

A SURVEY OF THE PHYSICOCHEMICAL AND MICROBIOLOGICAL CHARACTERISTICS OF PEPPERONI AND SALAMI PRODUCTS AVAILABLE ON THE IRISH MARKET

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I. INTRODUCTION

The consumption of charcuterie and associated fermented meat products has rapidly increased in Ireland in recent years and this is reflected with the emergence of new producers of these products on the island of Ireland. Fermented meat products are a traditional food to mainland Europe with a long history of production in these regions. Ireland, however, has had little cultural history of fermented meat production or consumption. Since Irish fermented meat products are novel food products with minimal previous characterisation or set standard for their production, this physicochemical and microbiological survey aims to characterise the products on the Irish market presently and determine features which are comparable or distinctive to products found on continental Europe.

II. MATERIALS AND METHODS

A selection of 16 pepperoni and salami products were purchased from the Irish market which included some imported fermented meats and Irish-artisan and Irish-industrial-scale products formulated along traditional and new flavouring recipe lines (e.g. garlic, truffle, rosemary, paprika). This selection encapsulated a comprehensive picture of the current Irish market. The physicochemical tests conducted included Texture Profile analysis (TPA) [1], colour, moisture, fat, protein, ash, nitrate [2], nitrite [3], lipid oxidation (TBARS), salt content and titratable lactic acid content. For Microbiology, samples were diluted and screened for, Total Viable Count, Lactic Acid Bacteria, *Pediococcus*, *Staphylococcus spp.*, *Pseudomonas*, *Listeria spp.* and *Brochothrix* [4-6].

III. RESULTS AND DISCUSSION

The physicochemical and microbiological results displayed in (Table 1), clearly demonstrate the diversity in product attributes across all experimental assessments. Results for moisture and pH are particularly significant with a moisture content of 40.4% and a pH of 6.1 recorded, which may highlight safety issues associated with the long-term manufacture of such products. The wide range in moisture content is reflected the hardness ranging from 6.2 to 216 N and, indicative of differing degrees of drying in products. Variable salt and nitrite contents as high as 5.8% and nitrite levels detected up to 86.1mg NO₂/kg were noted. Colour results showed significant differences. It was found that *L* values had a direct correlation with the protein:fat ratio present in products. The *a** and *b** values indicative of redness and yellowness attributes, respectively were highest in samples containing paprika with greatest *b** values detected in samples with both paprika and high fat content. Both values decreased in direct correlation with increased moisture and reduced spices. The fermented meat samples with the most diverse microflora were of artisanal origin and contained, increased numbers of both spoilage and pathogenic microorganisms. Commercial products exhibited a predominance of LAB and *Pediococcus*, with a corresponding increase in pH, salt and titratable acidity values. These additional hurdles appeared to exert significant impact in reducing pathogenic and spoilage species.

Table 1. Physiochemical and Microbiological analytical results

Physicochemical Tests	Value range	Units
Protein	25.2 – 35.4	%
Moisture	27.7 - 40.4	%

Fat	19.4 - 27.5	%
Ash	2.8 – 5.9	%
pH	4.6 – 6.1	
Salt	2.7 -5.8	%
Titrateable Lactic Acid	0.91 – 2.8	%
Nitrate	1.4 - 5.8	mgNO ₃ /kg
Nitrite	22.9 - 86.1	mg NO ₂ /kg
TBARS (Thiobarbituric acid reactive substances)	0.2 – 0.53	μg MDA/kg
Texture Profile Analysis (TPA)		Value Range
Hardness (N)	6.2 – 216	
Springiness	0.6 – 0.9	
Cohesiveness	0.7 – 0.9	
Gumminess (N)	5.1 – 160.1	
Chewiness (N)	4.2 – 134.2	
Colour		Value Range
L	39.3 – 56.8	
a*	9.1– 23.4	
b*	6.4 – 21.1	
Microbial Species		Value range¹
Total Viable Count	7.1 - 10.2	-
<i>Lactic Acid Bacteria</i>	6.8 - 9.6	All
<i>Pediococcus</i>	6.2 - 9.6	All
<i>Staphylococcus spp.</i>	0 – 7.2	10 out of 16
<i>Listeria spp.</i>	Not found	-
<i>Pseudomonas</i>	0 – 3.1	8 out of 16
<i>Brochothrix</i>	0 – 3.5	7 out of 16
<i>Enterobacteria</i>	0 – 5.2	13 out of 16

¹Values presented as log₁₀cfu/ml: *Following Biochemical tests, No Listeria monocytogenes or Staphylococcus aureus were detected.*

IV. CONCLUSION

Pepperoni and salami available on the Irish market show diversity, exhibiting attributes of many different styles adapted from other regions in Europe. This study shows the novelty of their production but also the need to improve aspects of their manufacture. The need for standardisation and optimisation of their production from a health and food safety perspective is evident.

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