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**Title:**

Use of Pulsed Electric Field technology to modify the texture and digestibility of chickpea flour-based gels for people with dysphagia

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**Abstract:** (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text into it.)

Preparation of Your Abstract

1. The title should be as brief as possible but long enough to indicate clearly the nature of the study. Capitalise the first letter of the first word ONLY (place names excluded). No full stop at the end.
2. Abstracts should state briefly and clearly the purpose, methods, results and conclusions of the work.

Introduction: Clearly state the purpose of the abstract
Methods: Describe your selection of observations or experimental subjects clearly
Results: Present your results in a logical sequence
Discussion: Emphasize new and important aspects of the study and conclusions that are drawn from them

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**Aim:**

An aging population has driven a need for novel food products that are dysphagia-friendly but still provide adequate nutrition. This study investigated the potential of pulsed electric field (PEF) processing to create gels with varied textures and digestibility from a chickpea flour slurry.

**Method:**

Chickpea slurry was prepared (10% w/w) and immediately PEF-treated at electric field strengths up to 2 kV/cm with different specific energies from 400 to 500 kJ/kg. After treatment, the samples were set at 4°C for 24 h before assessing their rheological, textural and in vitro starch and protein digestibility properties. Fourier transform infrared (FTIR) spectroscopy was used to detect structural changes in starch as well as any alterations in protein, lipid, and polysaccharide interactions.

**Results and Discussion:**

As specific energy increased, hardness and rheological properties such as storage modulus and yield stress of the gels increased (0.35±0.01 to 2.94±0.19 kPa, 195±42 to 2350±466 Pa and from 15.7±5.6 to 423.4±135.2 Pa, respectively), with textures spanning a range of International Dysphagia Diet Standardization Initiative levels. No differences in these parameters were observed between the two field strengths. FTIR spectra and light microscopy revealed that gel formation was mainly attributed to starch gelatinization (1047/1021 ratio decreasing from 0.759±0.007 to 0.699±0.002) caused by a temperature increase due to the Joule effect during PEF, while protein denaturation and aggregation became important in PEF-treated chickpea slurries above 450 kJ/kg, resulting in a more solid-like gel formation. Importantly, gels formed following treatment at 2 kV/cm led to an increase in readily digestible starch (16.28±0.15 to 89.06±1.78 %) and a faster intestinal protein digestion rate ($1.16\pm0.20\cdot10^{-2}$ to $1.65\pm0.04\cdot10^{-2}$ $min^{-1}$) during simulated gastrointestinal digestion.

**Conclusion:**

Overall, PEF treatment was an effective and rapid method (44.4-227.4 ms) for producing chickpea gels with varying textural and rheological consistencies from a single ingredient and improved digestibility.