Results: Obtained results showed that the nutritional properties of crackers from the composite flour was significantly ($p < 0.05$) higher than the control. There was observed increase in the protein (9.82–13.20%) and fat content (0.59–0.71%) with increase in chickpea composition. The control sample had the highest L* (67.0) as well as the lowest a* (1.94) and b* (43.14) colour values, while the hardness and fracturability of the printed crackers ranged from 165.40–222.50 N and 1.90–2.53 mm. The blend with 20% chickpea flour substitution exhibited the highest peak viscosity of 211.80 cP, trough viscosity of 189.90 cP, and final viscosity of 309.20 cP. The 15% composite dough exhibited the highest setback viscosity of 99.30 cP, while the control sample had the highest breakdown viscosity of 33.900 cP. The pasting temperature for all blended samples ranged from 91.30–95.20 °C.

Conclusions: Extrusion based 3D printing conveyed positive effects on the nutritional and functional properties of crackers composited with chickpea flour.

4.14.3. P.14.062 | Moving Forward with Solar Cooking: Closing Knowledge Gaps in Technical, Environmental and Food Quality Aspects

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Background: Solar cooking is a method that makes use of the sun's energy to cook food. Unlike traditional cooking methods that rely on non renewable energy sources, solar cookers only require sunlight. Solar cookers are environmentally friendly and help reduce greenhouse gas emissions. Additionally, solar cooking helps preserve natural resources by reducing consumption of non renewable energy. Despite the apparent benefits of solar cooking, some knowledge gaps remain regarding technical complexities, sustainability implications, and the impact on food nutritional quality.

Methods: An extensive literature review was conducted to comprehend the existing solar cooking knowledge. It examined scientific research available until 31 December 2023.

Results: Extensive research has been carried out on heat transfer in solar cooking, but there is still a lack of knowledge regarding the behaviour of food cooked with solar energy. The intricate interplay of dynamic variables affecting solar cookers' energy and food quality performance makes integrating this aspect with existing studies difficult.

It is crucial to perform modeling studies of the thermal and quality behaviour of the food prepared in each type of solar cooker. Innovative approaches such as machine learning can be identified as promising tools.

Conclusions: To increase the global use of solar cooking, presenting it as a viable solution for cooking-related challenges is essential, emphasizing its positive social and environmental impacts. Although some research works on the thermal performance of solar cookers are available, research on the modeling and simulation of time temperature profiles and histories of real foods undergoing solar cooking is very scarce, and it is crucial that the food quality aspects of solar cooking are addressed and experimental studies performed.

4.14.4. P.14.063 | Characterisation of Water State and Repartition During Drying Process of Tomato by Single Sided Nuclear Magnetic Resosance

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