



Aluminium

Food and Beverage Packaging - Health & Hygiene Implications

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Agenda

- Potential health issues from the use of Aluminium for food and beverage containers:
 1. Bacterial contamination of the contents:
 2. Aluminium dissolution into food;
 3. Bacterial contamination of the container.
- Literature review for Container contamination - is there really a problem?
- Ideas for improvement;
- Conclusions.



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Potential health issues:

1. Bacterial contamination of the contents:

- Aluminium is a very effective conductor of heat and cold:
 - In packaging, better conduction = faster sterilization and freezing of package contents = decreased health risks;
- Aluminium also minimizes the risk of contamination and tampering in packaging of medications and other items;
- Aluminium is an effective barrier material.



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Resolving potential health issues:

1. Bacterial contamination of contents cont'd:

- Bacterial contamination of aluminium container contents is very rare;
- When it does occur:
 - generally associated with public health issues related to handling and storage;
 - associated with all types of containers
- Aluminium containers, in fact, often tend to decrease the risk;
- Solution rests with proper food preparation and storage.



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Potential health issues:

2. Aluminium dissolution into food:

- Within normal pH ranges, this is not a problem;
- Even in highly acid or highly basic situations, when some dissolution can occur, it doesn't represent a health issue for a healthy person.
- As a general precaution, however, foods that are highly acidic or very salty in nature should not be stored in containers made of materials that can be taken up by the food itself;
- Health impacts of aluminium intake, per se, have been discussed in Dr. Lidsky's presentation;



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Resolving potential health issues:

2. Aluminium dissolution into food cont'd:

- Refrigeration decreases migration;
- Coating - found on all aluminium cans is an effective barrier to dissolution;
- Increased levels of aluminium in foods does not pose a health risk but can affect taste and other qualities;
- Ingestion of aluminium causes no health effects except in those people with serious kidney problems.

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Brasil Research Projects (Sponsor - ABAL):

- ITAL/CETEA Study on Migration - Results:
- Study 1:
 - Migration data from the study were compared to the recommended maximum aluminium intake of 1 mg/kg of body weight per day;
 - The contribution of aluminium to the diet from cooking food in aluminium pans assessed in the study is about 2% of recommended maximum;
- Conclusion: Cooking in aluminium pans is not a significant contributor to dietary intake of aluminium - the major contributor is from the natural content of the foods.

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Potential health issues:

3. Bacterial contamination of the container:

- This situation may occur when food is left in open containers or when the container itself is in contact with contaminants such as bacteria;
- Bacterial contamination of food containers is a risk with all types of containers;
- Preventing contamination is important.

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- Sources of bacterial contamination common to all food containers:
 - Food handlers practicing poor personal hygiene;



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- Sources of bacterial contamination common to all food containers:
 - Inadequately cleaned food containers and utensils - such as refrigerators, pots and pans, coolers, knives, forks, and spoons:



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- Sources of bacterial contamination common to all food containers:
 - Contact with other materials that may already be contaminated - such as ice used for cooling:



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Brasil Research Projects (Sponsor - ABAL):

- CETEA/ITAL (Centro de Tecnologia de Embalagem, Instituto de Tecnologia de Alimentos):
 - Carried out two studies:
 1. Determination of Aluminum dissolution during food cooking in aluminium pots (discussed previously);
 2. Survey of data on microbiological contamination of beverage packaging including testing by Fleury Labs for presence of Leptospira on containers - no Leptospira were found;



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Brasil Research Projects (Sponsor - ABAL):

- CETEA/ITAL Study Results:
- Study 2 - Contamination of containers:
 - At secondary packaging levels and on cans from bars, restaurants and vending machines contamination was negligible (<50 units of formed colonies (ufc)/cm²);
 - 89 % of cans from small retail outlets were also considered to have negligible contamination.
 - Some instances of higher contamination were found where street vendors both in urban areas and at beaches kept cans in styrofoam boxes cooled with ice:
 - The quality of the ice was not in compliance with the requirements for drinking water in any of the analyzed samples. It was the basic cause of the contamination.



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Brasil Research Projects (Sponsor - ABAL):

- ITAL/CETEA Study Results:
- Study 2 - Contamination of containers (cont'd):
 - Aluminium cans presented lower levels of contamination at all sample collection points when compared to plastic bottles or cups containing mineral water
 - Glass cups used to serve beverages in bars and restaurants showed variable microbiological quality but no cases of pathogenic bacteria were found;
 - Plastic straws showed low levels of contamination;
 - Effective cleaning of cans - close to 100% - was obtained by washing with domestic detergent and/or running water.



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Literature Review (1):

- Search:

Medline and Toxfile databases searched for scientific articles published since 1998 using the following key words:

 - Aluminium or Aluminum;
 - Food or water or container or foil;
- Results:
 - The report generated 154 abstracts;
 - No abstracts of direct importance were found;
 - Some papers of indirect interest were noted.



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Literature Review (2):

- Search:

A second search was carried out on the Gale Group[®] Health & Wellness Database SM using the following key words:

- Bacteria or Bacteriology - and -
- Aluminum or Aluminium - and -
- Container or Can or Packaging.

- Results:

- The report generated no additional abstracts.

* Gale Database is a comprehensive periodical and reference database providing broad coverage in the areas of health, medicine, fitness, and nutrition from a multitude of sources - both scientific and popular.



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Literature Review (3):

- Search:

A third search was carried out using the following key words on 12 journals with the words "Public Health" and/or "Environmental Health" in their titles:

- Bacteria or Bacteriology - and -
- Aluminum or Aluminium - and -
- Container or Can or Packaging;

- Results:

- The report generated no additional abstracts.



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Literature Review (4):

- Information of indirect interest:

- Aluminium compounds are effective in water treatment to remove bacterial contamination;
- Aluminium compounds can be used effectively to remove arsenic;
- Packaging containers that have aluminium layers are more effective for UV transmission;
- Packaging containers that have aluminium layers are also more effective for preserving the good taste properties of UHT milk.



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Bacterial contamination of the container:

Summary:

- Can occur from many sources;
- Poses a risk for every type of food container as well as many foods such as fruits;
- Transfer of contaminants to consumers can take place due to:
 - direct contact between the container and user;
 - contamination of the contents after opening;
 - handling of the container or food by the vendor or the consumer.



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Resolving potential health issues:

- Regulatory approaches to avoid contamination of food containers:
 - Ontario, Canada requires that:
 - Ice be made from potable water;
 - Ice be stored in sanitary containers;
 - Containers be cleaned regularly for sanitation;
 - Single-service containers and single-service articles are kept in such a manner and place as to prevent contamination of the containers/articles;
 - Additional protective devices such as lids are not required by the legislation.



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Resolving potential health issues:

- Regulatory approaches to avoid contamination of food containers cont'd:
 - The United Kingdom requires that:
 - Ice be made from potable water;
 - Ice be stored in sanitary containers;
 - Containers be disinfected regularly;
 - Food handling in a manner to prevent contamination;
 - Food handlers must regularly wash their hands in clean potable water;
 - Additional protective devices such as lids are not required by the legislation.



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Resolving potential health issues:

- Practical handling practices to avoid contamination of drink containers:
 - The Issue: Drink containers (bottles or cans) sold from ice chests may be contaminated by methods used for storage and handling;
 - Prevention is simple and is related to the adoption of basic public health practices for storage and dispensing food;
 - The type of container is not likely to be a factor in the risk from contamination;
 - Beverage cans have no characteristics that will predispose them to contamination.



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Resolving potential health issues:

- Practical handling practices to avoid contamination of drink containers cont'd:
 - To prevent contamination of beverage containers:
 - Clean and disinfect the ice chest daily;
 - The vendor should regularly clean their own hands;
 - Ice should be made only from potable water;
 - Drink containers should be dried with clean paper;
 - Washing with clean running water may also be effective;
 - Container users should consider using drinking straws;
 - Effective surveillance of vendors by public health authorities.




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Conclusions:

- Aluminium use as a material in food containers enhances opportunities for protection of food;
- Dissolution from aluminium containers is minimal when:
 - containers are coated;
 - contents stay within acceptable pH levels (i.e. between pH 4.5 and pH 8.5);
 - the container and contents are refrigerated;
- Cooking in aluminium pots contributes little (2% or less) to dietary intake and does not pose a risk.




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Conclusions:

- There is no scientific evidence that the contamination of food containers, per se, is a significant health issue;
- Contamination of containers (regardless of type) is easily controlled through standard public health measures and good handling practices - no additional devices, such as lids, are required.



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Muito Obrigado