DESIGN, DEVELOPMENT AND FABRICATION OF AUTOMATIC PIZZA BASE MAKER

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Abstract

Pizza is a highly well-liked dish both domestically and internationally. Pizzerias and pizza restaurants usually produce and sell pizzas on an individual basis. Pizza is a labor intensive food to make. To prepare the pizza crust in larger pizza shops, one person kneads, rolls, twirls, spins, and cuts the dough. Another person cuts the pepperoni or sausage, grinds the cheese, and adds the other pizza toppings one at a time with their fingers. The cook receives the pizza and uses a shovel or large spatula to put it in the oven. Using a shovel or spatula, the chef removes the pizza and cuts it by hand using a knife or a pizza cutter that has a circular blade or a sharp-edged table disk. For carryout, the sliced pizza is then physically placed on a plate or within a cardboard box. The diner will receive the pizza from a waiter or waiters. Usually, the consumer pays the cashier for the pizza. The cost of pizza in restaurants is significantly increased by the quantity of workers involved in its preparation. This invention is mostly related to the production of pizza bases, a popular kind of leavened pastry that is typically made of prepared sheet dough that is baked with a layer of cheese, oil, tomato sauce, and seasoning. It just takes a few minutes to bake because the dough is a relatively thin, flat sheet that the yeast has already worked into, and it is typically eaten hot. However, there are various challenges with this straightforward yet well-liked meal in any pizza carry-out business and in food service places like restaurants where a sizable number of customers order pizza at almost the same moment. It needs a particularly trained cook with a certain amount of manual dexterity to make it as it is usually made. This cook is harried at first and may have little to do for extended portions of the day. Small businesses can't afford to hire a pizza cook under these circumstances. Therefore, this idea will have an effect on these issues and offer useful answers.

Key words: Pizza Base, Flat sheet Dough, Thickness, Uniform Shape

Introduction

Pizza is an Italian food that starts with a flat, usually round base made of leavened wheat dough. It is then topped with cheese, tomatoes, and a variety of other ingredients (like meat, ham, olives, mushrooms, onions, and anchovies)(Finkelstein, Joanne 2011). The pizza is then baked at a high temperature, usually in a wood-fired oven(Goulding, Matt. 2015). The bottom crust that a pizza is formed on is called a pizza base. Usually, a raw, rolled-out dough composed of wheat flour is used to form it. It can also be a pre-cooked dough base, like foccacia, pita, etc., or a raw dough made with other non-grain ingredients. The "crust" is another name for the pizza base, or the bottom of the pizza. It can be thin, like in a classic hand-tossed Neapolitan pizza, or thick, like in a deep-dish Chicago-style pizza, depending on the style (Braimbridge et al., 2005). Similar to bread, it is made through a sequence of steps that include mixing, kneading, proofing, shaping, and baking. The main ingredients are refined wheat flour, water, yeast, and salt (Dewettinck et al, 2008; Banu et al, 2012). Although it is typically plain, it can also be stuffed with cheese or seasoned with herbs or garlic. The term "cornicione" can sometimes be used to describe the pizza's outer edge (Braimbridge et al, 2005). Sugar is frequently added to pizza dough to aid in the yeast's rise and improve crust browning.

Lazerson, who identifies the literal meaning of “pizza.” She uncovers that it is “The Italian word for pie, now specifically applied to a spicy, open-faced pie traditionally topped with tomatoes, cheese, and herbs. The flavorful topping usually contains other ingredients such as onion, green pepper, mushrooms, sausage, ground beef, or anchovies” (Lazerson, 146). Furthermore, she gives the origination of pizza which is in Naples, Italy. Her two experiments consist of college students who tend to favor pizza most to determine whether contemporary American English speakers view a pizza as a pie. The results of her study show that they do not view pizza as a pie. Instead, “pizza is more strongly attached to the tomato-cheese-spice sauce that goes on top of the pastry crust than to the crust itself” (Lazerson, 148). The findings of her study are interesting because most people I know refer to pizza as a pie. Perhaps, in certain regions, the word pie is not used.

According to a report by The Guardian, Dominos made 339.5 million pounds in revenue at the end of 2019, which is 5.5% more than their sales from the previous year. According to a typical market analysis conducted from 2010 to 2019, this market is experiencing an increase in turnover (Jolly, 2019). According to a different article (Links, 2019), Americans spend an average of 23 pounds on pizza annually. Dominos sold 500,000 pizzas on Christmas Eve 2019 in the UK alone, according to the same article published in The Guardian (Jolly, 2019). According to statistics in another article, the North American pizza market is expected to grow to 10% over the next five years (Littman, 2018).

In a piece about the pizza business, The Economist revealed that 83% of consumers eat pizza at least once a month and that, according to the results of the 2018 industry census, 60.47% of respondents said their sales had increased from the year before. Additionally, it predicted growth of 10.7% over the next five years (The Economist, 2015).

He researched heat-transfer apparatus used in the preparation of traditional Indian foods. In his study, he discussed the need for new technology in the production of pizza, given that it is a traditional staple food in India. The kinematics of the machines play a major role in the successful operation of the pizza making machine. The heat transfer through the machine's hot plate, which could be made of aluminium, stainless steel, or another material. He looked into the ideal cooking temperature for Indian pizza, or flatbread without yeast. If a machine for making pizza was made available, it would reduce the amount of labor required and make it more challenging to serve a large number of people with consistently good pizza in a short amount of time. He investigated the thermal and rheological characteristics of pizza. Pizza is devoid of gluten. cereal and makes up the bulk of people's staple diet in the completely arid tropical regions. In order to predict the enthalpy and thermal conductivity of solid foods within the temperature range of -400C to +400C, N.D. He presented enthalpy data for 58 foods and products as well as thermal conductivity data for 40 foods.

Schlosser E. (2001) brought up the most much of the time proclaimed the idea of eating at junk food eateries were the immediate service of food. Laroche and Parsa (2000) opined that the reason behind individuals to choose to pick junk food restaurant is the taste and incline toward moment fulfillment of their taste buds. Quick service restaurants include an wide diversity of prompt and immediate service, brands and take just brief period to serve it.

A Law, Y Hui, X Zhao, (2004) have examined the connections between client fulfillments; repurchase recurrence, waiting time and further administration quality factors in junk food outlets are demonstrated. The outcome demonstrates that consumer loyalty is altogether influenced by waiting time, state of mind of employees, and food variety and the quality of food served.

The goal of this project is to design and build a fabrication of automatic pizza base maker with the primary objectives being increased productivity and decreased labor and time requirements. The task at hand is to effectively handle and savor soft, freshly pizza base . The current manual fabrication method is labor-intensive, time- and energy-intensive, and frequently requires a great deal of physical exertion. Make sure the fabrication of pizza base maker has a consistent quality and taste. Optimize the fabrication procedure to increase the production of pizza base while requiring less time and work.

Methodology:

Figure 1. Work Design of Pizza Base Maker

1. PREPARATION OF DOUGH

Start with a medium bowl that's been lightly coated with olive oil. Add warm water (about 110 degrees F), dry yeast and sugar. Note: The activated yeast feeds on the sugar and makes the dough rise. In another bowl, combine flour and salt. When the dough starts to come together, get in there with your hands and knead it for a few minutes on a lightly floured board. Use the heel of your hand to push the dough down and forward. Give it a few turns. You're done when the dough is a little tacky. Place the kneaded dough into the oiled bowl, cover with plastic wrap and let it rise in a warm spot until it doubles in size. If the dough leaves an indentation when poked, it's ready.

2. DIVISION OF DOUGH

Once the dough has risen properly, use a knife to divide it. The larger the piece, the bigger the pizza; the smaller portions are easier to handle at home. Form into balls for individual pizzas, and place on a plate. Cover with a damp cloth. Let the balls of dough rest until you poke them and see an indentation.

3. DOUGH PLACING

Place the divided dough on the bottom surface and make sure that the dough was placed on centre of the pressing plate.

4. PRESSING

After the placing of dough, the pressing button should be turn on to start the process.The pressing plate move downwards to press the dough and it makes a round shape according to the size of the pressing plate.After the pressing was completed, the pressing plate move to its original place.

5. FORMING OF BASE

The formed base is ready for a further process like adding stuffs over the dough and keep for bake.

WORKING

The prepared dough is placed on the bottom surface and after that the use of start button to start the process. The start button will activate the DC motor to rotate the thread rod towards downside with round plate. The round plate will press the dough and make it uniform shape with proper thickness. While the thread rod touches the limit switch, it indicates the pressing time has completed and after it will move upward to its original place.

Figure 2.Working Model

Result and Discussion:

This fabricated pizza base making system can perform specific tasks with better efficiency. The results which we have obtained through our simulation analysis are very close to our expected or practical results. We have put different amounts of pressure and compared the findings with our simulation results. We keep changing the amount of pressure and observe the result obtained. The plate that we have used for dough placement contains the most critical region, hence it will not break if we use the pneumatic pressure fully around 150psi.The dimensions and area of the project provide more strength to the system. The system will break if we use a heavier pneumatic system with a higher pressure. Because of this, the system will last longer and will be more efficient as compared to other available systems.

Conclusion:

The dough can be pressed into 8 inches using the constructed pizza base maker. This will improve precision, cut costs and time, and enable restaurants to complete tasks more rapidly. Even though this project might be viewed as a luxury, once it is utilized, it greatly eases their lives an The authors are grateful to Bunge Alimentos S.A. for allowing the use of the rhino ferment meter saves them time; as a result, it becomes a necessity rather than a luxury**.**

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Conflict of interest:

The authors declared there is no conflict of interest.

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