

Qualitative Detection of Pork Products and Health Effects using Immunoassay

AL-Mofarji S¹, Hussien H¹, Jaber MM¹, Almayahi BA^{2*}, Ameen B¹ and AL-Jumaa Z³

¹Forensic DNA Research and Training Center, AL-Nahrain University, Iraq

²Department of Ecology, Faculty of Science, University of Kufa, Iraq

³Department of Internal and Preventive Medicine, College of Veterinary, University of Mosul, Iraq

Abstract

Lipid Pig derivatives may find in any foods that are prohibited from consumption by Muslims for this reason, an analytical method requires to give an accurate result to assure the halal of food. This study was aimed to detect “pork” lipid pig derivatives that can meet of a different trademark which are found in supermarkets of several places of Baghdad/Iraq. A fast technique was using a strip immunoassay method; 35 samples were collected for different trademarks. The results were found the trademark were tested is free of pork derivative.

Keywords: Pig derivative; Pork; Halal Food

***Correspondence to:** Basim A Almayahi, Department of Ecology, Faculty of Science, University of Kufa, Najaf, Iraq, E-mail: basimnajaf@yahoo.com

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Introduction

All of Muslims must be consume and use halal foods. Now days many food products of different trademarks are found in Iraqi market for using which the real content of these material not known. So, that halal verification is need. Different kind of non-halal components may be found just like pig derivative: pork, lard and gelatin. One of the easiest ways to determine these contents by using a qualitative method depends on immune assay which find a specific marker present or absent in products [1]. For Muslims consumption, knowing the content of raw materials and process of production is essential in Syari'ah law stating that any Muslim must consume only the halal and healthy products. From that point it is necessary because many consumer products are imported from places (nation) which do not depends on the restriction of Halal preparation according to Islamic syari'ah law. There are different approaches in order to determine and qualify the presence of non-halal derivative food products. One of them is by detecting the ratios between some chemical constituents and assuming that these ratios are constant food products and any addition in food products will change these ratios. Always this method is depending on a set number of analyses and the use of chemo metrics. But other approach, is by using analytical methods derived from physical analysis by using the whole samples to show the presence of small particles effects on the physico-chemical properties [2]. The analytical methods used for the determining of oils and fats particles including lard are based on the differences in the nature and the composition of the minor and major components of these particles and those of the unadulterated oils or fats. These methods usually depend on their physico-chemical constants

or based on chemical and biological measurements [3]. On the other hand, another method depends on found a specific marker in food content, either chemical constituents or morphological components, which proves the presence of the pig derivatives in food products [4].

Material and Methods

Thirty-five sample were collected for different trademark and different meat product found in Iraqi market in Baghdad for two months. All of them were tested to the presence of pork pig derivative in their component. This test depends on immune-chromatographic assay in which target antigen bound to specific antibody immobilized to colored micro particles, then antibody-antigen complex moved towards the result line where bind to second antibody labeled with enzyme to give colored which indicate positive result [5].

Test Procedure

- Put test strip at room temperature before use
- Gridding the sample very well and adding to warm distill water 1:5 in order to have a homogenize sample solution.
- Open the strip carefully.
- Put the strip in sample solution for 5 -10 second.
- Wait for 15 minutes to check the results.

Interpretation of the Results

- When two color line appeared that give indication for positive result



- But when only one-color line appear this give indication for negative result.



Results and Discussions

The results of the 35 tested samples showed that all samples were collected for different trade mark and from different places area in Baghdad, Iraq it is free of pork pig derivative, which is imported from different countries in Middle east or from Europe, but this result did not mean these foods product are halal because it may contain other derivative. Rapid Immunochromatographic test consider as an easy, rapid, sensitive and selective method for detection of pork derivative in food products.

On the other hand, chemical analysis plays an important role in verification and to authenticate the halal products, but the chemical analytical method does not cover all non halal matters. It should be developing a new analytical technique with the increasing complexity of the consumer products [6]. Based on chemical characteristics of foods, drugs and cosmetic which consider most important three categories for consumption can be tested using a chemical analysis method, these methods are basically depends on qualitative not quantitative because haram and halal status depends on kind of matter rather than quantity. There are several problems faced the chemical analytical methods one of them is that foods products are generally mixed with other materials have similar chemical properties, for example lard is mixed with fat from plant origin so, that it is difficult to identify the target compound, on the other hand haram products may contaminate with other materials during processes or testing that will give a false negative results so, that detection methods used must be selective and sensitive [6].

This paper will not present detail of the chemical analysis as it has been fully described by the author in for analysis of pig derivatives in food and by same author in for lard analysis in food products [7,8]. Fourier Transform Infrared Spectroscopy FTIR Spectroscopy was reported in to give accurate and reliable results with a 3% detection limit for analysis of lard in the mixture with other animal fats [9]. FTIR spectroscopy was also developed for quantitative analysis of lard in some food products such as chocolate, cake and meatball formulations [10]. In addition, this method is simple to perform and offer rapid result. The use of chromatographic-based techniques for analysis of non-halal items can be found in [7]. Meanwhile, the differential scanning calorimetry is one of the thermal analytical methods used

to characterize the thermal properties of non-halal items [8]. DNA-based technology is an important approach for species identification. It is understandable because DNA is relatively stable during and after process of production. Every species has its own specific character different from the other. However, this is difficult to apply in its derivatives, especially when further reactions occur.

Conclusion

Determination of pig derivative in consumption food products consume by Muslims peoples is necessary obligate and there are many methods can be use but some of them need to be in the laboratory and some laboratory equipment must be available. So, that this method uses in this paper consider to be easiest, fast and non-expensive method can any one use it for detection pig derivative in meat product that can be use in our food. This method considers to be a qualitative method determine specific antigen in food, the important of this research and other research concern with the same purpose to ensure the halal of some food products even in Arabic or Islamic country or in European and American country.

References

1. Rohman A, Che Man YB. Analysis of pig derivatives for halal authentication studies. *Analysis of Pig Derivatives for Halal Authentication Studies*. *Food Rev Int* 28: 97-112. <https://doi.org/10.1080/87559129.2011.595862>
2. Cordella C, Moussa I, Martel AC, Sbirrazzuoli N, Lizzani-Cuvelier L (2002) Recent developments in food characterization and adulteration detection: Technique-oriented perspectives. *J Agr Food Chem* 50: 1751-1764. <https://doi.org/10.1021/jf011096z>
3. Kowalski B (1989) Sub-ambient Differential scanning calorimetry of lard and lard contaminated by Tallow. *Int J Food Sci Technol* 24: 415-420. <https://doi.org/10.1111/j.1365-2621.1989.tb00661.x>
4. Fadzillillah NA, Man YB, Jamaludin MA, Rahman SA, Al-Kahtani HA (2011) Halal food issues from Islamic and modern science perspectives. In *2nd International Conference on Humanities, Historical and Social Sciences* 171: 59-163.
5. Mursyidi A (2013) The role of chemical analysis in the halal authentication of food and pharmaceutical products. *J Food Pharm Sci* 1: 1-4. <https://doi.org/10.14499/jfpps>
6. Rohman A, Sisindari, Erwanto Y, Che Man YB (2011) Analysis of pork adulteration in beef meatball using Fourier transform infrared (FTIR) spectroscopy. *Meat Sci* 88: 91-95. <https://doi.org/10.1016/j.meatsci.2010.12.007>
7. Rohman A, Che Man YB (2008) Review article: Analysis of lard in food products for halal authentication study. *Agritech* 28: 192-201.
8. Che Man YB, Mirghani ME (2001) Detection of lard mixed with body fats of chicken, lamb, and cow by fourier transform infrared spectroscopy. *J Am Oil Chem Soc* 78: 753-761. <https://doi.org/10.1007/s11746-001-0338-4>
9. Syahariza ZA, Man YC, Selamat J, Bakar J (2005) Detection of lard adulteration in cake formulation by Fourier transform infrared (FTIR) spectroscopy. *Food Chem* 92: 365-377. <https://doi.org/10.1016/j.foodchem.2004.10.039>
10. Ali ME, Mustafa S, Hashim U, Che Man YB, Foo KL (2011) Nanobioprobe for the determination of pork adulteration in burger formulations. *J Nanomater* 2012. <https://doi.org/10.1155/2012/832387>