

# Understanding Consumer Perceptions of Novel Meat Processing Technologies

Lu, T<sup>1,3\*</sup>, Wall, P<sup>1,3</sup>, Burke, M<sup>5</sup>, McCaffrey, N<sup>6</sup>, Scannell, A.G.M<sup>2,3,4</sup>

<sup>1</sup>UCD School of Public Health, Physiotherapy and Sports Science;

<sup>2</sup>UCD School of Agriculture and Food Science;

<sup>3</sup>UCD Institute of Food and Health;

<sup>4</sup>UCD Centre for Food Safety, University College Dublin, Belfield, Dublin 4, Republic of Ireland

<sup>5</sup>Devenish Nutrition, 19 Clarendon Road, Belfast BT1 3BG, Northern Ireland

<sup>6</sup>Ipsos MRBI, Block 3, Blackrock Business Park, Blackrock, Co. Dublin, Republic of Ireland.

\*Corresponding author email: ting.lu@ucdconnect.ie

**Abstract –Consumer acceptance is vital for successful adoption of new technologies in food processing. This project aims to understand consumer perceptions of meat processing techniques for reduction of Campylobacter on poultry on the island of Ireland. The study used a mixed methods approach, involving focus groups, telephone questionnaires, and face-to-face interviews with consumers to understand consumer perceptions. After being given some explanations of a selection of interventions, forced air chilling (55%) ranked as the most acceptable intervention followed by crust freezing (48%), steam ultrasound (47%), cold plasma (39%) and organic acid washes (37%). Chemical washes (16%) were considered the least acceptable. The survey established that the public have clear negative views about chemical forms of treatment with more positive views of physical treatments.**

**Key Words – Campylobacter in poultry, Consumer Acceptance, Novel Technologies**

## I. INTRODUCTION

Campylobacter is the commonest cause of bacterial food poisoning on the island of Ireland [1]. Retail poultry is very often contaminated with Campylobacter, its prevalence on the island of Ireland ranging from approximately 50% to over 90% [2]. Consequently, there is a current impetus to find effective methods to reduce Campylobacter in raw retail poultry [3]. This study aimed to determine the level of awareness of consumers of Campylobacter in general, in addition to assessing the level of consumer acceptance of a number of processing technologies proven to reduce Campylobacter, including forced air chilling, crust freezing, steam ultrasound, light technology, irradiation, ozone treatment, electrolyzed oxidising water, cold plasma, organic acid washes and chemical washes.

## II. MATERIALS AND METHODS

There were two components of the study: 1) qualitative focus groups with consumers to identify consumer perceptions of interventions and to establish the six most likely to be acceptable for inclusion in the subsequent quantitative research: Crust freezing, Steam Ultrasound, Forced air chilling, Organic acid washes, Chemical washes and Cold plasma treatment. During the qualitative research, a total of five consumer focus groups (9 respondents per group) were conducted across ROI and NI, involving a mix of ages and life stages, with two groups female only and three groups mixed gender; 2) quantitative surveys with consumers which assess the level of acceptability of the six decontamination treatments. Each of the two surveys were part of an omnibus style research; however, respondents in ROI were interviewed over the phone, while NI respondents were interviewed face-to-face. At analysis stage, each of the two data sets were weighted to the known profile of the ROI and NI populations using the latest CSO estimates. The data of quantitative survey was also analyzed using cluster analysis.

## III. RESULTS AND DISCUSSION

The qualitative research was designed to determine how respondents would react to the 10 selected meat decontamination treatments. In particular, the study focused on issues surrounding how natural and/or invasive the processing methods were perceived (Figure 1). Based on the reactions of groups and input from industry experts, the six treatments selected for inclusion in the quantitative survey were 1. Crust Freezing, 2. Steam Ultrasound, 3. Forced Air Chilling, 4. Organic Acid Wash, 5. Chemical Wash and 6. Cold Plasma treatment.

In the quantitative research, a similar number of interviews were carried out in ROI and Northern Ireland, resulting in a 50:50 ratio. Within this, Greater Belfast respondents form 21% and Dublin residents 14% of the sample interviewed. Just over half of respondents are female (51%), with males at 49%. In general, chill-based interventions were considered more natural, while Chemical treatments were felt to be less natural (Figure 1). After being given some explanations, forced air chilling (55%) ranked as the most acceptable intervention followed by crust freezing (48%), steam ultrasound (47%), cold plasma (39%) and organic acid washes (37%). Chemical washes (16%) were considered the least acceptable. 33% of respondents were indifferent to interventions of any type, 27% found some acceptable, 21% found some partially acceptable, 19% were against every method. The survey established that the public have clear negative views about chemical forms of treatment with more positive views of physical treatments. Given sufficient information, people become more positive about some forms of treatment. However, it appeared that the language used in the explanations given to the respondents did not sufficiently convince many consumers of the benefits of the interventions discussed. This may have been due in some small part to the fact that interviewers did not all have scientific backgrounds.

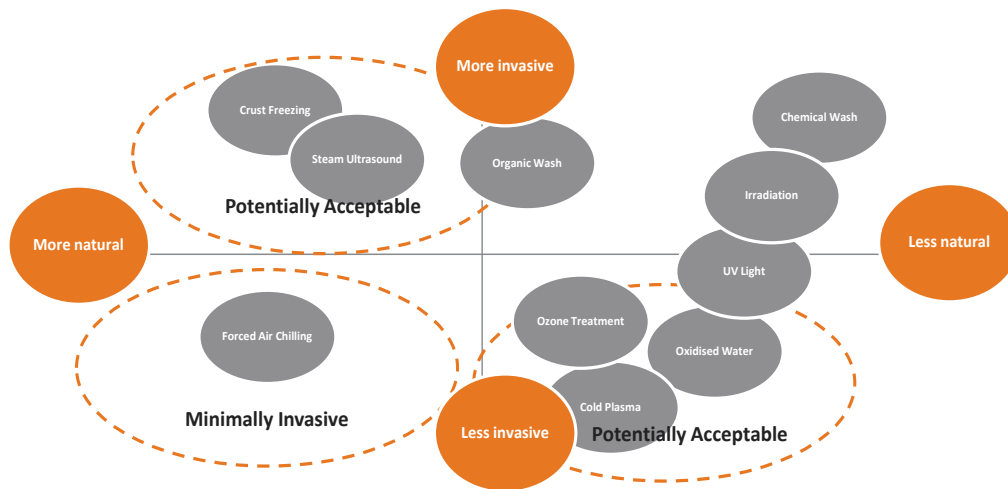


Figure 1. Consumer perceptions of novel meat processing technology

#### IV. CONCLUSION

Overall, 48% respondents found some interventions acceptable or partially acceptable while 52% were neither indifferent nor against all selected interventions. This study highlighted the gap that exists between the public and professional views of what is acceptable. It highlighted the challenge for communicators framing messages that can effectively reassure consumers that interventions are beneficial. More innovative communication strategies are needed to generate consumer confidence in interventions. However, not every information campaign is effective and research underscores that in addition to the content of the message, a range of other attributes such as the source, form, messenger and audience may be at least as important [4].

#### ACKNOWLEDGEMENTS

Safe Food - The project was generously funded by Safe Food, Ireland.

#### REFERENCES

1. European Food Safety Authority (EFSA), European Centre for Disease Prevention and Control (ECDC). (2015). The Community summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks in the European Union in 2014. *The EFSA Journal* 11(4):3129.
2. Madden, R. H., Moran, L., Scates, P., McBride, J., & Kelly, C. (2011). Prevalence of *Campylobacter* and *Salmonella* in raw chicken on retail sale in the republic of Ireland. *Journal of food protection*, 74(11), 1912-1916.
3. Food Safety Authority of Ireland. (2011). Recommendations for a Practical Control Programme for *Campylobacter* in the Poultry Production and Slaughter Chain (ISBN 1-904465-80-3). Abbey Court: FSAI.
4. Broadbent, D. E. (2013). Perception and communication. Elsevier.