

Technical document relating to maximum sulphite levels for crustaceans, and their control.

1. Reminder on the rationale for treating shellfish with sulphites

The purpose of the treatment of shrimps and crustaceans with sulphites is to prevent blackening - or MELANOSE -, coloring due to the formation of melanin under the action of enzymatic reactions: it is mainly, but not exclusively, due to the action of tyrosinase which oxidizes free tyrosine in tissues. To avoid melanosis, it is necessary to create a reducing medium, which motivated the testing of many preservatives in the 1980s. Among these agents, only the salts of sulfur dioxide gave satisfaction. Following tests carried out by the French research institute (ISTPM, 1981), the sodium metabisulfite treatment method appeared to be the most efficient. As melanosis constitutes a very unfavorable criterion on the commercial level, the use of sodium sulphite was admitted in France by a circular of July 15, 1952, then authorized by the decree of September 13, 1982, and finally included in European regulations.

In most cases, the treatments take place from the production phase: during slaughter and before freezing for farmed shrimp, or on the deck of boats for fishing crustaceans (Norway lobsters in particular). Additional treatments (retreatments) may take place in certain cases when necessary.

The profession today faces the difficulties described below.

2. Inconsistency in setting regulatory thresholds for sulphites in crustaceans

2.1. Cooked shellfish vs raw shellfish

The thresholds set by Regulation (EC) No 1333/2008 for cooked crustaceans are lower than those set for raw crustaceans.

Size (number of pièces/kg)	Regulatory threshold for shrimps (mg/kg)		Regulatory threshold for Lobsters and Norway lobsters (mg/kg)	
	Raw	Cooked	Raw	Cooked
< 80	150	135	150	50
80 - 120	200	180		
> 120	300	270		

Table 1 – Maximum authorized sulphite content for crustaceans according to Regulation (EC) n ° 1333/2008

In practice, the cooking process does not lead to a decrease in the sulphite content, as has been demonstrated in studies. A raw and compliant product can therefore become non-compliant after cooking.

To overcome this regulatory inconsistency, some companies have implemented preventive measures:

- stopping systematic retreatment during the cooking process, for several years now; such treatments are occasionally reserved for batches sensitive to melanosis ;
- via their specifications, some processing (cooking) companies require their suppliers to provide raw materials with sulphite levels below the regulatory limits for cooked products.

However, it turns out that the use of sulfites in too low concentrations does not always achieve the expected technological effect, i.e. prevention of melanosis. This prevention is essential to meet the demands of consumers and customers, who do not want products with melanosis because of their appearance, and thus minimize food waste.

For lobsters and Norway lobsters, the situation is even more critical, because the regulatory limit varies from simple to triple (150 ppm for raw versus 50 ppm for cooked).

2.2. Different thresholds depending on the size

The regulatory sulphite thresholds for shrimp, recalled above in Table 1, vary according to the size of the products. Large sized pieces are subject to a lower maximum allowable content than small sized shrimp. With hindsight, this difference does not seem justified today.

2.3. Harmonization of thresholds

In view of the above, it would seem relevant to harmonize the regulatory sulphite thresholds for raw and cooked crustaceans in order to simplify the regulations and make them more consistent with the reality observed in processing companies. As such, we propose the following regulatory thresholds for sulphites:

- 150 mg / kg for raw and cooked lobsters (Palinuridae) and Norway lobsters (Nephropidae);
- 200 mg / kg for raw and cooked shrimps (Peneaidae, Solenoceridae, Aristeidae).

Our members are particularly attached to the health of consumers, these modifications would make it possible to maintain a satisfactory level of health security for the consumer.

According to the opinion issued by EFSA in 2016, the Tolerable Daily Intake (TDI) was set at 0.7 mg / kg of body mass. From this TDI, maximum amounts of crustaceans consumable per day were calculated for different body masses and maximum sulphite levels in crustaceans. The results which are summarized in Table 2 show that the maximum consumable quantity per day is satisfactory for the thresholds that we propose, including for high theoretical consumption quantities, which, in practice, would be far from being reached within the framework. of everyday consumption.

Body weight of the consumer (kg)	Sulfite dosis ingestible for a TDI of 0,7 mg/kg of body weight (mg / day)	Ingestible shrimp meat quantity for a MAQ¹ of de 200 mg/kg (g/ day)	Ingestible Lobster or Norway Lobster quantity for a MAQ of 150 mg/kg (g/ day)
25	17,5	87,5 g	116,5 g
50	35	175 g	233 g
70	49	245 g	326 g
100	70	350 g	467 g

Table 2 - Amounts of ingestible crustacean meat according to the weight of the individual for the requested AMQs

¹ QMA = Quantité maximale autorisée

Body weight of the consumer (kg)	Sulfite dosis ingestible for a TDI of 0,7 mg/kg of body weight (mg / day)	Number of ingestible shimps of size 40/60 pieces/kg for a MAQ of 200 mg/kg	Number of ingestible Norway lobsters of size 20/30 pieces/kg for a MAQ of 150 mg/kg
25	17,5	8 à 9	7 à 12
50	35	17 à 18	14 à 23
70	49	24 à 25	19 à 33
100	70	35	28 à 46

Table 3 - Number of ingestible crustaceans according to the weight of the individual for the requested AMQs

Data on shrimp consumption in France: estimate of the French consumption of shrimp sold freshly cooked:

Estimated volume: around 55,000 tonnes (a)

Penetration: 45% of households (b) or ~ 30 million consumers

Average consumption per consumer: 1850 g / year or 5 g / day

On an assumption of 12 shrimp meals per year (once / month) for average consumers (non-consumers excluded) this would result in 155 g / meal.

(a) Source ADEPALE - professional estimate

(b) Source FranceAgriMer - KANTAR World panel 2018 consumer panel

The comparison of consumption data and the maximum ingestible quantity with the highest contamination thresholds, shows that the safety margin is very appreciable.