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Food of the Future:

Meat Substitutes from Hemp and Wheat Gluten



Conclusion

This study aimed to define and establish an experimental window to explore which textures could be achieved with two protein ingredients, hemp protein concentrate and wheat gluten, in the high-moisture meat analogue (HMMA) application at pilot scale and how the ratio between the crops was related to the textural outcome.

The study demonstrated that extrudates could be produced using up to 100% hemp protein. Higher hemp concentration and lower moisture content generally led to increased hardness, chewiness, and cutting forces. FAB ratio analysis suggested structural shifts between core and edge regions. The ratio between hemp and wheat gluten completely outruled the effect of extruder process parameters. Therefore, the choice of extrusion ingredients is vital in terms of textural outcome for high-quality meat analogues.

Experiments

A twin-screw co-rotating extruder (TwinLab-F 20/40, Brabender) was used in the HMMA experiments. The trials were preformed using seven different ratios of input material, ranging from 100% wheat gluten to 100% hemp protein with targeted moisture content and screw speed as process



variables.

Setup

Set parameters:	Varied parameters:
Mass flow: 3 kg/h	Screw speed: 600, 700 and 800 rpm
Temperature profile: 40, 80,	Moisture content: 57.5-67.5%
110 and 130°C	Raw material ratio: 7
Cooling die: 50°C	

Texture analysis

Mimicking meat is technologically challenging, and therefore, a texture analyzer can be a valuable tool for determining the optimal microstructure.

Optimal ratio: 50% hemp & 50% wheat gluten

