Study of Factors Affecting Strength of sealing in the product packing process By Utilizing Central Composite Design

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Abstract. This research is to study the appropriate factors to increase the strength of the sealed packets containing seasoning sauce to experiments. This study began with the introduction of cause and effect diagram to analyze the factors that affect the strength of seals. From the evaluation of several factors involved and found that the 3 factors may affect the strength of seals which are sealing temperature, speed in film feeding, and degree of shut-off valves. Therefore, an experimental design has been conducted by Central Composite Design to analyze the optimal conditions of the packaging, and using Response Surface Methodology to find the best value and it was found that the temperature sealing at 126 ºC, film feeding 18 rpm and degree of shut-off valves at 115 degrees, given the maximum strength of the top and bottom seals. After the application of the experimental result, the strength of the sealing on top increased from 34 N to 56 N or 64.71% more, the standard deviation decreased from 3.14 to 2.92, or a decrease of 7.01% and the strength of seals at the bottom increased from the original 34 N to 55 N, or 61.77% more, the standard deviation decreased from 3.21 to 2.98, or decreased 7.17%. The result of improvement has determined to decrease the waste caused by sealing down from 81.5% to 3.68%, causing the waste of the packaging process reduce from 7.84% to 2.47% or down by 5.37% but the quality of seasoning sauce remain the same. This project has achieved the objective of the study.

Keywords: The Strength of Seals, Central Composite Design, Response Surface Methodology.