سُورَةُ النَّحلِ

بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

وَالْأَنْعَامَ خَلَقَهَا ۖ لَكُمْ فِيهَا دِفْءٌ وَمَنَافِعُ وَمِنْهَا
تَأْكُلُونَ ﴿٥﴾

صدق الله العظيم

الفتح (4)

استخدام تقنية البلازما الباردة في حفظ وسلامة اللحوم ومنتجاتها

Cold Plasma Technology on Meat and Meat Products Preservation

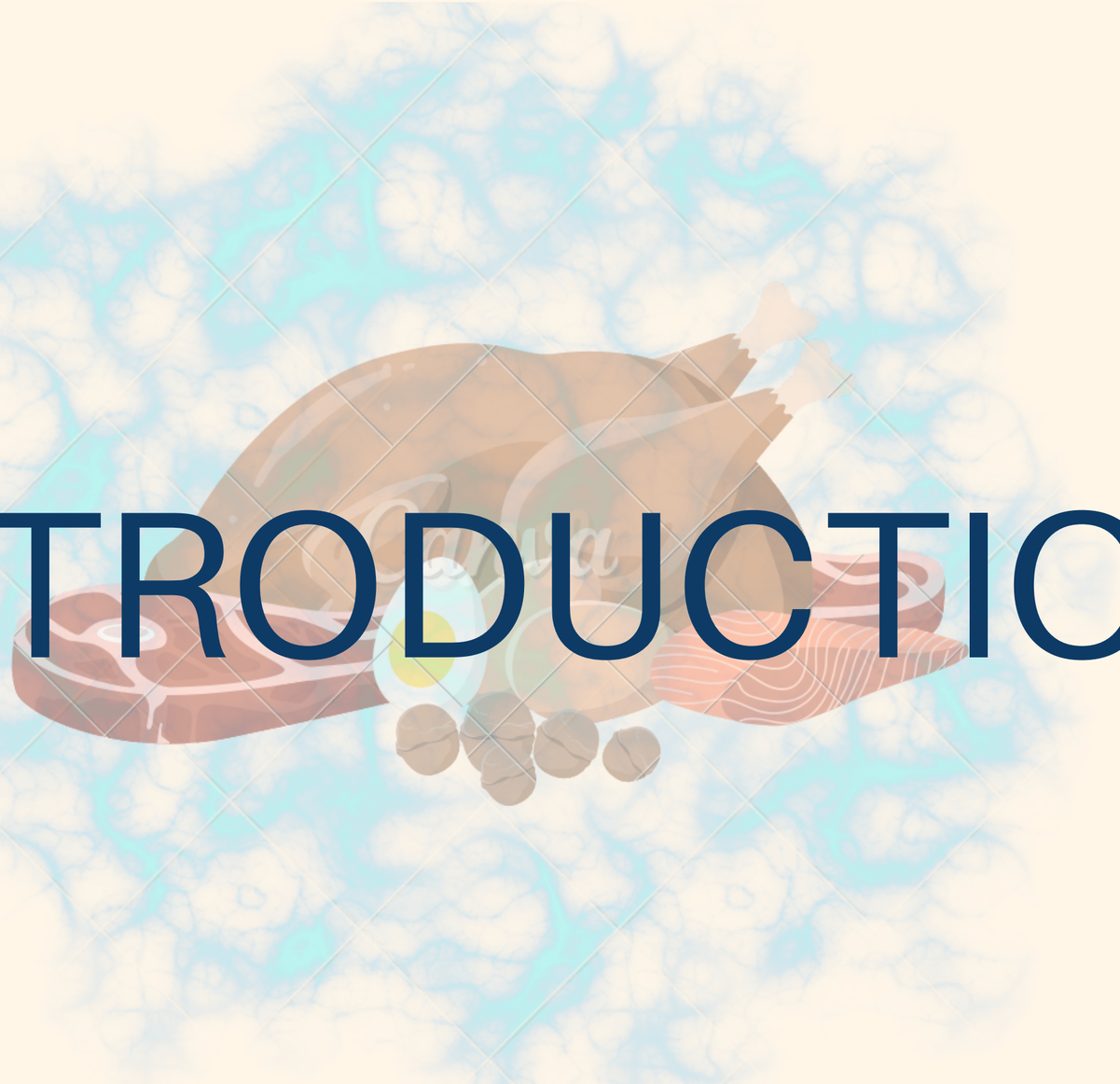
طالبة الدكتوراه

نرجس صفاء عبدالحميد محمود

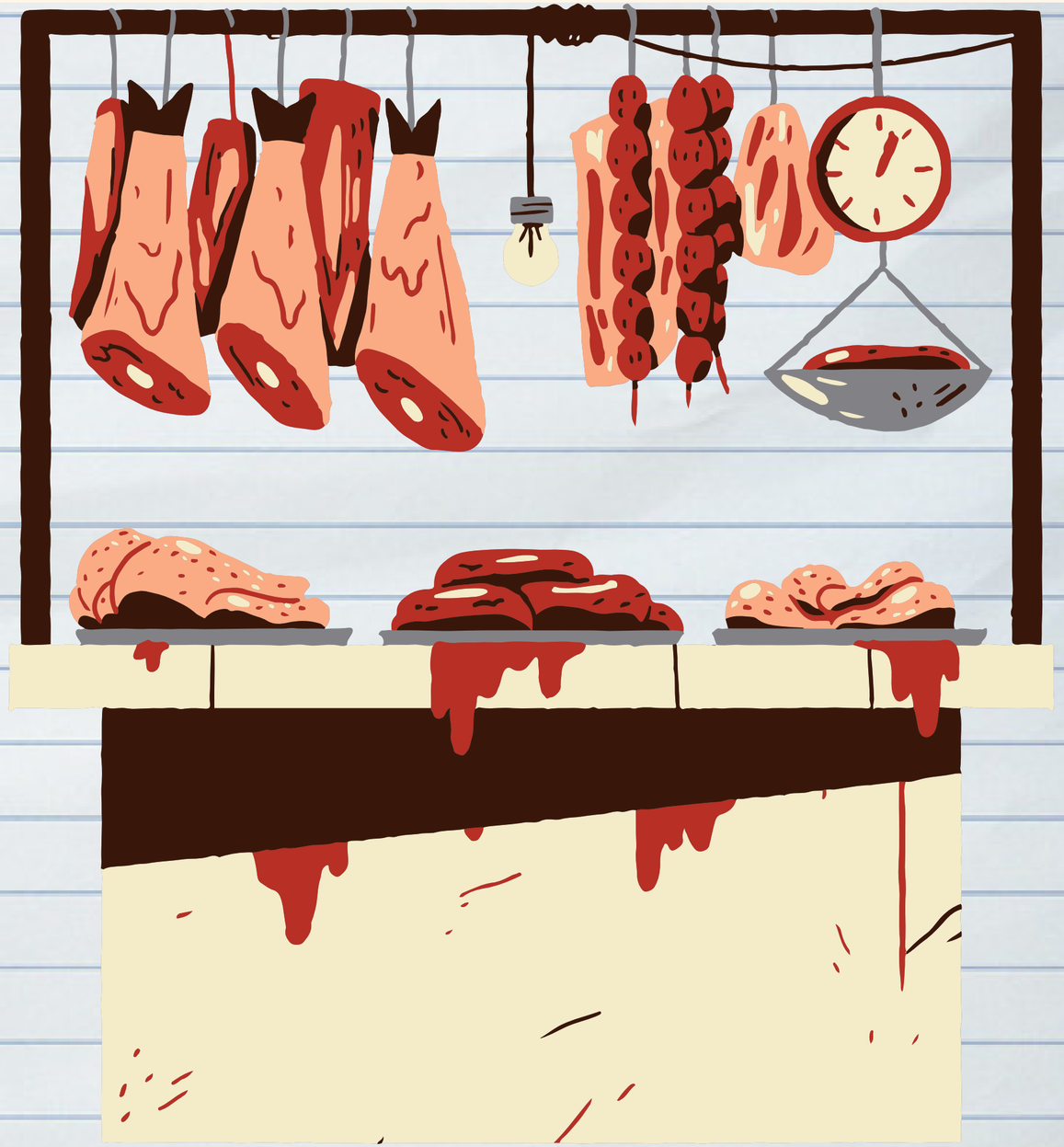
بأشراف

أ.د. اميرة محمد الربيعي

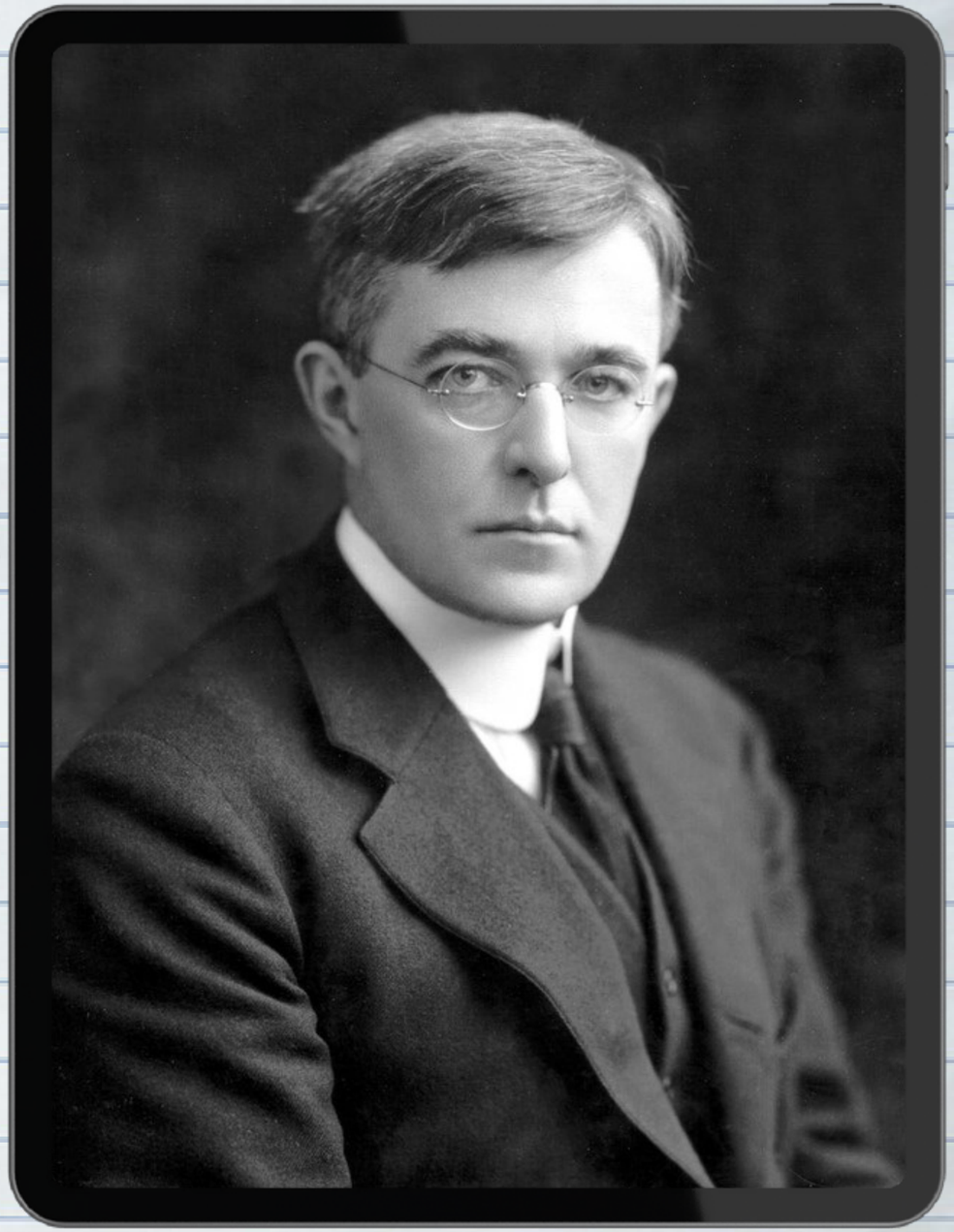
INTRODUCTION



What is Meat?



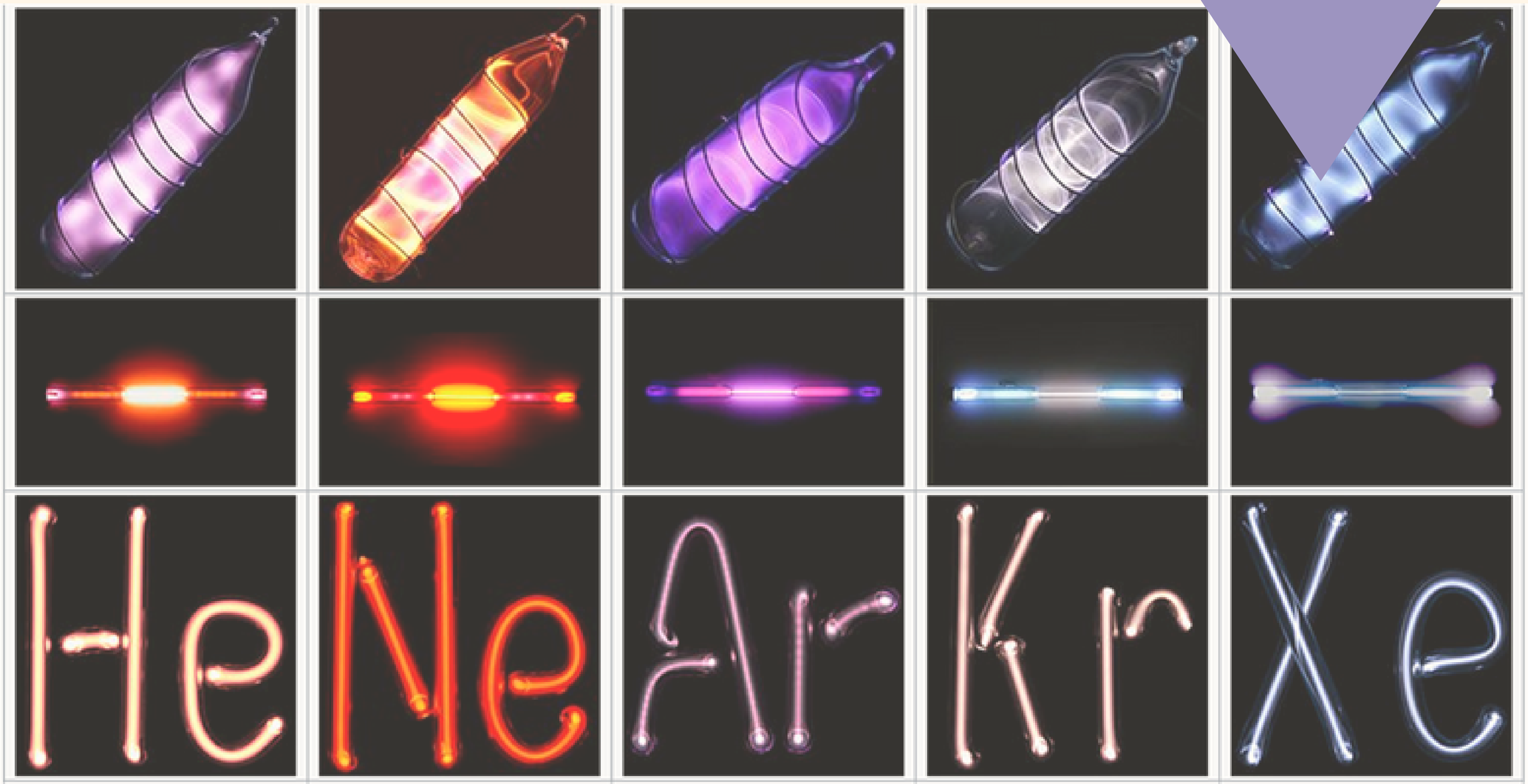
What is Plasma?



Cold Plasma

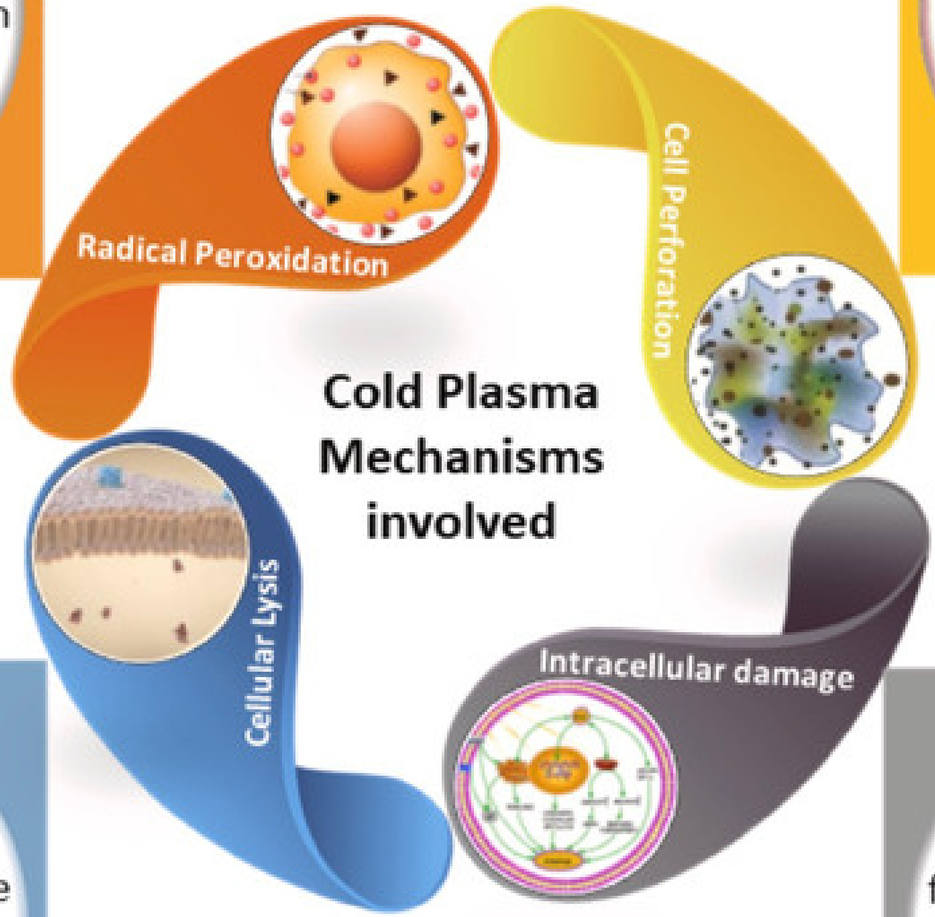
plasma

- Thermal Plasma
- Low-Temperature Plasma
- Cold Plasma (NTP)


He
Ne
Ar
Kr
Xe

Reactive ions present in cold plasma cause catalysis by peroxidation mechanism which later damage the microbial cell

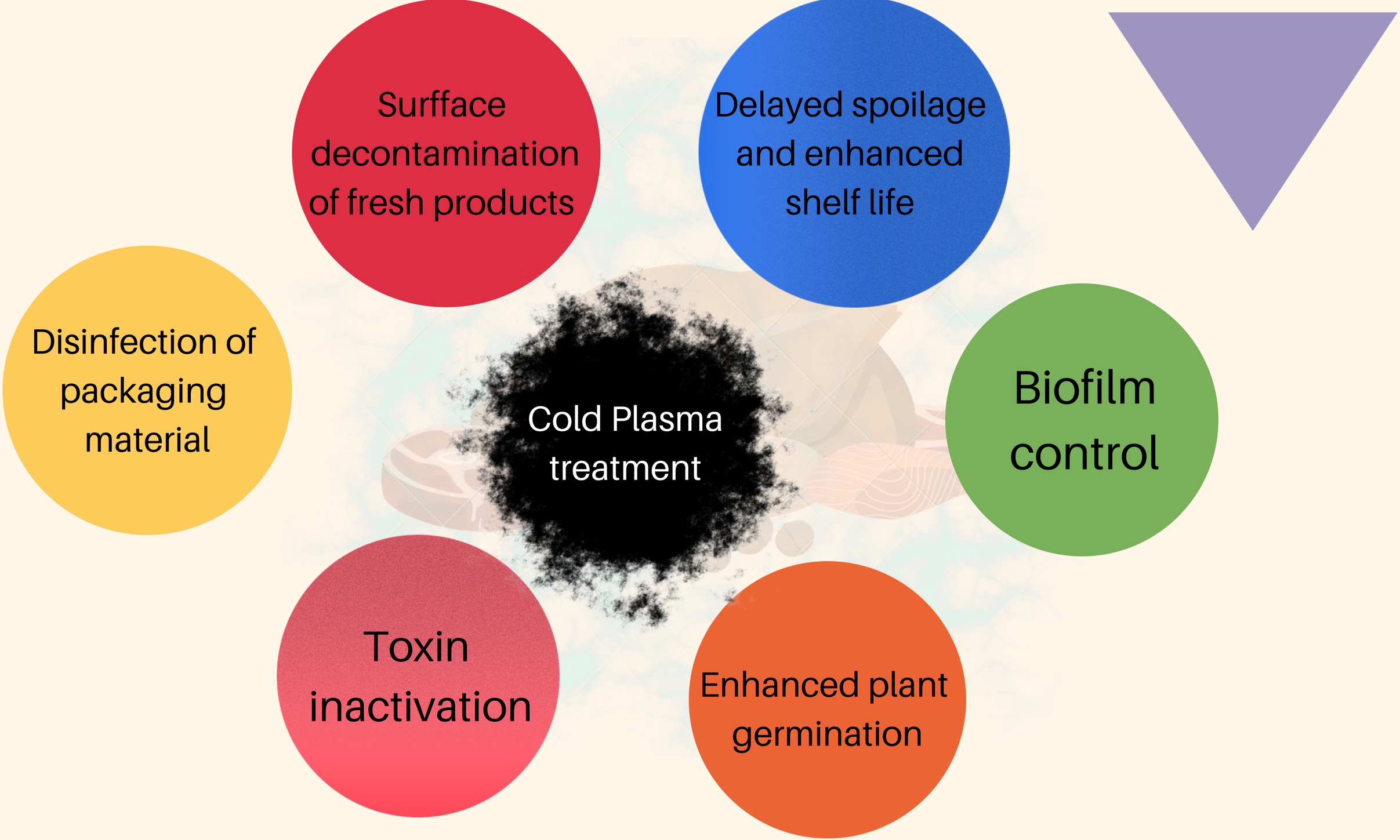
Reactive oxygen species easily harm the microbial phospholipids and polysaccharides in presence of reactive ion production

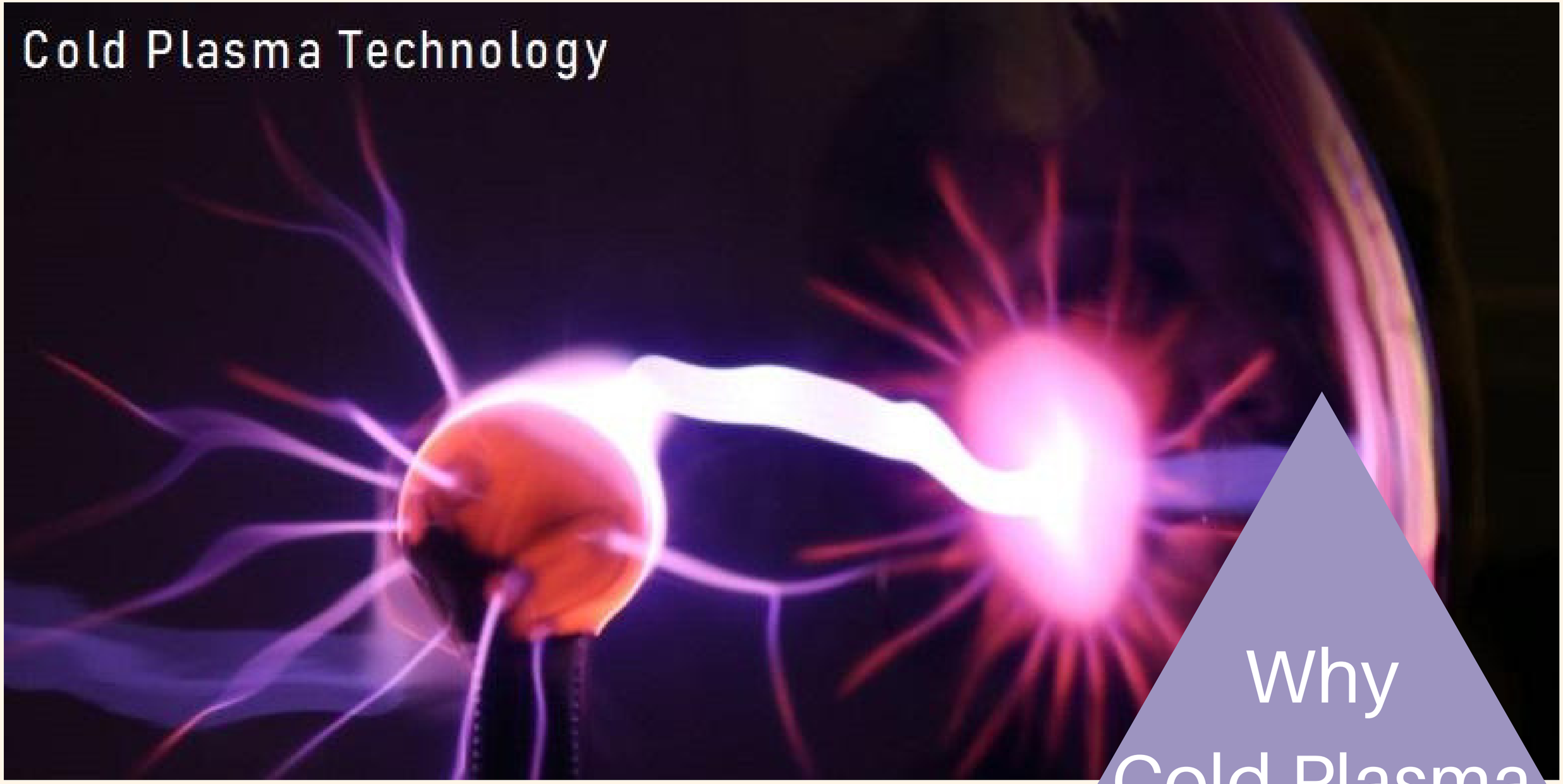


Cold Plasma Mechanisms involved

Combining with all sequential events due to cold plasma application the cell membrane and membrane proteins are damaged to cause cell lysis

Malondialdehydes are formed by taking over the cell's intracellular pathway of proteins and nucleic acid destruction


Surffface decontamination of fresh products
Delayed spoilage and enhanced shelf life
Disinfection of packaging material
Cold Plasma treatment
Biofilm control
Toxin inactivation
Enhanced plant germination


Cold Plasma Technology
Why
Cold Plasma

Objective of this study

- Using modern technologies such as cold plasma
- Longer storage time
- Improve meat sensory characteristics during storage

Table 1

: Effect of cold plasma treatment on meat and meat products.

Substrate	Plasma	Results Observed	References
Ready-to-Eat meat	Cold atmospheric pressure plasma; 15.5, 31 and 62 W; 2-60 s	• Reduction in *L. innocua* to 1.6 log_{10} CFU/g • Thiobarbituric acid reactive substances (TBARS) increased with treatment power.	Rød et al; 2012
Chicken skin and breast fillet	Cold atmospheric pressure plasma; Argon/Air; 2-3 kV; 3-180 s; 5, 8 and 12 mm (distance)	• Reduction in *Campylobacter jejuni* by 2 log_{10} CFU/cm^2 using Ar gas after 120 s treatment time • Higher surface temperature can cause denaturation that could affect inactivation efficacy	Rossow et al; 2018
Chicken fillets	In-package DBD atmospheric cold plasma; 80 kV;70 W; 3 min	• Decrease in microbial population with no effect on meat appearance on storage (4 ºC-3 days) • Decrease in redness and yellowness of meat	Wang et al; 2018
Meat batter	Atmospheric pressure cold plasma; 1.5 kW; 60 min	• Nitric content of Meat batter increased to 377.68 mg/kg • Treatment did not affect the total aerobic bacterial count· Lipid and protein oxidation increased with treatment time	Jo et al; 2018

(Bora et al;2022)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