

INTISARI

Penelitian tentang integrasi mesin ekstrusi dengan manufaktur aditif sudah umum dilakukan pada bidang farmasi, namun belum ada penelitian untuk menggabungkan kedua metode tersebut untuk memproduksi daging analog. Oleh karena itu pada penelitian ini, diharapkan dapat melihat potensi metode baru dalam memproduksi daging analog yang bertekstur dengan menggunakan mesin ekstrusi sederhana berporos ganda. Sebelum dapat mengintegrasikan teknik ekstrusi dengan manufaktur aditif, perlu dilakukan penelitian tentang pengaruh perubahan parameter pada mesin ekstrusi (temperatur barel) dan juga komposisi bahan baku (persentase massa, kadar air dan kadar minyak) karena dapat memengaruhi tekstur daging analog yang dihasilkan.

Tujuan penelitian ini adalah melihat interaksi parameter persentase tepung kedelai *Isolated Soy Protein (ISP)* dan tepung gandum *Wheat Flour (WF)*, parameter kadar air, parameter temperatur barel, dan parameter kadar minyak. Pertama dilakukan eksperimen untuk melihat parameter mana yang memiliki *main effect*. Didapatkan bahwa parameter temperatur barrel, kadar air dan kadar minyak merupakan *main effect* dari hasil uji analisis tekstur. Parameter temperatur barel paling berpengaruh terhadap nilai *Hardness*, *Adhesiveness*, *Gumminess* dan *Chewiness* sedangkan parameter kadar air paling berpengaruh terhadap nilai *Cohesiveness*, dan kadar minyak paling berpengaruh *Springiness*.

Selanjutnya dilakukan eksperimen untuk melihat interaksi antar parameter. Interaksi antara parameter temperatur barel dan kadar air (suhu*air) berpengaruh signifikan terhadap *Hardness*, *Gumminess* dan *Chewiness* (*Turkey's test*, $p < 0,05$). Sementara pada interaksi parameter kadar air dan kadar minyak (air*minyak) tidak menunjukkan pengaruh signifikan (*Turkey's test*, $p < 0,05$) terhadap hasil uji analisis tekstur. Sedangkan interaksi parameter minyak*suhu menunjukkan pengaruh signifikan (*Turkey's test*, $p < 0,05$) terhadap *Gumminess* dan *Chewiness*.

Kata kunci: daging analog, mesin ekstrusi, analisis tekstur.

ABSTRACT

Research on the integration of extrusion machines with additive manufacturing is common in the pharmaceutical field, but there has been no research to combine the two methods to produce analogue meat. Therefore, this research is expected to overlook the potential of a new method in producing textured analogue meat using a simple twin screw extrusion machine. Before being able to integrate extrusion techniques with additive manufacturing, it is necessary to conduct research on the effect of parameter changes on the extrusion machine (barrel temperature) and the composition of raw materials (mass percentage, moisture content and oil content) because it can affect the texture of the analog meat produced.

The purpose of this study was to see the interaction of the parameters of the percentage of soybean flour Isolated Soy Protein (ISP) and wheat flour Wheat Flour (WF), water content parameters, barrel temperature parameters, and oil content parameters. First, an experiment is conducted to see which parameters have the main effect. It was found that the parameters of barrel temperature, water content and oil content were the main effects of the results of the texture analysis test. The barrel temperature parameter has the most influence on the Hardness, Adhesiveness, Gumminess and Chewiness values, while the water content parameter has the most influence on the Cohesiveness value, and the oil content has the most influence on Springiness.

*Furthermore, experiments were carried out to see the interaction between parameters. The interaction between the parameters of barrel temperature and water content (temperature*water) has a significant effect on Hardness, Gumminess and Chewiness (Turkey's test, $p < 0,05$). Meanwhile, the interaction of the parameters of water content and oil content (water*oil) did not show a significant effect (Turkey's test, $p < 0,05$) on the results of the texture analysis test. Meanwhile, the interaction of oil*temperature parameters showed a significant effect (Turkey's test, $p < 0,05$) on Gumminess and Chewiness.*

Keywords: *analogue meat, extrusion techniques, texture analysis.*