

**KAJIAN TEKNIS PENGARUH DURASI PEMBERIAN UAP PANAS,  
KETEBALAN BAHAN, DAN KETINGGIAN RAK TERHADAP  
KARAKTERISTIK BUBUK KAKAO INSTAN DENGAN PEMANIS GULA  
SEMUT (*Arenga pinnata*) DIPRODUKSI DENGAN BATCH-TYPE STEAM JET  
AGGLOMERATOR**

**INTISARI**

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*Steam agglomerator* merupakan salah satu teknologi yang dapat diterapkan untuk proses instanisasi bubuk kakao. Kandungan lemak yang tinggi, mengakibatkan bubuk kakao sukar larut dalam air dingin. Proses instanisasi bubuk kakao ini diharapkan mampu meningkatkan kelarutan bubuk kakao dalam air dingin. Berbagai kajian telah dilakukan terkait dengan instanisasi bubuk kakao menggunakan steam agglomerator. Tujuan dari penelitian ini adalah mengkaji pengaruh durasi pemberian uap panas, ketebalan bahan, dan ketinggian rak serta interaksinya terhadap karakteristik bubuk kakao instan yang dihasilkan melalui proses aglomerasi termal menggunakan *batch-type steam jet* agglomerator, mengkaji hubungan durasi pemberian uap panas, ketebalan bahan, dan ketinggian rak terhadap karakteristik fisik, instan, dan alir dengan *Principal Component Analysis* (PCA), serta menentukan hasil terbaik berdasarkan analisis *Technique for Order of Preference by Similarity to Ideal Solution* (TOPSIS). Sampel kontrol (non-aglomerasi) merupakan pembanding dalam penelitian ini. Hasil penelitian menunjukkan ketiga variabel penelitian memiliki pengaruh yang signifikan pada sebagian besar karakteristik fisik (kecuali densitas) dan karakteristik instan, tetapi tidak pada karakteristik alir, adanya penurunan kadar air ( $<3,61\%$  d.b); penurunan nilai  $L^*$  ( $<45,52$ ); peningkatan nilai  $a^*$  ( $>12,54$ ) dan  $b^*$  ( $>26,96$ ); penurunan nilai densitas ( $p_b < 0,49 \text{ gr/cm}^3$ ;  $p_t < 0,54 \text{ gr/cm}^3$ ); peningkatan nilai FM ( $>1,01$ ) dan diameter rerata ( $>0,21 \text{ mm}$ ); peningkatan nilai *solubility* ( $>59,53\%$ ) dan *dispersibility* ( $>6,47\%$ ); serta tidak ada pengaruh terhadap karakteristik alir ( $CI \leq 10$ ;  $HR \leq 1,2$ ). PCA mampu menjelaskan hubungan antara variabel penelitian dan karakteristik bubuk kakao dengan total variansi lebih dari 78% (78,35%). Perlakuan terbaik berdasarkan analisis TOPSIS dalam penelitian ini adalah sampel W1T0,5A.

Kata kunci : *batch-type steam agglomerator*, minuman cokelat instan, kelarutan, karakteristik bubuk instan

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**A STUDY ON THE INFLUENCE OF STEAMING TIME, COCOA POWDER THICKNESS, AND TRAY POSITION ON THE CHARACTERISTICS OF INSTANT COCOA POWDER SWEETENED WITH PALM-SAP SUGAR (*Arenga pinnata*) PRODUCED BY USING BATCH-TYPE STEAM JET AGGLOMERATOR**

**ABSTRACT**

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Steam agglomerator is one of the technologies applied to the cocoa powder instantiation process. A large amount of fat content in cocoa powder leads to higher insolubility in cold water. The instantiation process is purposed to increase the solubility of cocoa powder. Several kinds of studies related to steam agglomerators had been done respectively. This study aimed to evaluate the influence of steaming time, cocoa powder thickness, and tray position and its interaction of instant cocoa powder produced by using batch type steam jet agglomerator, application of Principal Component Analysis (PCA) to visualize the interaction of agglomeration process to its characteristics, and choose the best treatment by Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) analysis. A control sample (non-agglomerated) was chosen as a comparison respectively. The result of this study showed the research variables significantly affected most physical characteristics (aside from density) and instant properties, not flow properties. The decreasing of moisture content ( $<3.61\%$  d. b);  $L^*$  value ( $<45.52$ ); and density ( $\rho_b < 0.49 \text{ gr/cm}^3$ ;  $\rho_t < 0.54 \text{ gr/cm}^3$ ) were found. Several characteristics, such as  $a^*$  value ( $>12.54$ ),  $b^*$  value ( $>26.96$ ), FM ( $>1.01$ ), average particle diameter ( $>0.21 \text{ mm}$ ), solubility ( $>59.53\%$ ), and dispersibility ( $>6.47\%$ ) increased respectively. Furthermore, the agglomeration process did not influence the flow characteristics ( $CI \leq 10$ ;  $HR \leq 1.2$ ). PCA tends to visualize the interaction of research variables and their characteristics with more than 78% variances (78.35%). By the TOPSIS analysis, the best treatment was chosen for W1T0,5A respectively.

Keywords : batch steam agglomerator, instant cocoa powder beverage, solubility, instant powder characteristics

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