From an individual approach to a Cluster strategy

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Portuguese agri-food sector, as well as in Europe, is characterized by being dispersed and pulverized. Nevertheless, in Portugal, the Food and Beverage Industry (F&B) has the highest rates in terms of turnover of the manufacturing industry - corresponding to 20% (INE - 2009). This sector is a key vector of the economy, contributing the most to the Gross Domestic Product (GDP). Due to the relative small dimension of the domestic market, and its subsequent small scale, companies are obliged to turn to international markets in order to be more competitive.

In the last decades, Portuguese F&B was not able to achieve the desirable stages of self-sufficiency, competitiveness and technological sophistication in the value chain, either by the fragile linkage between primary sector and manufacturing industry, in order to boost the national added value, or by the reduced cooperation between primary sector, manufacturing and academia. All the above, enabled an efficient answer to the national and international demand to better compete in a globalized market.

In order to accomplish the challenge of overcoming this situation, PortugalFoods in a partnership with PricewaterhouseCoopers (PwC) and in a closed cooperation with other entities of the sector, such as sectorial associations, food companies, government, and interface entities, built up a joint strategy to support the internationalization of the Portuguese F&B.

In this study, seventeen different sectors in the food field were analysed, in which the meat and meat products industry was included.

Firstly, a diagnosis of the meat and meat products national industry was carried out by analysing its representativeness in the food sector. This subsector comprises a total number of 227 companies, involving 9,617 workers, generating a GDP of 187 M€ and a turnover of 1,381 M€, showing a relative relevance in the food sector. The evaluation of the balance of trade reveals that the sausages and similar products have the highest performance (positive), both in value and volume, showing an increasing growth of the exports and, on the other hand, a maintenance or decreasing of the imports. Remaining subcategories among the meat and meat product, present a contrary effect (negative), showing a large external dependency of the international markets.

The analysis of the index of revealed comparative advantage expresses that Portugal has competitive advantages in sausages and similar products, in markets such as Europe, with special incidence in Spain and UK, Africa (Angola) among others. Additionally, a comparative analysis was carried out focused on the major importer markets, allowing to identify markets with good perspective of exports.

Three strategic priorities and specific goals were raised from this study:

• Production – policies to support national production, inducing positive effects in meat industry provision, stimulating competitiveness.

• Positioning – reinforcement of the subsector by differentiation and innovation, indexing to its origin, tradition, quality and authenticity, based in sustainable production and exploring the uniqueness of Portuguese meat products, supported by knowledge and Research & Development.

• Diversification – reinforce the Portuguese presence in European markets, with no constraints regarding imports of this type of products; and striking in emerging markets, evaluated as a priority due to its potential of growth in a nearer future.
Diagnosis and detection of swine zoonotic diseases and pork hazards

A Multiplex PCR Assay for Detection of *Salmonella* sp., *Listeria monocytogenes*, *Campylobacter* sp., *Staphylococcus aureus* and *Escherichia coli*

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**Abstract**

Contaminated food and water are usual vehicles for bacterial pathogens transmission. According to EFSA they promote foodborne illness. *Salmonella* sp., *Campylobacter* sp., *Listeria monocytogenes*, *Escherichia coli* and *Staphylococcus aureus* are the most foodborne pathogens reported. Bacterial contamination levels remain at high level, particularly in Europe, despite regulatory efforts to address the situation. The need of new diagnostic tools is crucial. Ideally, tests easy to perform, enough accurate and low cost. The present work talk about optimization of a multiplex PCR (mPCR) test used to detect 5 foodborne contaminants: *Salmonella* sp., *Campylobacter* sp., *L. monocytogenes*, *E. coli* and *S. aureus*. For specificity evaluation, 5 PCR amplification reference DNA were used respectively: 103bp, 174bp, 151bp, 121bp and 136bp. No amplification was observed when primers and DNA from mismatching species were subject to PCR amplification. Furthermore, the sensitivity of this assay was evaluated by using serial dilutions of DNA extracted from clean 1CFU culture of each pathogen. This assay will be optimized by using Real-Time PCR and DNA plasmids containing a single copy of each gene, towards a new and rapid test for food and food manipulated surfaces control. Results are promising and allow us to postulate the design of an accurate and useful assay for bacterial control.

**Introduction**

Scientific literature indicates more than 1415 species known to be pathogenic for humans, and 61% of them are zoonotic (Taylor, et al., 2001). Despite the efforts done by industries, foodborne pathogens continue to be a challenge to public health institutions and a threat for consumers (Garrido, et al., 2013). According EFSA data, human cases of infections by *Campylobacter* sp. has shown a slightly decreased in 2012 for the first time in five years, but remain responsible for 214000 infections (EFSA 2014). *Salmonella* sp. is recognized as a major human foodborne pathogen (CDC 2008) and represents a human health concern (Carraco, et al., 2012). Human infection by *Salmonella* sp. has been decreasing, even if 91034 cases have been reported in 2012 (EFSA 2014). Human infections by *Listeria* sp., mainly by *L. monocytogenes* accounted for 10,5% more reported cases in 2012 than in 2011 and has been gradually increasing over the past five years (EFSA 2014). *E. coli* is a common commensal bacterium of mammalians. However, several strains integrate virulence factors promoting diarrhea, urologic, or systemic illnesses (CDC 2012, Jandhyala, et al., 2013). *S. aureus* is commonly associated with staphylococcal food poisoning (Alarcón et al., 2006). All these bacteria cause serious problem for human and animal health. So, it is of utmost importance to detect them by tracing food chain with rapid, sensitive, specific and low cost diagnostic tests (Fisher, et al., 2007). The aim of this work is to perform a new mPCR assay to detect these five foodborne pathogens.