

## MULTIFUNCTIONAL CHICKEN SAUSAGE PRODUCTION WITH BIT POWDER SUBSTITUTION

### ABSTRACT

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This study aims to determine the characteristics of tubers, determine the preparation and drying of tubers to optimize their ability as natural antioxidants and natural dyes, determine the substitution level of tuber flour as a *filler*, a source of natural antioxidants, and a source of natural coloring in chicken sausage processing and determine the functional properties of chicken sausage. tuber flour substituted on performance and fat profile in the blood of rats *Rattus norvegicus* L.. This research consists of three stages. The first research stage was to produce tuber flour as the selected antioxidant and natural dyes source. The second research stage was to obtain the best ratio of tuber flour substitution, antioxidants, and natural dyes in chicken sausages with a ratio of tapioca flour: beet flour, namely 18: 0, 17: 1, 16: 2, and 15: 3. The third stage of research was to determine chicken sausage's functional properties on the performance and lipid profile of rats *Rattus norvegicus* L with sausage feed at doses of 1.8, 2.7, and 3.6 g / head/day. Quantitative data, tuber secondary metabolite compound data, chemical composition data, physical quality, performance data, and lipid profiles were statistically analyzed using a variance, and differences between means-tested using the DMRT test. Microstructure data were analyzed descriptively. The results showed that carrots, purple sweet potatoes, and beets all have secondary metabolite compounds and also have potential as a source of natural antioxidants and a source of natural dyes with different characters. The beets' flavonoid content was  $2.15 \pm 0.03$ , and a total phenol content was  $13.26 \pm 0.07$  % b / b. The highest antioxidant activity contained in beets as the selected tubers was  $0.39 \pm 0.03$ %. The carbohydrate content ( $5.69 \pm 0.84$ %) and low fat content ( $0.05 \pm 0.02$ %). The preparations *Non-blanching* chosen because they produced higher antioxidant activity than preparations using *blanching* was  $0.36 \pm 0.02$ %. The chromatographic color indicator as a chromatic red color producer (a) was also higher ( $52.27 \pm 0.0$ %). The content of metabolite compounds such as betalain in beets is also higher in preparations *non-blanching*, which is  $6.52 \pm 0.22$  mg / g. The manufacture of beet flour by drying the *freeze dryer* on beet flour contained  $6.82 \pm 0.25$  mg / L betalain. The optimization of heating temperature in the use of beet flour is 80 ° C. The second study results substituting tapioca flour in chicken sausage processing further improve the chicken sausage's chemical, physical, and sensory quality. Based on the chemical quality, chicken sausage with 2% substitution of beet flour produces sausages with a high protein content of  $14.77 \pm 0.02$ % while a low-fat content of  $0.42 \pm 0.01$ %. Based on DIA's physical quality produced on the substitution of beet flour, 2% has a mean, almost the same as without beet flour. The longer the storage time for chicken sausages, the higher the average TBA value, while increasing beet flour substitution will slow down the increase in the TBA value. Beet substitution with a ratio of 16: 2 will be optimal to inhibit the rate of increase in TBA <2 days. Based on this, chicken sausage with a substitute of 2% beet flour functions as a filler and as a source of antioxidants because it can inhibit the rate of product damage due to oxidation during storage and can also function as a source of natural dyes. The optimal substitution to produce a good emulsion is the substitution level of 16: 2 beet flour. Chicken sausage substituted by beet flour based on chemical, physical, and sensory test results selected was chicken sausage with a ratio of 16: 2 beet flour substitution. initial range was  $179.0 \pm 2.6$  -  $182.6 \pm 3.9$  g / head. The highest increase in daily body weight gain (ADG) found in mice with the provision of AIN 93M was  $234.4 \pm 3.8$  g / head/day, while the lowest was found in rats who consumed chicken sausage substituted by beet flour with a dose of 2.7 g / head/day of  $0.66 \pm 0.4$  g / head/day. In addition to the attainment of PBBH, which can slow the rate of increase, it is also necessary to observe the lipid profile's impact. Testing the consumption of chicken sausage substituted by 2% beet flour affected increasing HDL, lowering cholesterol, LDL, triglycerides, and glucose. Giving chicken sausage containing 2% beet flour at a dose of 2.7 g / head/day will increase HDL if consumed for 3 consecutive weeks. The higher the dose of sausage consumed, the lower the blood MDA level, namely by  $2.23 \pm 0.74$ . Sausage with red beetroot substitution powder provision positively affects mice by decreasing free radical levels in the body. MDA product was an indirect index of oxidative damage. Consumption dose of 2.7 g / head/day with the average consumption of chicken sausage substituted by beet flour was  $2.07 \pm 1.07$  g / head/day on the mean of rats with an average weight of  $189.8 \pm 8.8$  g / head. equivalent to a consumption of 0.33 g / kg / day. Based on this, the recommended consumption of chicken sausage containing 2% beet flour is



## PRODUKSI SOSIS AYAM YANG DISUBSTITUSI DENGAN TEPUNG UMBI SEBAGAI PANGAN FUNGSIONAL

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0.33 g / kg BW / day with a maximum time limit for consecutive consumption of 3 weeks. The conclusion based on exploration, beets contain secondary metabolite compounds (flavonoids, phenols, and alkaloids). Preparation of fresh beets using non- *blanching* with drying *freeze dryer* produces beet flour, can be applied as a *filler* in chicken sausage processing. The best substitution of beetroot as *filler* in chicken sausage is 16:2 to produce chicken sausage, optimal chemical, physical, and sensory properties. Consumption of chicken sausage substituted with beet flour at a dose of 2.7 g / head/day in rats proves that chicken sausage also has functional properties because it can slow down PBBH, increase HDL, reduce cholesterol, LDL, triglycerides, glucose, and MDA. Based on these results, chicken sausage substituted with beet flour can be consumed as a functional chicken sausage as much as 0.33 g / kgBB / day with a maximum time limit of 3 consecutive weeks.

Keywords: chicken sausage, beet flour, antioxidants, and functional food