HALAL STATUS OF ETHANOL IN BAKERY PRODUCTS

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Abstract

The complexity of food nowadays makes the Halal status of food are uncertain for Muslim consumers. Some food ingredients which are not permissible in Islam might be unintentionally added by food producers. This circumstance makes Halal Certification and Halal Assurance become crucial. Ethanol is the main constituent produced during fermentation of carbohydrates derived from fruits and other biomass substances. Setting the limit of ethanol in Halal food industries is needed to facilitate food production and complied with certain religious demands. In this review, ethanol levels in different kinds of bakery products and baked goods is addressed. Analytical methodology used for determining ethanol percentage is Headspace Gas Chromatography with FID Detector. The results data tells ethanol levels in the tested samples varies from 0.01% to 5 % v/w. Fruit and chocolate-based cakes detected for high amount of ethanol in this review.

Keywords: Ethanol, Halal, GSO, GC, FID

Introduction

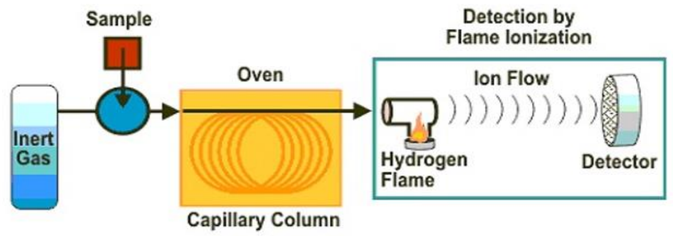
Halal refers to any object that is permissible to use according to Islamic law. To access the Halal market, it is necessary to obtain Halal certification. As Halal has strict alcohol regulations, it can be difficult to obtain Halal certification for many food products due to the small amount of alcohol naturally produced by fermentation. In this regard, it is necessary to establish an exact method for measuring alcohol in various food. One of the critical parts in issuing Halal certificates is the level of permissible alcohol content in food products.

The aim of this study was to investigate the percentage of ethanol content in various bakery products including cake, chocolate available in Dubai market. Headspace gas chromatography with flame-ionization detection (HS-GC–FID) has become the gold standard for ethanol analysis because of its ease of automation, sensitivity, accuracy, and relative specificity

Analytical Methodology

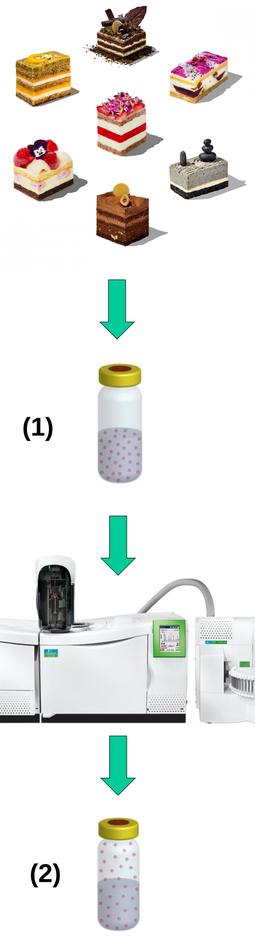
Gas chromatography–flame ionization detector **(GC–FID)** has been used as an analytical method for the determination of ethanol content in various food and food products. The alcohol contents of various bakery products, cakes and chocolate samples have been analyzed by this method. Commercial cake and chocolates samples were obtained from Dubai local market. All samples were analyzed on the HS-GC–FID instrumentation using n-propanol as an internal standard (ISTD). Volatile sample components are extracted from the non-volatile aqueous samples by heating, pressurizing the vial and then sampling from the equilibrated gas phase above sample phase.

Schematic Diagram GC-FID

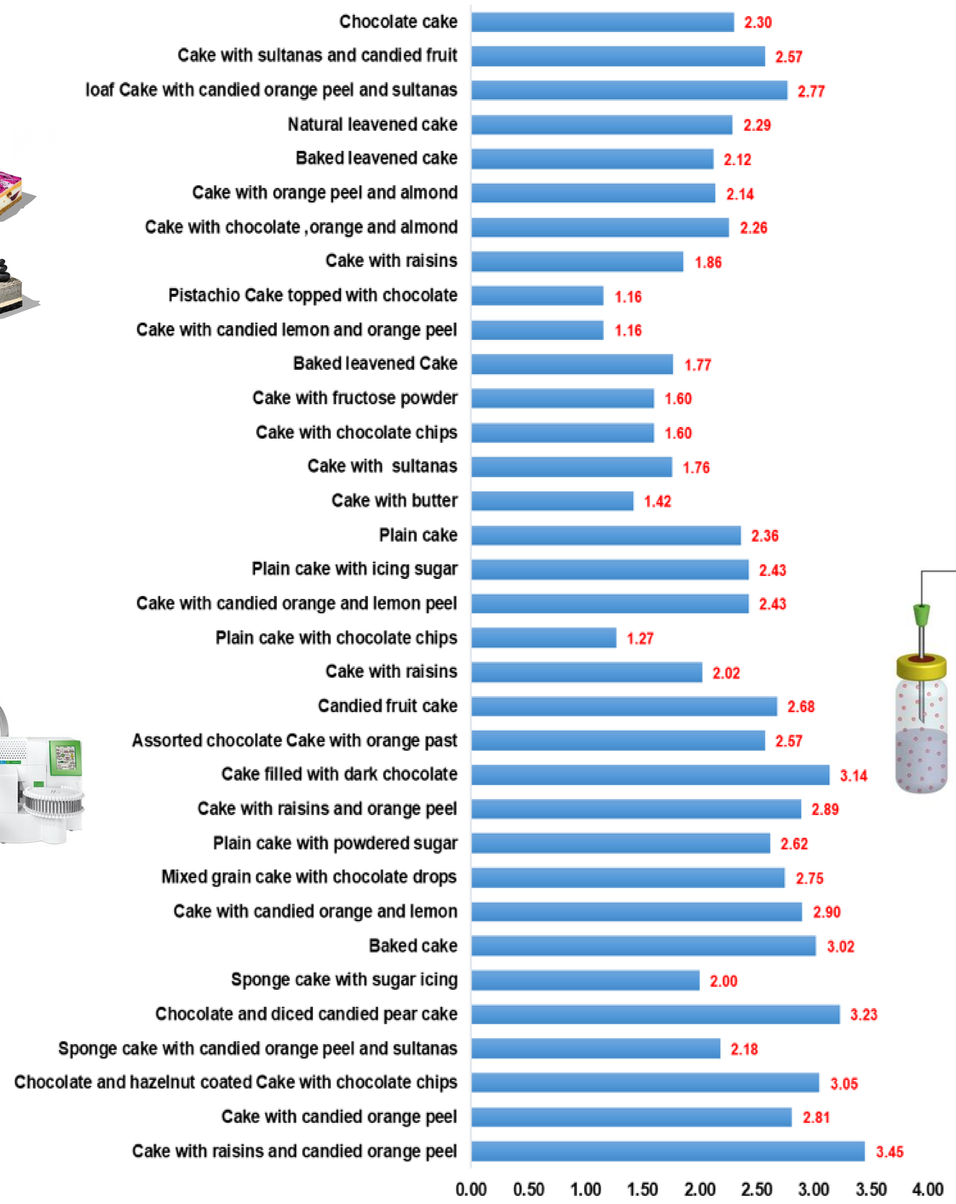


GSO 2538:2021, Edition : 2 Approved on 01 July 2021

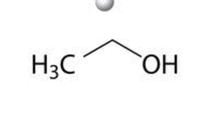
The content of ethyl alcohol (ethanol) resulting from natural fermentation of the ingredients, naturally present in the product, shall not exceed the maximum limits mentioned in the standard **GSO 2538:2021**. The limits present in this are standard limits for accepting or rejecting food products.

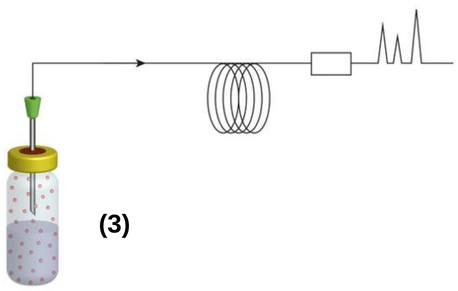


Ethanol Content Found in Various Cake Samples



Ethanol





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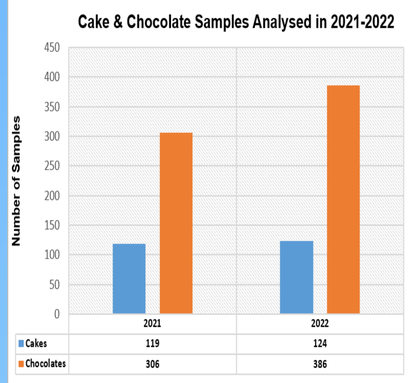
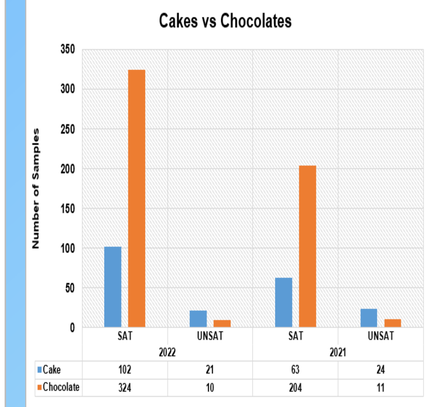
Summary of Results





Conclusion

200 cake and 550 chocolate samples were collected from Dubai market and were tested for the presence of ethanol content using Headspace GC with Flame Ionization Detector. The data presented show that alcohol percentage in some of the cakes and chocolate samples were exceeded the maximum limits for residues of ethyl alcohol (ethanol) adopted by GCC Standardization Organization. Presented work show that 20% cake and 3.5% chocolate samples were exceeded the MRL (GSO 2538).

Although, a controlled manufacturing process is maintained in the non-alcoholic beverage industry, some products might include a trace ethanol in the final product. This trace should be only naturally formed by product and not manmade.

Future Direction

There is a great need to create awareness at different levels to choose right food products for the consumption. The determination of specific percentage of ethyl alcohol in food is not related to the safety or quality of the product , but to the HALAL requirements according to Islamic Shariah.

Companies producing food according to any GSO Halal Standard, such as GSO 2055 shall fulfill to the regulatory requirements and rules.

Acknowledgement

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