Ghourraf) is an open cylindrical gear at both ends and placed on file on the seabed to trap octopus. The main period of fishing using this gear at the sea area of Dakhla region is between November and March. A boat drops an average of 300 octopus pots per tide.



ligging or kerracha

By the end of 1994, the octopus fishing activity saw the introduction of a device known locally as 'Kerracha' used because of its low cost and reduced risk compared to the octopus pot.

This is a fishing gear for fishing octopus, consisting of a rigid rod to which are attached several hooks. These hooks must not be arranged exclusively on the end of the rod in ring form a grapple.

➤ A development plan for octopus fisheries

The management plan of octopus fishery aims at preserving and recovering the stock of octopus, consolidating the investments made in the fishery to a level ensuring the profitability and sustainability of stakeholders, and maximizing socio- economic benefits that emerged from this fishery.

🐙 Octopus fishery development plan south of Sidi Lghazi

The current management system of the octopus fishery is organized in two fishing seasons, «winter and summer» and two periods of fishing for widespread throughout national coastline (spring and fall).

The exploitable overall quota is fixed for each fishing year following the National Institute of Fisheries Research (INRH) surveys and divided into three segments targeting this resource in accordance with the scale laid down in the 2004 matrix.





The 2004 Matrix is a platform for development, management and operation. It defines for each segment, the technical measures for this fishery, fishing effort, fishing grounds. The management measures, the country resumed conditions (overall TAC «Total Allowable Catches», quota per segment, fishing area, authorized gear ..) and periods of fishing judgment in the management unit of the fishery are established after review of the INRH.

Octopus fishery development plan north of Sidi Lghazi

To enable an efficient organization of the octopus fishing activity, and to ensure a sustainable and rational exploitation of the octopus fishery north of Sidi Lghazi and to fight against the illicit circuits, the Department of Marine Fisheries has set up since 2010, a set of management measures, including the determination of octopus catch limits per maritime district and stopping fishing along the national coastline, these measures were accompanied by other provisions to Fight illegal fishing.

> Valuation industry

High standards

The octopus is one of the most popular Moroccan species, its valuation is subject to very require- giant standards. The main purpose is to provide a product of very high quality. The valuation aims as well at preserving the safety of the product and its organoleptic and nutritional quality, and of course meeting all the national and international health requirements.

Octopus processing companies are approved by the Department of Maritime Fisheries and are subject to controls and regular monitoring. All these units adopt the HACCP (Hazard Analysis Critical Control Point) approach to assess and control hazards that threaten food safety. Freezing the octopus is the main activity of the Moroccan industrial; with some units that are more elaborate as the cooked or marinated octopus products.

> Octopus freezing

This activity involves 140 ground freezing units located primarily in Dakhla, Laayoune and Agadir and 226 freezer vessels, distributed between Agadir and Tan Tan. All these freezer units have freezing tunnels allowing rapid lowering of product temperature (below -18° C to heart) and negative cold rooms for storage. No additive or preservative is used in the octopus freezing process.

The octopus is frozen in blocks, trays or individually IQF (Individual Quick Frozen), the choice is usually done according to customer demands and also by size of octopus. The larger sizes are generally intended to block freezing.

<u>Commercial size</u>	T1 = + de 4,5 kg T2 = 3 à 4,5 kg T3 = 2 à 3 kg T4 = 1,5 à 2 kg	T5 = 1,2 à 1,5 kg T6 = 0,8 à 1,2 kg T7 = 0,5 à 0,8 kg T8 = 0,3 à 0,5 kg
----------------------------	---	--



Octopus freezing process

Reception

The octopus is received either fresh or frozen. A temperature control, organoleptic quality, transportation conditions and traceability documents are made.

Storing

Storing is done below 2°C for the fresh octopus and below 18°C for the frozen one.

Sorting - washing

A sorting and calibrating are done to rank octopus according to its size.

Evisceration

Evisceration is done to eliminate all the viscera carefully avoiding contamination of the flesh.

IQF Forming, block, tray

Forming in IQF comes just after mixing in a churn to give it a flower shape. Mixing is done with ice brine. Octopus in blocks or container does not undergo mixing.

Freezing

Freezing is done in tunnels at a temperature similar to that of the octopus heart -18 °C.

Glasurage

Glasurage is performed only for some products. It consists of dipping the frozen product in ice water to remove the layers of ice on the surface and protect the product against skin dryness. Glasurage rate is of 2 to 3%.

Packaging



➤ Other transformations

There are other units that produce other forms of octopus, either cooked or marinated.

This activity concerns only some units installed in Agadir and Casablanca.

Morocco among the top 3 exporters
of octopus

Morocco is one of the leading producers and exporters of octopus in the world, with an export volume of up to 44 000 tons.

What is the secret of success of the Moroccan octopus? The three essential elements for the success and notoriety of the Moroccan octopus are the sustainable management of the resource, the quality assured throughout the value chain and, of course, these sensory qualities related to the specific habitat in the Moroccan coasts.



Nutritional quality

A real treasure of nutriment



› Moroccan Octopus in menu

Appreciated by gourmets and recommended by nutritionists, the Moroccan octopus is simply a unique product. It's got a flavour that instantly takes you to the South Atlantic coast of Morocco, tasting provides you with true relaxation.

› Octopus is excellent for health

Did you know that the octopus is full of excellent nutrients for health, especially B12 vitamin and omega-3?

Regular consumption reduces the risk of colorectal cancer and myocardial infarction. It is also an ideal food for people concerned about their good shape, mainly because of the high protein content of his coat while being low in fat. The octopus is well recommended in a low calorie diet for light and balanced meals.

Octopus is rich in omega-3 fatty acids; especially eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) that promote healthy immune, circulatory and hormonal functions.

Moreover, it is also very rich in minerals and trace elements necessary for our balance. It is an excellent source of copper, selenium and B12 vitamin, and contains many other essential micronutrients to health.

Basic nutritional values of octopus are :

Weight		Raw octopus, 100 g
Calories		82 Kcal
Proteins		14,9 g
Carbohydrates		2,2 g
Lipids		1,04 g
	Saturated	0,22 g
	Mono-unsaturated	0,169 g
	Poly-unsaturated	0,239 g



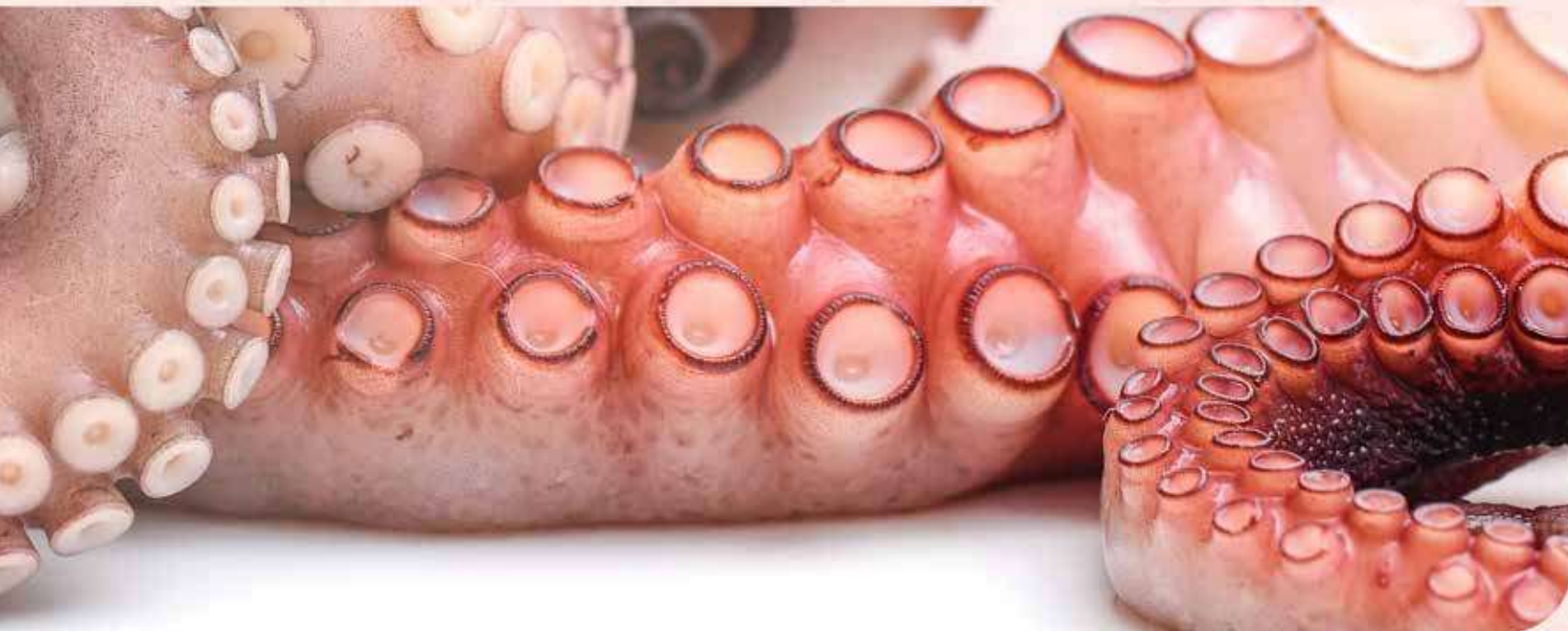
➤ Practical tips

To make life easier for you

Here are some practical tips for using, cooking and appreciating the Moroccan octopus

➤ To make a good choice of octopus

If bought fresh from the fishmonger, it should be shiny, slippery and non sticky; obviously its smell should not be unpleasant. It's preferable to choose small octopus.



› To prepare my octopus



1

Start by rinsing out the octopus many times.



2

After washing it properly, cut the octopus separating the head from the tentacles



3

Empty the head, reverse it like a glove, remove the internal nervous tissue, it peels off easily.



4

Reverse again and peel off the membrane that peels off easily.



5

Do the same with the tentacles. If the octopus is big you can skip this step or do it after a precooking.
Your octopus is ready to be cooked.

› To pound my octopus

Most cooks agree that freezing is the best way to soften. We recommend putting fresh octopus six to eight hours in the freezer before cooking, or to buy it frozen.

› To precook my octopus

In most recipes, the octopus is pre-cooked in a court-bouillon before cooking: it usually takes 15 to 45 minutes in boiling water because it depends on the size of the octopus and its hardness.

To ensure that the octopus is well done, you plant the tip of a knife or fork in the flesh: you can also start cooking in cold water, when it starts boiling cook for thirty minutes, remove from fire and cool in the water.

If you did not remove the skin of large octopus at the time of preparation, this is the time to do it.

You can also braise it in the pressure pan, without water, with a little olive oil, leaving it to cook covered for 20 to 30 minutes.

In all cases, we add little salt when cooking comes to an end in order not to harden the flesh.

After the first firing, the octopus is eaten immediately in salad or you cook it at your liking: stewed, roasted, baked ... All tastes can be pleased.



Octopus recipes

Please your buds

Octopus salad

Ingredients :

1kg of octopus,
3 tomatoes,
2 green pepper,
Olive oil,
1 lemon,
Parsley,
Salt and pepper.



Preparation :

1. Precook octopus (15 to 45 mn according to size and hardness) in a pressure pan.
2. Cut tomatoes and peppers into small cubes.
3. Prepare the dressing: oil, lemon, parsley, salt and pepper.
4. When precooked, cut the octopus into piece of 2 to 3 cm.
5. Mix all the dressing and refrigerate.
6. Serve chilled.

Octopus Tajine



Ingredients :

1 kg of octopus,
3 tablespoons of cooking oil,
2 onions,
2 peppers,
6 cloves of garlic, crushed,
4 small peeled tomatoes,
1 bunch of parsley,
1 teaspoon of spices for tajin
(Ginger, cumin, hot pepper),
1 teaspoon of paprika,
salt and pepper .

Preparation :

1. Cook the octopus in boiling water (put the octopus when the water is boiling), cut it into pieces after.
2. Fry in cooking oil raw peppers sliced. When they begin to be cooked, add the sliced onions. Then add the finely chopped garlic..
3. As soon as you feel the smell of garlic begins to cook (2min), add peeled tomatoes (Prior cut and crushed).
4. Add more paprika and spices for tajine, salt / pepper to the octopus. Let the sauce reduce to a third (Or more if you want a thick sauce), add little water if necessary and mix regularly.
5. At the last moment add a few sprigs of parsley.
6. Serve hot.

Couscous with octopus

Ingredients :

500 g of fine couscous*,
An octopus of 800 g,
25 g smen*,
A small glass of olive oil,
A grated onion,
2 green peppers,
2 zucchini cut into large pieces,
3 potatoes,
100g chickpeas soaked from the previous day,
100g fresh peas,
Green chillies, salt and pepper, 3 large tablespoons of tomato paste.



Preparation :

1. Boil the octopus in water with the bay leaf and cloves for about ten minutes, then cut into pieces and set it aside.
2. In the oil, fry the onion and add the tomato diluted with a little water, the octopus and chickpeas and leave that 10 minutes on the fire.
3. Add water, when it a boils immerse the vegetables: carrots, potatoes, peppers and finally peas.
4. Prepare the couscous and steam it twice. Monitor the level of the broth, adding water as needed and discarding the vegetables already cooked.
5. When the couscous is cooked, put a dab of smen and drizzle with sauce until you get the desired texture. Decorate with vegetables and octopus.

* Smen : Butter, salt and oregano (let it go rancid) * couscous : durum wheat semolina

Soup with octopus

Ingredients :

400 g fresh octopus,
2 teaspoons of olive oil,
1 tablespoon of coriander seeds,
A teaspoon of paprika,
2 cloves of garlic, finely crushed,
1 onion,
3 or 4 fresh tomatoes,

1 tablespoon tomato puree,
150 g of barley, salt, pepper and cumin,
3 tablespoons of vinegar,
1 tablespoon of capers,
½ diced of conserved lemon,
1 bell pepper cut into cubes,
Few coriander leaves.



Soupe with octopus

Preparation :

1. Wash, rinse and dry the octopus and cut it into small pieces.
2. Mix all the spices, garlic, onion, fresh tomato in a blender.
3. Pour the olive oil, octopus and content of the mixer, in a saucepan and cook for two minutes, then add the tomato puree.
4. Sprinkle a litre of hot water and cook for 20 minutes over medium fire.
5. Twenty minutes later, pour the wheat barley and cook another 20 minutes.
6. The soup should have a slightly thick consistency.
7. Once the wheat softened, add the conserved lemon, pepper and vinegar.
8. Adjust the seasoning with salt.
9. Garnish with some chopped coriander leaves.

