GSICA
THE ITALIAN SCIENTIFIC GROUP
OF FOOD PACKAGING

The Korean Society of Food
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SLIM 2012
SHELF LIFE INTERNATIONAL MEETING

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In cooperation with

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THE MARKET FOR ALTERNATIVE SPECIES OF SHRIMP PROCESSED TO INCREASE THE SHELF-LIFE

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ABSTRACT

A reason that has put at the center of attention the crustaceans has been the growing demand for fast food products to which these fishes are particularly suitable. This paper proposes for the first time the use of the species of shrimp *Parapeneus longirostris* of the Mediterranean sea to realize precooked trays of V range and analyze the evolution of the process of melanosis with respect to commercial products in general coming from the Atlantic Ocean.

Key words: *Parapeneus longirostris*, shelf-life (SL), market, PPO, precooked.

INTRODUCTION

In recent years, eating habits have privileged the "pharmafood" products to prevent any diseases. Today the world production of shellfish has increased, recording since the 1980s, an unprecedented boom. This highlights also the dependence of European Mediterranean States from third countries, in particular in other geographical areas, although crustaceans have minor impact on the level of Community trade. Since under this trade category, the total production of shrimp from fish in the Mediterranean Sea (especially those of Italy) proved to be insufficient for a increasing Community market demand. It is of some interest to understand the trends in trade flows in the Mediterranean area, in which the greater supply of such products (fresh and/or "processed") for the Community markets takes place

and the *Parapenaeus longirostris* feeds traffic flow represented mostly by "transformed" (frozen) product, and the corresponding data that track the trend will be examined here using the international official statistical source of FAO. The aim of the working group is to contribute to the development of Mediterranean fisheries through research and technology transfer of new high-value production processes aimed at sustainable exploitation of fisheries resources and the maximization of the value of the fish. This paper proposes for the first time the use of the species of shrimp *Parapeneus longirostris* of the Mediterranean and analyze the evolution of the process of melanosis with respect to commercial products in general coming from the Atlantic Ocean. The enzyme polyphenol oxidase (PPO) is responsible for the process of melanosis in shrimp extracts of *Parapeneus longirostris*. Numerous studies aim to reduce the effects of melanosis using a wide range oftreatments inhibitor (Buta *et al.*, 2001; Liao *et al.*,1988; Chinivasagam *et al.*, 1998). It is shown that the effectiveness of the treatments is influenced by the type of the species of the crustacean and the stage of intermuta to which they face.

MATERIAL AND METHODS

The *Parapenaeus longirostris* was caught with bottom trawls on sandy-muddy bottoms at depths between 50-500 meters of the Tyrrhenian coast. Shrimp were selected with a size of 16-17 cm, very clear color tending to pink-orange and were discarded those who had trauma from capture. Each sample had a very pronounced rostrum with seven dorsal teeth. The enzymatic analysis included the determination of tyrosinase spectrophotometrically in according to the method proposed by Leonard *et al.* (1985). The enzymatic activity was expressed as the change in absorbance at 490 nm per minute per mg protein. The market analysis of *Parapenaeus longirostris* (frozen), and corresponding data that trace the trend will be examined here using the official statistical source FAO International.

RESULTS AND DISCUSSION

Fig. 1-a shows the enzymatic activity of tyrosinase in commercial samples ofshrimp currently available on the local market of the Mediterranean. The heat treatment (blancing) suffered by the minimally processed product with Tropical Shrimp has completely inhibited the enzyme activities differently to those obtained

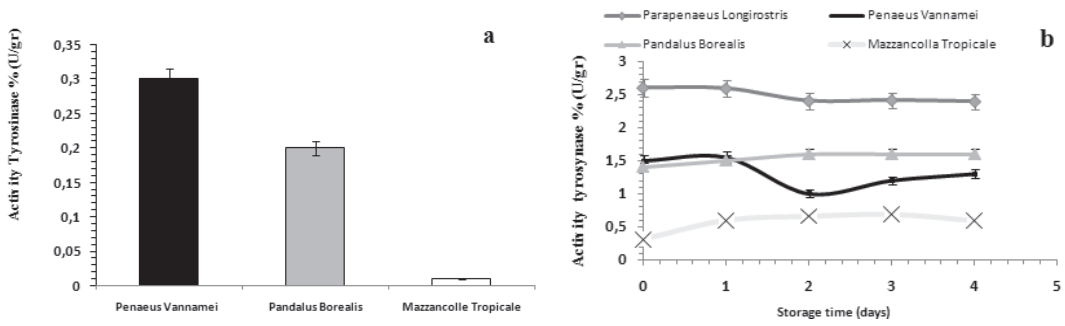

Fig. 1 - Activity of tyrosinase in commercial samples (a) and on different species during the freezing (b).

with *Penaeus vannamei* and *Pandalus borealis*. In order to analyzethe products currently available on the market trends have been studied regardingthe traffic streams of the crustaceans. In the Mediterranean basin is realized intensive trade in frozen Crustaceans, largely as a result of trends that characterize the group "shrimps and prawns".

In reality, according to the FAO trade consists in mainly movements in import, so much so that the trade balance of all countries bordering the Mediterranean Sea, was negative; as it is also shown in the balance normalized. This negative balance, however, in the evolution intervened in the last decade, as can be observed from Table 1, appears to be increasing by +37% considering all Crustaceans, +46% examining the group the "shrimps and prawns". From the examination of the exposed data, the consumption of "shrimps and prawns" frozen in the Mediterranean would be realized therefore with product of other origin, for the most oceanic. From market analysis can be seen that however, for certain species belonging to this large group of crustaceans, the production obtained in the Mediterranean, would feed streams of traffic over the same area of the Mediterranean. In this situation the species *Parapenaus longirostris* is found, in fact the amount of frozen product prevails on its trade balance, a situation that occurred mostly during the decade examined, in fact, against a steady increase in the product realized there is a loss in the trade balance. In particular, *Parapenaus longirostris* captures in Mediterranean Sea, always with reference to FAO statistic, is mainly used fresh, de facto,

Table 1 - Development of trade Crustaceans, frozen, and frozen shrimps and prawns in the countries of the Mediterranean Sea.

Commodity	**2001 - 2003 Thousand ton**	**2004 - 2006 Thousand ton**	**2007 - 2009 Thousand ton**
		Import	
Crustaceans (a)	391.874	467.267	526.661
	100	119	134
Shrimps, prawns (b)	256.778	322.292	362.354
	100	126	141
(b)/(a)*100	65.5	69.0	68.8
		Export	
Crustaceans (a)	71.367	75.465	88.682
	100	106	124
Shrimps, prawns (b)	45.183	46.995	54.445
	100	104	121
(b)/(a)*100	63.3	62.3	61.4
		Trade balance	
Crustaceans	- 320.507	- 391.802	- 437.979
	100	122	137
Shrimps, prawns	- 211.595	- 275.297	- 307.909
	100	130	146
		Balance Normalized (%)	
Crustaceans	-69.2	-72.2	-71.2
Shrimps, prawns	-70.1	-74.5	-73.9

Table 2 - Distribution of production Parapenaus longirostris in the countries of the Mediterranean Sea (our calculations based on FAO statistic).

Commodity	2001 - 2003 Thousand ton	2004 - 2006 Thousand ton	2007 - 2009 Thousand ton
Capture production	30.722	40.479	42.637
	100	*132*	*139*
Frozen production	15.139	14.728	17.851
	100	*132*	*139*
frozen/captured (%)	49.3	36.4	41.9
Import	15.716	13.457	11.091
	100	*86*	*71*
Export	3.493	3.077	1.881
	100	*88*	*54*
Trade balance	- 12.223	- 10.379	- 9.210
	100	*85*	*75*
Balance Normalized (%)	-63.6	-62.8	-71.0

only 40% is the share of the production of frozen product. Indeed, as shown in Table 2 between the 2001/2003 and 2007/2009, the catches of 30.7 thousand tons, coming to 42.6 thousand tons are brought, the frozen product frozen from 15.1 thousand to 17.9 thousand tons. At the same time period, the trade balance gradually decreases from 12.2 to 9.2 thousand tons.

In Fig. 1-b shows the relative activity of tyrosinase minimally treated with 4 different fish species. The tyrosinase showed a continuing increase in the species Pandalus Borealis until the third day of storage that we set as the limit of shell-life. The activity of tyrosinase Parapeus Longiristris, even high than the other species, has been maintained constant in time. It is observed that the main alterations detected in the trays minimally processed are related to the chromatic variations and loss of texture or juiciness. The main issues related to engineering and manufacturing technique are related to tuning and optimization of blancing and portioning of shrimp. The technology used in this preliminary study does not significantly impede the physiological processes of melanosis previously identified as the main qualitative issues. In conclusion, from the data obtained, the species Parapeneus Longirostris could be used to obtain minimally processed and pre-cooked shrimp products able to increase the shelf-life (SL) as an alternative to commercial products.

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