MEDIUM FILTH
(NAJS MUTAWASSITAH)
INDICATORS IN HALAL FOOD

HALAL FOOD AND NAJS MUTAWASSITAH (MEDIUM FILTH)

Halal food is defined as any food, drink and/or their ingredients that are permitted under the Shari’ah law (Malaysia Halal Standard, MS1500:2009). Halal food should fulfill several conditions including free from ingredients that are najs according to Shari’ah law, has not been prepared, processed or manufactured using equipment that is contaminated with things that are najs according to Shari’ah law and is physically separated from any other food or things that have been decreed as najs by Shari’ah law.

Najs (an Arabic term) is anything that is unclean or filth. Islamic teaching has classified najs into three categories; (1) najsmughallazah (severe filth),

(2) najsmutawassitah (medium filth) and (3) najsmukhaffafah (light filth). Najsmughallazah specifically refers to dogs and pigs including any liquid and object discharge from their orifices, descendants and derivatives.

Najsmutawassitah is considered as medium filth which is filth/unclean that does not fall under severe or light najs such as feces, urine, vomit, blood, pus, carrion, alcoholic drink and other liquid and objects discharged from human or animal’s orifices.

Najsmukhaffafah only consists of urine from male infant upto 2 years of age and who has not consumed any other food except his mother’s milk.

Even though najsmutawassitah is a lighter najs compare to najsmughallazah, najsmutawassitah may come from wide variety of sources, indirectly contaminating food and is more difficult to control. It may come from unhygienic raw materials, unclean or unhealthy food handlers, improper practices in preparing food or it may come from environmental contaminations. The najs may also be carried by animals or pests in food premises.

The contamination of najsmutawassitah in/on food or on equipment is quite difficult to confirm using human senses. The smell, taste and colour of the najs could not be easily identified especially if its amount is relatively minute. Microbiological analysis could be used to verify the contamination of najsmutawassitah in halal food handling, preparation and storage facilities.

MICROORGANISMS IN NAJS MUTAWASSITAH

Since najsmutawassitah originally comes from unclean or filthy matters, it contains considerable amount and many types of microorganisms. For example, bacteria that are present in human feces include...
<table>
<thead>
<tr>
<th>Organism</th>
<th>Coliforms</th>
<th>Strep</th>
<th>Clostridium</th>
<th>Bacteroides</th>
<th>Lactobacilli</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human</td>
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<td>38,000,000</td>
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<td>84,000,000</td>
<td>3,980</td>
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<tr>
<td>Chicken</td>
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<tr>
<td>Dog</td>
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<td>25,100,000</td>
<td>795,000,000</td>
<td>630,000,000</td>
</tr>
</tbody>
</table>

Table 1: Estimation of Microbial Pathogens in Manure (per gram) of Human and Several Type of Animals

**Bacteroidesfragilis, Bacteroidesmelaninogenicus, Bacteroidesoralis, Lactobacillus, Clostridium perfringens, Clostridium septicum, Clostridium tetani, Bifidobacteriumumbifidum, Staphylococcus aureus, Enterococcus faecalis, Escherichia coli, Salmonella enteritidis, Salmonella typhi, Klebsiella sp.,Enterobacter sp.,Proteus mirabilis, Pseudomonas aeruginosa, Peptostreptococcus sp., Peptococcus sp. and Methanogens.**

There could be about 400 billion of bacteria present in 1 gram of human feces. An estimate of microbial pathogens that are present in manure of human and several animals are shown in Table

1. Other types of *najsmutawassitah* like urine, blood, vomit and pus also have many pathogens.

**MICROBI BIOLOGICAL INDICATOR OF NAJS MUTAWASSITAH**

Routinely measuring all of the pathogens that exist in food for determining their presence, absence or at acceptable concentration is not possible. Thus, some researchers suggested the examination of
microbial indicators to indicate the contamination, predict the presence of pathogens and estimates human health risks.

In halal food handling, preparation and storage, the same microbial indicators could be used to indicate the contamination of najsmutawassitah. Below are some examples of microbial indicators:

1. **Coliforms**

The enumeration of total coliform bacteria indicates general sanitary quality of foods and water. This is because coliforms may come from human/animal feces or from environmental sources. Coliforms are rod-shaped, gram-negative, non-sporing bacteria which can ferment lactose with the production of acid and gas when incubated at 35-37°C.

2. **Fecal coliforms**

Fecal coliforms examination normally indicates the fecal contamination even though it may also detect non-fecal microorganisms (e.g. *Enterobacter, Klebsiella, and Citrobacter*). Bacteria of fecal coliforms are facultative anaerobic, rod-shaped, gram-negative and non-sporing forming bacteria. They can grow in the presence of bile salts or similar surface agents, are oxidase negative, and produce acid and gas from lactose within 48 hours at 44 ± 0.5°C.

3. **Escherichia coli**

The detection of *E. coli* indicates fecal contamination. It could be distinguished from total coliform and fecal coliform by beta-glucuronidase-enzyme activity. *E. coli* is a gram-negative, rod-shaped bacterium that is commonly found in the lower intestine of warm-blooded organisms (especially in tropical environment). Escherichia is from *Enterobacteriaceae* family and originally come from gastrointestinal tract of human and animals. Because of this, it is usually used as indicator of feces contamination in food sample.

Most *E. coli* strains are harmless but some such as serotype O157:H7 can cause serious food poisoning in humans. *E. coli* are not always confined to the intestine and their ability to survive for brief periods outside the body makes them an ideal indicator organism to test environmental samples for fecal contamination.

4. **Salmonella spp.**

Salmonella is a genus of rod shaped bacterium. It also comes from *Enterobacteriaceae* family which originally comes from gastrointestinal tract of human and animals. Because of that, it also been used as indicator of feces contamination. *Salmonella* is a major cause of bacterial enteric illness in both humans and animals. Most commonly, *Salmonella* is the cause of food poisoning and typhoid fever and the microbe lives in the intestine of mammals, birds and reptiles.

The types of Salmonella that is health hazard is usually contracted by touching raw meat, raw eggs, raw shellfishes or unpasteurized animals products such as milk and cheese. In food industry, *Salmonella* bacterium can be acquired by human that have the bacteria on their hands. However, Salmonella is not a threat until it is ingested.

5. **Staphylococcus aureus**

The original habitats of *S. aureus* are on human skin and in human and animal mucus. It also could be found in pus. Thus, it indicates the contamination that may come from human or more specifically from food handlers. *S. aureus* is very small (0.5-1 µm), has coccus shape (like grape fruit), gram negative and static. It also has facultative aerobic characteristic. There is quite a number of *Staphylococcus* species but *S. aureus* is the most pathogenic that can affect human health.

In Malaysia, the contamination of najsmutawassitah in food sample is verified using microbial indicators mainly according to the Microbiological Standard as stated in Schedule 15, Regulation 39 of Food Act 1983 and Food Regulation 1985.