

FORMULATION AND SCALE-UP OF PLANT-BASED LASAGNA

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Food Science & Industry, Global Food Systems Leadership

A FINAL HONORS PROJECT

submitted in accordance with the University Honors Program requirements

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KANSAS STATE UNIVERSITY  
Manhattan, Kansas

May 2025

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## Abstract

Lasagna is a classic dish, widely loved and consumed by many students at dining centers. However, there isn't currently a lasagna option supporting diverse dietary needs and evolving consumer preferences in institutional dining centers. The objective of this study was to develop and scale-up a vegetarian lasagna for K-State's dining centers, utilizing texturized soy protein (TSP) as the plant-based protein emphasizing flavor optimization. A lasagna recipe was obtained from the dining center and initially prepared by using a marinara sauce with seasoned TSP, noodles, and a blend of mozzarella, parmesan, and ricotta. After conducting multiple trials to refine flavor and texture, the final lasagna prototype features diced tomatoes, tomato paste, Italian seasonings, a blend of cheeses, and the TSP. Methods included sautéing onions and garlic with tomatoes and seasoning, followed by layering sauce, noodles, and cheese to build the lasagna. The TSP was prepared by soaking it in warm water and vegetable base for 15-20 minutes. Then it was sautéed in a skillet with Italian seasonings to brown. Baking tests revealed that setting the Combi oven at 350°F for 35 minutes without foil was optimal for even heating after freezing, after proper thawing. The internal temperature after 30 minutes reached 165°F. The average water activity measurement was  $0.975 \pm 0.004$  on various lasagna components, indicating a larger amount of water available for potential microbial spoilage. The lasagna was scaled-up and consumer tested in the Kramer dining center. Approximately 50 students tasted the product which resulted in an average overall acceptability score of  $7.89 \pm 0.82$  (from a scale of 1-9) and 72.9% stated that they would consume/purchase the product again. This study demonstrates that students in the dining centers would consume this product and offers an option to accommodate for dietary preferences.