

Consumer propensity to purchase non-chemical treated crustacean product: a case study of Italy

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Abstract. The present research was focused to study the propensity of consumers to purchase crustacean product without chemicals. Among non-chemical technologies (NCTechs), modified atmosphere packaging (MAP) has increased steadily in recent years at the global stage. Inevitable at consumer end, the application of non-chemical preservation to crustacean product may likely add to eventual selling price. It is needful however to appreciate/understand the extent to which consumers' associate with any given MAP crustacean product. This necessitates the present study investigating the propensity of consumers to buy non-chemical treated (MAP) crustacean product via case study using Italy as a reference point. Study locations included Palermo, Naples, Rome, Milan and Turin. In total, 1540 respondents participated. The results showed that, going up to at least once a month, more consumers demonstrated their willingness to purchase the MAP crustacean product without chemicals. Beyond everyday up to at least once a month, the willingness to purchase non-chemical product increasingly varied among a considerable number of usual and unusual consumers. In addition, the willingness to pay for the non-chemical product greatly varied across the studied locations.

Key Words: modified atmosphere packaging, crustacean product, willingness to pay (WTP), periodicity of purchase, non-chemical preservation method.

Introduction. Crustaceans are among economical important seafood products. The nutritive value includes rich source of protein, resource for ample amounts of long chain polyunsaturated fatty acids (LCPUFAs or Omega-3) hence, very beneficial for health and wellbeing of global populace (Bono et al 2012a, b; FAO 2014; Okpala 2014a, b; Okpala & Bono 2015; Okpala 2015a, b, c; Carlucci et al 2015). Drivers that facilitate the consumption of fishery products include eating habits, sensory likings and health benefits (FAO 2014; Carlucci et al 2015). Moreover, the best quality of crustaceans are at point of harvest. Postharvest onwards, the quality of product declines inevitably given the deteriorative changes (Bono & Badalucco 2012; Okpala et al 2014; Okpala 2015a, b; Okpala & Bono 2015). Resolving this has brought about the increasing use of preservative treatments such as 4-hexylresorcinol as well as sulphite agents (Gonçalves et al 2003; Montero et al 2004; López-Caballero et al 2007; Nirmal & Benjakul 2011). On the other hand, modified atmosphere packaging (MAP) is among non-chemical technologies (NCTechs) is increasing steadily in recent years at the global stage. Fundamentally, it involves the modification of gas mixtures within the packaging headspace, practically aimed to improve/prolong the shelf of fishery products at controlled temperatures (Ruiz-Capillas & Moral 2001; Nirmal & Benjakul 2011; Bono & Badalucco 2012; Bono et al 2012b; Messina et al 2015; Bono et al 2015). Furthermore, many seafood products have been subject to MAP combined treatments. Examples include chilled and gutted hake - *Merluccius merluccius* (Ruiz-Capillas & Moral 2001), stripped red mullet - *Mullus surmuletus* (Bono & Badalucco 2012), deep water rose shrimp - *Parapenaeus longirostris* (Gonçalves et al 2003; Bono et al 2012b), common dolphin fish - *Coryphaena hippurus* (Messina et al 2015), lingcod fillets - *Ophiodon elongates* (Duan et al 2010), giant red shrimp - *Aristaemomorpha foliacea* (Bono et al 2015), as well as Pacific white shrimp - *Litopenaeus vannamei* (Nirmal & Benjakul 2011).

There is paucity of relevant information regarding the propensity of consumers to purchase non-chemical (MAP) seafood product. Importantly, how consumers perceive

these preservative treatments are often neglected. Practically, it is of great essence to improve our understanding about consumers' purchasing behaviour not only towards the fishery product but also towards these non-chemical preservative methods as this would help in the development as well as to allow for an effective and more robust market and policy strategies. Besides, treating crustacean products with any of these non-chemical preservative methods, which are aimed to improve quality and shelf life, would as a consequence, increase the eventual selling price at the expense of consumer end. Schönfeldt & Hall (2012) indicated that consumers ought to have the knowledge as well as means to make informed food choices. Considering this, the authors of this work developed keen interest to know how willing consumers' would be in purchasing crustacean product without chemicals. From standpoint of the consumer, to effectively appreciate willingness to purchase this new product would require additional knowledge and skills. In addition, to improve the consumers' ability to consume fishery product could be associative of their respective experiential knowledge (Carlucci et al 2015). Essentially, the personal involvement of consumers with respect to seafood require additional investigations considering its impact on consumption as well as diverse interventions (Carlucci et al 2015). In addition, stakeholders of fishery sector have a role to play to help consumers appreciate not only the applications of the emerging food technologies but more so the processed fishery products without chemicals. In this context, authors' of the present research were interested to study the propensity of consumers to purchase crustacean product without chemicals. Specifically, Italy will be used as a case study.

Material and Method

Location of study. Adult consumers from 18 years and above targeted five representative locations of Italy namely: Palermo, Naples, Rome, Milan and Turin. Prior participation, informed consent was discussed with participants whom were assured that information provided are treated with high level of confidentiality.

Research instrument and validation. Aimed to assess consumer willingness to purchase crustacean product without chemicals, the research instrument developed by authors was based on their knowledge and experience in the fishery endeavour. The main questions included the overall propensity to buy this new product according to consumer types (usual and unusual), thereafter according to locations, the latter two aspects considering periodicities of purchase. Authors and respondents neither had direct nor indirect contact during the conducted study because the actual interviews was delegated to the professional services of S.W.G. S.p.A. (Trieste, Italy) as well as Demopolis S.r.l. (Palermo, Italy) who also validated the study instrument. Importantly, the responses of validation did not form part of the conducted study.

Data collection and analysis. S.W.G. S.p.A. (Trieste, Italy) interviewed the participants using computer assisted telephone system via trained interview panel. Reported in agrofood based qualitative studies, the use of computer assisted telephone method is believed to reveal satisfactory results (Migliorati et al 2015). The study was conducted over an 8-week period. The interview panel underwent specific training using questions to be presented to participants. Consistent with Migliorati et al (2015), the interview panel adapted random digit telephone number dials to reach as many participants at different times of the day. If first attempt failed, the least of three attempts were applied. Since participation essentialized the age of 18 years and above, if the eligible person was unavailable, specific time of when to call back was requested. In adherence to anonymity, all respondents' feedback were strictly coded. A total of 1540 respondents participated. Throughout this report, the results are shown in terms of percentages.

Results and Discussion. The objective of this work was to study the propensity of consumers towards the purchase of crustacean product without chemicals using the

Italian scenario. But prior to the propensity to purchase, it is important to underline that the willingness to pay (WTP) for seafood product would be underpinned by consumer preference with respect to cognitive/rationale and symbolic/emotional rankings. Of this context, and in particular the choice of frequency and quantity of consumption of fishery product, there may arise personal and situational factors that could potentially affect the behavior of consumers particularly at the purchase of any given fishery product (Carlucci et al 2015).

Figure 1 shows the overall propensity to purchase crustacean product comparing chemical and non-chemical preservative methods. The response to propensity for non-chemical product appear significantly higher from frequencies of purchase from every day up to once a month compared to chemical. Notably, the decreasing response to propensity observed for non-chemical for the remaining lower frequencies (from once per 2/3 months up to once per year) of purchase can be attributed to a shift of people from these latter (lower frequencies of purchase) categories unto the earlier ones (higher frequencies of purchase). Such propensity shift from the less to more frequent under the quantitative viewpoint could in absolute terms exemplify the increase in frequency of purchase of crustacean product without chemicals. Through the use of the abovementioned assumption(s), plausible purchase estimations could be quantified. A deeper insight into this scenario may suggest consumers making use of their knowledge, skills as well as self-confidence if any impact on the anticipated consumption frequency are to be realized (Birch & Lawley 2012, 2014; Carlucci et al 2015; Pieniak et al 2010).

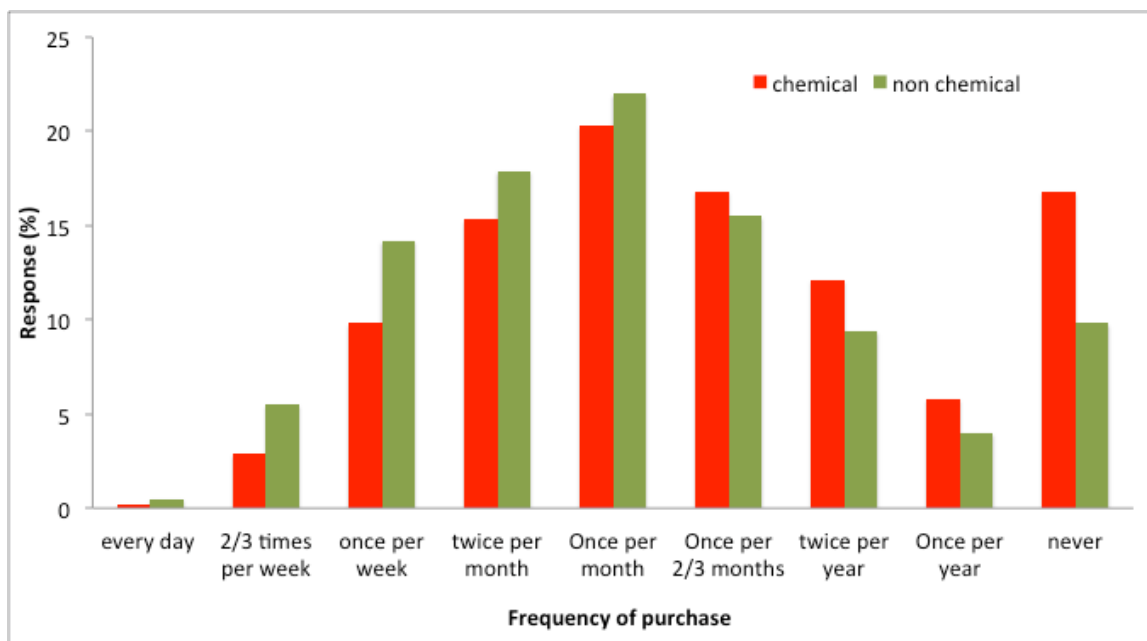


Figure 1. Response-frequency distribution of propensity to purchase crustacean product comparing chemical and non-chemical preservative methods.

Besides, the overall propensity to purchase crustacean product without chemicals of Figure 1 is not the same when usual and unusual consumer types are considered. Figure 2 shows the propensity to purchase these products comparing the usual and unusual consumer types (in terms of percentage) as function of frequency of purchase. This frequency of purchase differs considerably between usual and unusual consumers. Clearly, both consumer types indicated that they would not purchase (response = zero) the new preserved product every day. Subsequently, between periodicities of twice/thrice a week up to at least once a month, the propensity to purchase the new product increasingly varies across the consumer types such that those of usual increased rapidly compared with those of the unusual. However, there appeared opposing trends between the periodicities of purchase of at least once per month and once every two months. Specifically, the propensity for the usual significantly decrease with rather rapid increases

for unusual consumers. Across periodicities of once every two/three months up to once a year, the propensity to purchase the new product relatively decreases among consumer types, very gradual at those of usual compared with the more rapid decreasing trend of unusual. Comparing consumer types, the frequency of purchase from once a year up to never remained rather unchanged at usual but would increase towards the 20% mark at the unusual consumers. This could be correlated to the presence of a small group of respondents probably due to ethno-cultural reason do not consume crustacean hence, appear non-sensitive to the potential availability of new product without chemicals.

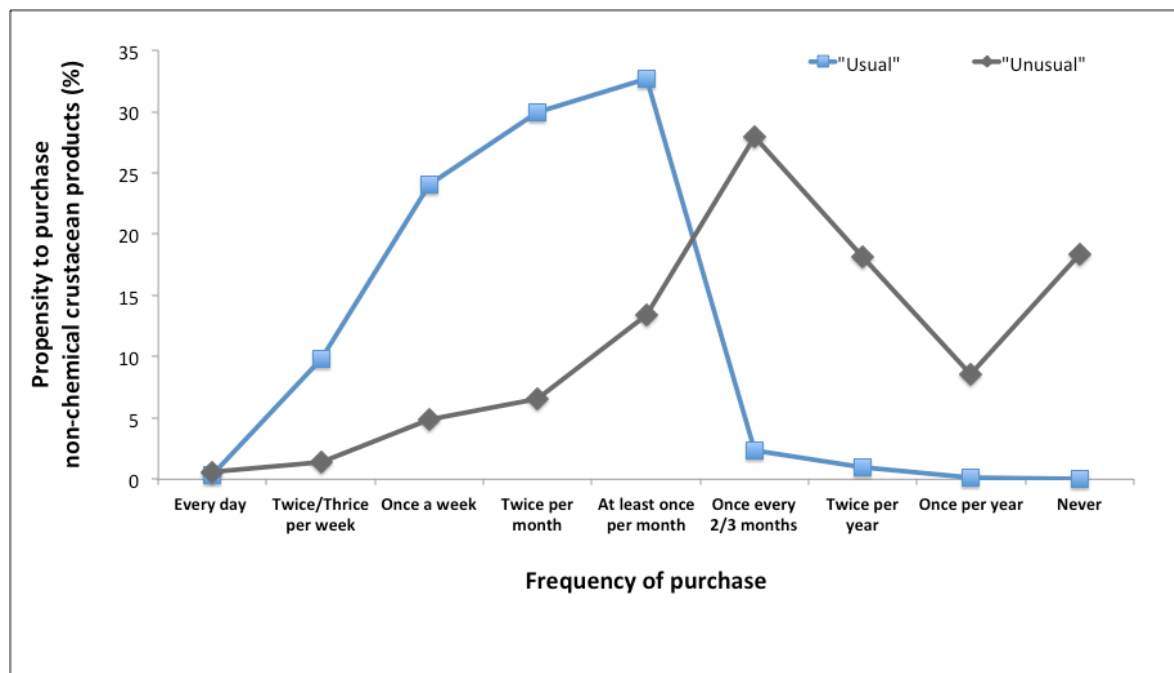


Figure 2. The propensity to purchase non-chemical (MAP) crustacean product between usual and unusual consumers as function of frequency of purchase.

Figure 3 details the propensity to purchase non-chemical crustacean product with frequency of purchase as function of the studied locations of Palermo, Naples, Rome, Milan and Turin. At frequencies of purchase of twice/thrice per week, up to twice per week, respondents of Naples and Palermo strongly indicated the willingness to purchase the non-chemical crustacean product, less those of Rome, Milan and Turin. However, a differing response particularly at those of Milan, Rome and Turin suggest to purchase the new product at least once per month. Yet, as the frequency moved from once every 2/3 months up to once per year, respondents willingness to buy the new product would vary decreasingly. It can be that the abovementioned increases may identify with a particular subgroup of respondents that could be included in usual consumers. On the contrary, the subsequent decrease in propensity that appeared from once every 2/3 months up to once per year could be attributed, as previously above-stated, to a shift of people from these latter (lower frequencies of purchase) categories unto the earlier ones (higher frequencies of purchase). The increases found at Palermo and Naples appear unsurprising given that these locations are either found near coastlines and some related ethnological background or fishery culture/tradition could affect the behaviour and response of the respective consumers. Conversely, respondents of internal locations such as Turin, Rome and Milan would appear with less emphasis in this direction. There would probably have increased patronage to ready-to-cook seafood products.

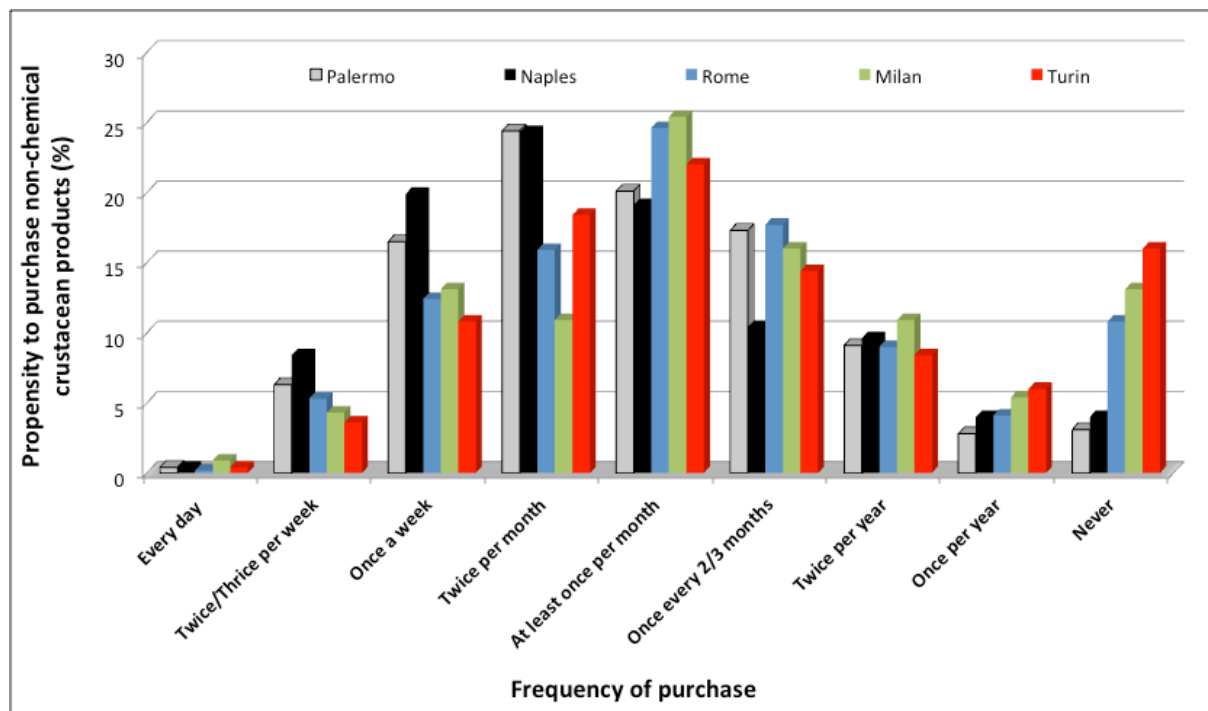


Figure 3. Response-frequency distribution of propensity to purchase crustacean product comparing chemical and non-chemical preservative methods as a function of the studied locations.

For emphasis, the crux of this study was to elucidate the willingness of consumers to purchase non-chemical treated (MAP) crustacean product and this objective is hereby achieved. Besides, if this new product is appropriately preserved and packaged and then, shelved on the supermarket, there is a high chance that it would physically appear like those of ready-to-cook ones, the latter dominant at various supermarkets around the globe. Thus, given that this non-chemical product would greatly appeal to consumers alike as this case study tends to suggest, the use of supermarket could be an avenue to project the product. According to Santulli & Modica (2009), supermarket chains are nowadays becoming the fast dominant force for fishery production as they are easily accessible and with high capacity to satisfy consumers' pressing needs, making seafood products available with consistency, quality and size.

Conclusions. MAP – being situated among the NCTechs, stands highly promising and showcases itself an attractive chemical-free substitute and from the consumers' viewpoint. The motivation to undertake this case study was necessitated by the keen interest to understand the demonstrated willingness of either usual or unusual consumers to purchase non-chemical treated crustacean product. Regardless of type, consumers, would appear more in favor of the non-chemical preserved product and at different periodicities. Across locations, the propensity to purchase this new product showed noticeable differences that could be related to the respective root culture, tradition as well as values of respondents as well as population densities/living standards of the studied locations (Palermo, Naples, Milan, Rome and Turin).

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