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Performance comparison of five different steam chambers used to produce straight and single form of rice noodles strings

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Abstract

Over gelatinization of extruded rice noodles during open wet steam cooking is a major problem in food processing industry. This occurs due to condensation of water droplets which come into contact with noodle strings during steaming process. This issue may arise due to the presence of stuck noodles in the finished product. The design of a steam chamber is also very important aspect in order to produce straight and single form of rice noodles strings. As a result, five prototype designs were created: the wooden frame enclosed with polythene sheet (A), the wooden frame enclosed with gray cloth (B), the wooden frame enclosed with plywood sheet with two steam inlets in the galvanized door (C), the wooden frame enclosed with plywood sheet with multiple steam inlets in the galvanized door (D), and the completely enclosed galvanized chamber (E). All steam chambers had multiple steam inlets in lateral walls except the chamber with gray cloth. Red rice noodles were prepared from the combination (16% MC, 200 μ m, water at ambient temperature ($30\pm 2^\circ\text{C}$), control atmosphere, 20 minutes) and fed into five different types of prototype designs in order to complete the cooking (gelatinization) process. Performance of the five prototype designs were evaluated in terms of percentage of dried noodles coming out of each design in single straight form. According to the results, the percentage of dried noodles coming out of each design was analyzed (A- $50.0 \pm 7.1\%$, B- $15.0 \pm 5.0\%$, C- $15.0 \pm 5.0\%$, D- $50.0 \pm 7.1\%$, E- $77.5 \pm 4.3\%$). The mean values of all designs revealed that best prototype design was "design E" (steam chamber consisted of completely enclosed galvanized chamber with the multiple steam inlets in the two lateral sides). When compared to other designs, it produced a larger percentage of straight single noodles. To conclude, design E is the ideal steam chamber for producing straight single rice noodles for the market.

Keywords: Over-gelatinization, Rice noodles, Steam chamber, Straight single noodles

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