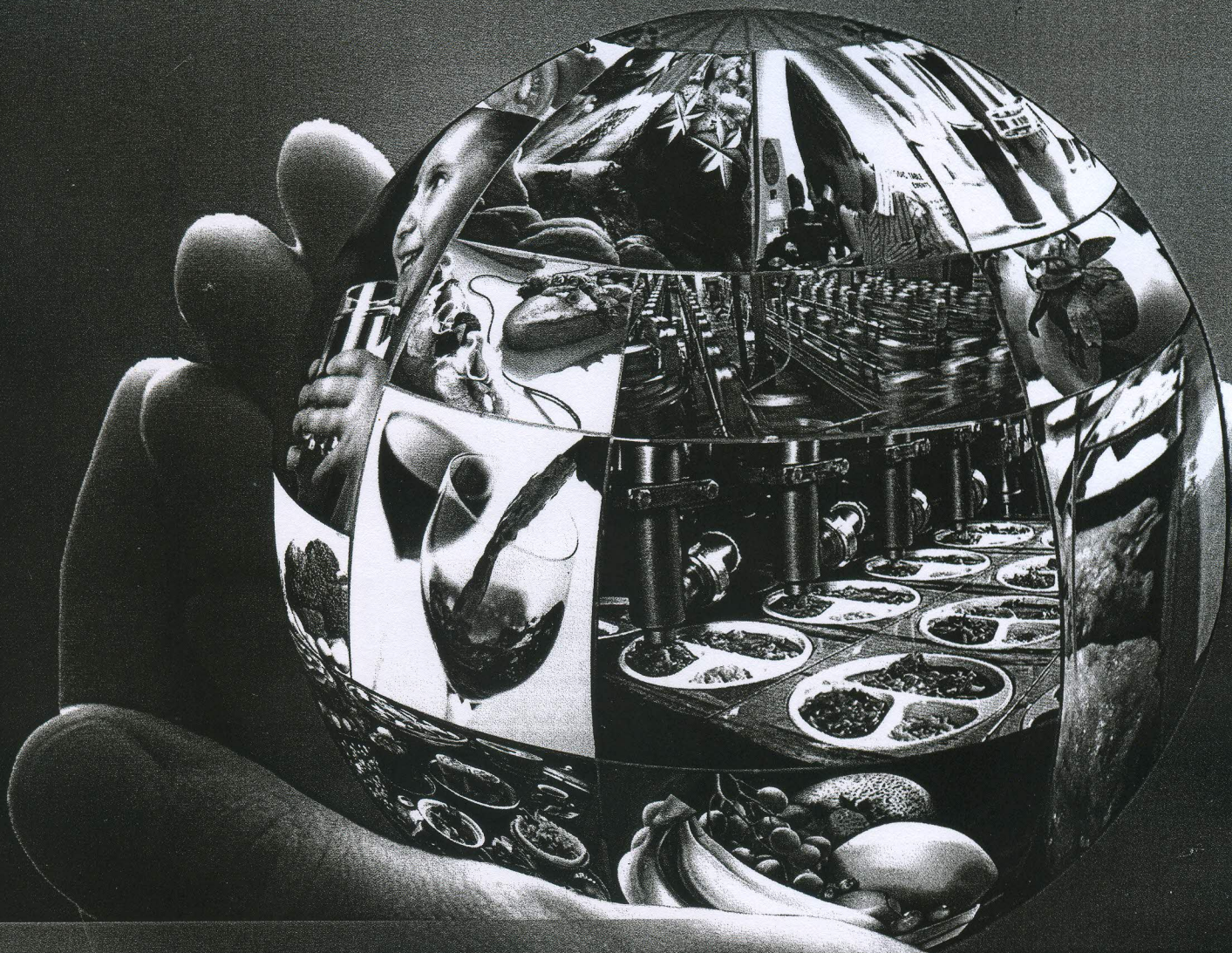# Food Innovation Asia Conference 2013

"Empowering SMEs through Science and Technology"

BOOK OF ABSTRACT

13-14 JUNE 2013
BITEC, BANGKOK, THAILAND

Prince of Songkla University · MAEJO UNIVERSITY · PROPAK ASIA 2013 · FoSTAT · AIAC · FoSTA · AOAC THAILAND

OB-5

Differentiation of pork from other meat species by lipid analysis methodologies

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Abstract

A study was conducted to establish various lipid analysis methodologies to differentiate pork from other meat species such as cow, lamb, and chicken for halal authentication purposes. Extraction of lipids from meat species was done using a chloroform–methanol mixture according to the methodology of Folch et al. (1957). The isolated lipid samples were analyzed using instrumental techniques such as gas liquid chromatography (GLC), reversed-phase high performance liquid chromatography (RP-HPLC), elemental analyzer–isotope ratio mass spectrometry (EA-IRMS), and differential scanning calorimetry (DSC). According to GLC, lard and chicken fat shared common characteristics by having palmitic, oleic and linoleic acid as major fatty acids while beef and mutton fats shared common characteristics by possessing palmitic, stearic and oleic acid as major fatty acids. As direct comparisons among the fatty acid data may not be suitable for discrimination of different animal fats, the percent palmitic acid enrichment factor [PAEF (%)] was found to be very much useful to differentiate lard from other meat species. RP-HPLC analysis showed that triacylglycerol profile of lard was quite different from that of beef fat, but appeared to be closely related to that of chicken fat. Because of this, some peak ratios based on stearoyl-palmitoyl-oleoyl glycerol (SPO), linoleoyl-palmitoyl-oleoyl glycerol (LPO) and dioleoyl-palmitoyl glycerol (OPO) were found to be useful parameters to differentiate lard from other meat species. According to EA-IRMS analysis, determination of the carbon isotope ratios ($\delta^{13}C$) would be a good indicator for discriminating lard from other animal fats. In the DSC analysis, lard displayed cooling and heating profiles which were completely different from those of other animal fats. In conclusion, all these techniques provide some basis for halal authentication of meat species, and one technique can become a confirmatory to another technique.

Keywords: Animal fats, food adulteration, halal authentication, lard detection