

# **DETERMINATION OF PORK ADULTERATION IN MEATBALLS USING ENZYME LINKED IMMUNO SORBENT ASSAY (ELISA) TECHNIQUES CASE STUDY: SMALL MEDIUM ENTERPRISES MEATBALLS TRADERS AT JATINANGOR EDUCATION AREA, SUMEDANG DISTRICT, WEST JAVA, INDONESIA**

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**Abstract:** Adulteration of meatballs using pork begins to bloom in a row with the increase of beef price in the market. There is a risk that can occur around the education area of Jatinangor. Therefore the identification of meatballs adulteration with enzymes linked immuno sorbent assay (ELISA) approach need to be done in order to create certainty and security guarantee of the consumed products. Results showed that Small Medium Enterprises (SMEs) in Jatinangor who process meat (meatballs) was 21 meatball traders around Jatinangor. ELISA tests on 21 meatball samples taken from the SMEs merchant in Jatinangor showed no pork-adulterated meatballs on all of the samples tested.

**Keywords:** Pork, Adulteration, Meatballs, ELISA

## **Introduction**

Jatinangor is one of education area in West Java that dominated by four large universities such as Universitas Padjadjaran, Institute Technology Bandung, Ikopin and IPDN. These conditions give rise to new demands for the fulfillment of food and snacks that are cheap and nutritious. One of the food that popular among college students is meatballs. Meatballs become favourite because of sufficient nutritional value, taste and ease of preparation. However, the high price of meat and uncontrolled supply recently allegedly made it more difficult for producers to produce high quality meatballs with the appropriate raw materials.

To overcome the raw material problem, producers could substitute beef as main ingredient with other types of meat. However some producers who want to

reap greater profits misunderstand this clause. Pork used as substituent because it was cheaper and produces meatballs that have the closest characteristics of beef meatballs. This poses a serious threat to the security and halal processed meat products are consumed. The ingredients substitution practices break no laws but in many countries ingredients can also generate religious concern, such as pork contains ingredients are prohibited by Moslems (non-halal) (Roostita, *et al.*, 2009).

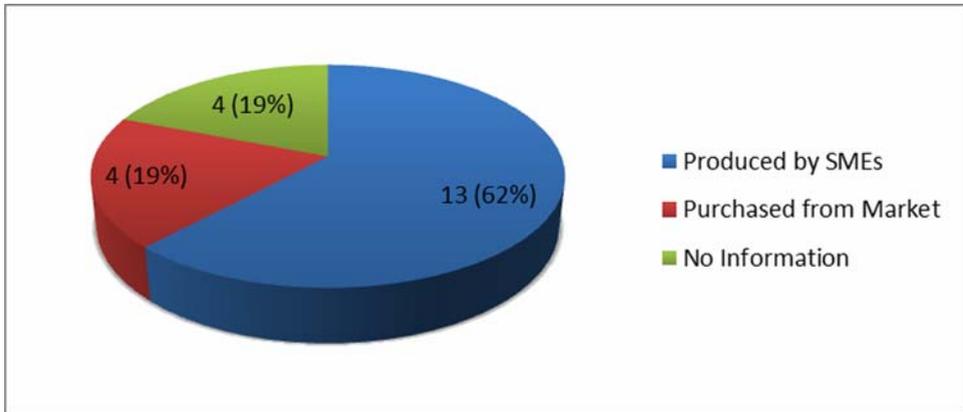
Adulteration test on meat product were so difficult, especially heat processed product like meatballs, because heat process resulting denaturized proteins (Hoffman, *et al.*, 1996). Therefore, antibodies to heat-stable soluble proteins, which retain their antigenicity after high temperature process, must be prepared (Rencova, *et al.*, 2000). Enzymes linked immunosorbent assay (ELISA) approach allows the identification of different types of meat mixture in very low quantities or have undergone changes caused by processing. The test expected to provide a guarantee and assurance of the quality and safety of processed products (meatballs) generated by SMEs in the Jatinangor Education Area Sumedang, West Java-Indonesia.

## **Materials and Methods**

The SMEs meatballs traders in Jatinangor Education Area (JEA) were identified by survey method. Samples were taken from the SMEs meatball merchant at Educational Area Jatinangor, Sumedang District, West Java-Indonesia. Meatballs samples are prepared for enzyme linked immunosorbent assay test using Tepnel BioKits Pork Cooked Identification Test Kit Cat. No. 902012N (Roostita, *et al.*, 2009).

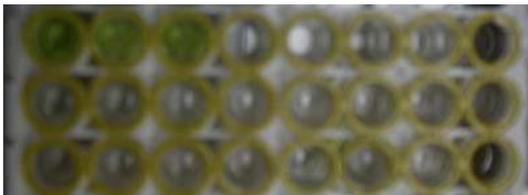
## **Results and Discussions**

Survey of SMEs meatballs traders in JEA showed there were 21 meatballs traders around JEA that frequently accessed by students. Only 13 (62%) of traders that produce their own meatballs, while 4 (19%) of traders purchased the meatballs from the traditional market and 4 (19%) others did not gave appropriate information.



**Figure 1. Survey of JEA SMEs Source of Meatball**

Traders who produce their own meatballs were settled traders. It is because the traders want to maintain consumer safety and confidence in the quality of products. Meanwhile trader who purchased meatballs from the market or do not provide information are traders who used carts that are not settled. The ease in preparation becomes one of the considerations, in addition, the mobility of traders allow alternation buyers so the traders did not worries about losing customers. It is affect to the lack of attention to the quality of the meatballs sold.



-	-	-	-	-	-	-	-
1	2	3	4	5	6	7	8
-	-	-	-	-	-	-	-
9	10	11	12	13	14	15	16
-	-	-	-	-	+	+	+
17	18	19	20	21	22	23	24

No Sample 1-21: Meatballs Samples, 22-24: Positive Control

**Figure 2. Enzyme immunoassay result**

Twenty-one samples were taken from the SMEs meatballs merchant to identify pork adulteration on sold meatballs and tested using ELISA. The ELISA kit was utilizing a biotin-avidin enhancement process. With increased concentrations of pork-specific protein in the extract, more of the protein will bind to antibody attached to the well. After allowing the reaction to proceed, unbound material is removed by washing. The amount of specific protein bound to the antibody coated well is determined by reaction firstly with biotinylated and also with a streptavidin-peroxidase conjugate. After incubation, access reagent is removed by washing. Finally, bound peroxidase activity is determined by adding a

fixed amount of Tetramethylbenzidine (TMB) substrate which develops a blue color (changing color to yellowish green on addition of acid stop reagent) in the presence of peroxidase. Color development is proportional to the original amount of specific pork protein in the samples extract (Roostita, *et al.*, 2009).

The test on 21 samples taken from meatballs merchants in JEA showed no pork adulteration. This is because the meatball traders realize the importance of raw materials quality that related to halal meatballs. Merchants already have the knowledge of halal meatballs so that the traders do not worry about the meatballs sales. Halal is a sensitive issue because most of the residents of JEA were Muslim. If the trader commit an adulteration by mixing pork into the meatballs, although at certain times provide very high gain however this may threaten the business sustainability.

## Conclusions

There were 21 meatballs traders around JEA that frequently accessed by students. Thirteen (62%) of traders produce their own meatballs, 4 (19%) of traders purchased the meatballs from the traditional market and 4 (19%) others did not give appropriate information. The ELISA test on 21 samples taken from meatballs merchants in JEA showed no pork adulteration.

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## **Određivanje svinjetine u ćuftama primenom enzim imunosorbent test tehnike (ELISA): mala i srednja preduzeća, trgovci iz Jatinangor oblasti, Sumedang distrikt, zapadna Java, Indonezija**

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## Rezime

Upotreba (nedozvoljena) svinjetine u proizvodnji ćufti počinje da cveta sa povećanjem cene govedine na tržištu. Stoga identifikacija korišćenja nedozvoljene svinjetine u ćuftama korišćenjem enzima imuno sorbent testa (ELISA) je neophodna kako bi se osigurala sigurnost i bezbednost za konzumiranje proizvoda. Studija je uključila mala i srednja preduzeća (SME) u Jatinangor oblasti koja prerađuju meso (ćufte) kao i 21 preduzeće koje se bave trgovinom proizvoda od mesa u oblasti Jatinangor. ELISA testovi na 21 uzorku ćufti uzetih u malim i srednjim preduzećima (SME) u Jatinangor oblasti nisu pokazivali prisustvo svinjetine u analiziranim uzorcima.

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