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**Name :** NURAIN BINTI AZIMAN

**Title :** ANTIOXIDANT CAPACITY AND ANTIMICROBIAL ACTIVITY OF SELECTED AROMATIC MALAYSIAN HERBS AND THEIR EFFECTS ON THE STORAGE STABILITY OF MECHANICALLY DEBONED CHICKEN MEAT SAUSAGE

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Mechanically deboned chicken meat (MDCM) is widely used due to the lower price however it is very susceptible to oxidative rancidity and microbial growth. Hence, this study was conducted to produce a quality MDCM sausage with added nutritional values by diversify the usage of six aromatic Malaysian herbs; *Persicaria hydropiper* (L.) H. Gross, *Citrus hystrix* DC, *Murraya koenigii* Spreng., *Etlingera elatior* (Jack) R.M. Sm., *Cymbopogon citratus* Stapf and *Kaempferia galanga* L. as functional food ingredients. Spectrophotometric method and RP-HPLC were used to identify and determine phenolic acid and flavonoid compounds of aromatic Malaysian herbs. DPPH radical scavenging, ferric reducing antioxidant power (FRAP),  $\beta$ -carotene bleaching and oxygen radical absorbance capacity (ORAC) assays were used to determine antioxidant capacity, and the antimicrobial activity was determined using disc diffusion assay. An optimum formulation of MDCM sausage incorporated with selected aromatic Malaysian herbs was obtained using a mixture design (Design Expert 8.0.1) software. The synergistic effect of these herbs on the storage stability of MDCM sausage was also determined throughout the nine months of frozen storage ( $-18^{\circ}\text{C}$ ), and was compared with the formulation without any incorporation herb (control) and formulation incorporated with BHA/BHT combination. Results showed gallic acid, (-)-epicatechin and myricetin were the major bioactive compounds detected in six aromatic Malaysian herbs. However, only *P. hydropiper*, *M. koenigii* and *E. elatior* exhibited strong and moderate antioxidant and antimicrobial

activities, and they were used in MDCM sausage formulations. MDCM sausage which consists of *P. hydropiper* and *E. elatior* (59.46%, 40.54%) was optimised with the highest desirability of 0.93. The other two formulations also obtained from the mixture design consist of *P. hydropiper* and *M. koenigii* at two proportions (53.32%, 46.68%) and (50.00%, 50.00%) with 0.795 and 0.793 of desirability, respectively. The incorporation of dried *P. hydropiper*, *M. koenigii* and *E. elatior* into MDCM sausage formulation as suggested by mixture design was found to exhibit synergistic effects which include improvement in the water-holding capacity (WHC), cooking yield, texture and sensory properties. Besides that, the incorporation of these herbs was also found to reduce the cooking loss, rates of darkening in colour, rates of lipid oxidation, and decrease microbiological spoilage which comparable with formulation incorporated with BHA/BHT combination. However, the combination of *P. hydropiper* and *E. elatior* (59.46%, 40.54%) in MDCM sausage formulation had a lower shelf life compared to the combination of *P. hydropiper* and *M. koenigii* (53.32%, 46.68%), *P. hydropiper* and *M. koenigii* (50.00%, 50.00%) and also BHA/BHT, where their shelf life can be extended up to nine month of frozen storage period. Hence, from this study it can be concluded that combinations of *P. hydropiper* and *M. koenigii* at two different proportions (i.e. 53.32%, 46.68% and 50.00%, 50.00%) can be used in the development of quality and nutritious MDCM sausage.