



Federation of Malaysia



EDICT OF GOVERNMENT



In order to promote public education and public safety, equal justice for all, a better informed citizenry, the rule of law, world trade and world peace, this legal document is hereby made available on a noncommercial basis, as it is the right of all humans to know and speak the laws that govern them.

MS 1265-10 (2005) (English): CODE OF GOOD
IRRADIATION PRACTICE - PART 10: DRIED MEAT AND
DRIED SALTED MEAT OF ANIMAL ORIGIN FOR INSECT
DISINFESTATIONS, CONTROL OF MOULDS AND REDUCTION
OF PATHOGENIC MICROORGANISMS



BLANK PAGE





MALAYSIAN STANDARD

MS 1265: PART 10:2005

CODE OF GOOD IRRADIATION PRACTICE - PART 10: DRIED MEAT AND DRIED SALTED MEAT OF ANIMAL ORIGIN FOR INSECT DISINFESTATIONS, CONTROL OF MOULDS AND REDUCTION OF PATHOGENIC MICROORGANISMS

ICS: 67.020

Descriptors: code of practice, irradiation, ionising, radiation treatment, dried meat, dried salted meat, insect disinfestations, control of moulds, reduction of pathogenic microorganisms

© Copyright 2005

DEPARTMENT OF STANDARDS MALAYSIA

DEVELOPMENT OF MALAYSIAN STANDARDS

The **Department of Standards Malaysia (DSM)** is the national standardisation and accreditation body.

The main function of the Department is to foster and promote standards, standardisation and accreditation as a means of advancing the national economy, promoting industrial efficiency and development, benefiting the health and safety of the public, protecting the consumers, facilitating domestic and international trade and furthering international cooperation in relation to standards and standardisation.

Malaysian Standards are developed through consensus by committees which comprise of balanced representation of producers, users, consumers and others with relevant interests, as may be appropriate to the subject in hand. To the greatest extent possible, Malaysian Standards are aligned to or are adoption of international standards. Approval of a standard as a Malaysian Standard is governed by the Standards of Malaysia Act 1996 (Act 549). Malaysian Standards are reviewed periodically. The use of Malaysian Standards is voluntary except in so far as they are made mandatory by regulatory authorities by means of regulations, local by-laws or any other similar ways.

The Department of Standards appoints **SIRIM Berhad** as the agent to develop Malaysian Standards. The Department also appoints SIRIM Berhad as the agent for distribution and sale of Malaysian Standards.

For further information on Malaysian Standards, please contact:

Department of Standards Malaysia
Level 1 & 2, Block C4, Parcel C
Federal Government Administrative Centre
62502 Putrajaya
MALAYSIA
Tel: 60 3 88858000
Fax: 60 3 88885060

OR

SIRIM Berhad
(Company No. 367474 - V)
1, Persiaran Dato' Menteri
Section 2, P. O. Box 7035
40911 Shah Alam
Selangor D.E.
Tel: 60 3 5544 6000
Fax: 60 3 5510 8095

<http://www.dsm.gov.my>

<http://www.sirim.my>

E-mail: info@dsm.gov.my

CONTENTS

	Page
Committee representation	ii
Foreword	iii
1 Scope	1
2 Normative references	1
3 Pre-irradiation treatment	1
4 Packaging	2
5 Pre-irradiation storage and transport	3
6 Irradiation	3
7 Post-irradiation handling and storage	4
8 Labelling	5
9 Re-irradiation	5
10 Quality of irradiated dried meat and dried salted meat	5
11 Final product specification	5
Bibliography	6

MS 1265: PART 10:2005

Committee representation

The Food and Agricultural Industry Standards Committee (ISC A) under whose authority this Malaysian Standard was developed, comprises representatives from the following organisations:

Department of Agriculture
Department of Standards Malaysia
Federal Agricultural Marketing Authority
Federation of Malaysian Manufacturers
Malaysian Agricultural Research and Development Institute
Malaysian Association of Standards Users
Malaysian Palm Oil Association
Ministry of Agriculture and Agro-based Industry
Ministry of Health Malaysia
Ministry of International Trade and Industry
Universiti Kebangsaan Malaysia
Universiti Putra Malaysia

The Working Group on Food Irradiation which developed this Malaysian Standard consists of representatives from the following organisations:

Department of Fisheries Malaysia
Department of Veterinary Services Malaysia
Federation of Malaysian Consumers Associations
Malaysian Agricultural Research and Development Institute
Malaysian Institute for Nuclear Technology Research
Ministry of Health Malaysia
SIRIM Berhad (Secretariat)
Universiti Putra Malaysia

FOREWORD

This Malaysian Standard was developed by the Working Group on Food Irradiation under the authority of the Food and Agricultural Industry Standards Committee.

The standard was prepared in response to a need that was recognised by the Secretariat of the Working Committee on Food Irradiation established by the Nuclear Energy Unit, and subsequently supported by various government departments and professional bodies. This standard was initially compiled by the above secretariat.

This standard is developed for processing dried meat and dried salted of Malaysian origin. It is based on the salient features selected from the International Consultative Group on Food Irradiation (ICGFI) provisional code of good irradiation practice.

MS 1265 consists of the following parts, under the general title *Code of good irradiation practice*:

- Part 1: *General*
- Part 2: *Bulb and tuber crops for sprout inhibition*
- Part 3: *Fresh fruits and vegetables for insect disinfestations and as quarantine treatment*
- Part 4: *Cereal grains for insect disinfestations*
- Part 5: *Dried fish and dried salted fish for insect disinfestations*
- Part 6: *Bananas, mangoes and papayas for shelf-life extension*
- Part 7: *Fish, frogs and shrimps for the control microflora*
- Part 8: *Prepackaged meat and poultry for the control of pathogens and/or to extend shelf-life*
- Part 9: *Spices, herbs and vegetable seasonings for the control of pathogens and microflora*
- Part 10: *Dried meat and dried salted meat of animal origin for insect disinfestations, control of moulds and reduction of pathogenic microorganisms*

Compliance with a Malaysian Standard does not of itself confer immunity from legal obligations.

**CODE OF GOOD IRRADIATION PRACTICE –
PART 10: DRIED MEAT AND DRIED SALTED MEAT OF ANIMAL ORIGIN
FOR INSECT DISINFESTATIONS, CONTROL OF MOULDS AND
REDUCTION OF PATHOGENIC MICROORGANISMS**

1. Scope

This Malaysian Standard describes a code of good irradiation practice for dried meat and dried salted meat of animal origin for the purpose of insect disinfestations, reducing pathogenic microorganisms and controlling mould growth.

2. Normative references

The following normative references are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the normative references (including any amendments) applies.

MS 1265: Part 1, *Code of good irradiation practice - Part 1: General*

The Malaysian Food Act 1983 and Malaysian Food Regulations 1985

3. Pre-irradiation treatment

3.1 Handling

3.1.1 Applicable codes of hygienic practices and good manufacturing practice should be followed in maintaining the initial quality of the fresh meat before processing and during pre-irradiation handling. In brief, these measures can be stated as follows: slaughtering of only healthy animals; appropriate cutting, trimming and de-boning (if required); and wash with clean water. The meat should then be iced or refrigerated without delay. Storage and handling should comply with good sanitation practices and maintained at low (melting ice) temperature to minimise build up of bacterial contamination.

3.1.2 Food additives should be used properly and in accordance with good manufacturing practices and the Malaysian Food Act 1983 and Malaysian Food Regulations 1985.

3.2 Salting

3.2.1 Salting of the fresh or dried meat may be prepared either by dry salting or by soaking in saturated brine.

3.3 Smoking

Smoking of meat is a two-step process, in which the meat is dried and smoke is deposited during the drying process, using an acceptable source of heat and smoke.

MS 1265: PART 10:2005

3.4 Drying

3.4.1 Drying may be done by sun drying method or by using artificial drying equipment. The modification of traditional practices may be beneficial, and new technologies for sun drying in tropical countries are available.

3.4.2 It is necessary that good handling practice procedures to be followed to avoid or minimise contamination of the product in all aspects during the sun drying process. The final moisture content of the dried meat should be less than 15 %.

3.4.3 The salt content of the dried salted meat may range from 4 % to 20 % and should be at a level appropriate to practices of the local market. The moisture content of dried salted meat should be low in order to minimise mould growth.

3.4.4 It is recommended that good sanitation practices be employed to minimise the initial insect population on the dried product and to prevent insect population build-up in the processing area.

4. Packaging

4.1 Packaging should be done in an insect-proof material and if possible, prior to irradiation. The packaging materials should also serve as moisture barrier to prevent moisture gained by the product. Vacuum packaging is recommended only for dried salted meat, as CO₂ used to replace air in the package is to avoid rancidity. The use of an O₂ absorber or other likewise is also only suitable for dried salted meat. Vacuum packaging and exclusion of oxygen is unsuitable for unsalted meat due to the possible risk development of botulinum toxin.

4.2 If the irradiation is carried out in a packaged product, the conventional packaging materials that are in contact with the product should not undergo any significant alteration of their functional properties nor yield toxic materials which can transfer to the meat of animal origin as a result of irradiation treatment at the doses required.

4.3 Polyethylene, polypropylene or other clear flexible materials of similar qualities may be used. Polypropylene is more effective in preventing insect penetration than polyethylene. The combinations of films may be used, such as polypropylene and polyethylene or polyester and polyethylene. Polyethylene film is permeable to oxygen, therefore polypropylene or laminates should be used in order to minimise oxidative damage.

4.4 Gunny bags with a polyethylene lining may be used in bulk packaging of dried meat and dried salted meat, provided that the gunny bags are treated with a suitable insect repellent.

4.5 Carton boxes with a suitable liner such as adequately thick polyethylene or an equivalent material are acceptable for bulk packaging.

4.6 Rigid containers such as wooden, metallic or plastic boxes used with suitable liners or covers which prevent moisture gain by the product may be used for bulk packaging. However, containers made of wood or other cellulose material will gradually be damaged by repeated exposure to irradiation treatment, and, in time, will become unusable.

4.7 For retail packages, polyethylene, polypropylene or other clear flexible materials of similar qualities may be used. However, cellophane, for instance, which is relatively impermeable to oxygen but not to water vapour (moisture) is not suitable to be used.

4.8 The size and shape of containers which may be used for irradiation are determined in certain aspects of the irradiation facility. The critical aspects include the characteristics of the product transport systems and of the irradiation source, as these relate to the dose distribution obtained within the container (See Clause 5).

5. Pre-irradiation storage and transport

5.1 The normal storage and transport provided for dried meat are sufficient. Meat with moisture levels below 15 % need not require to be refrigerated.

5.2 Storage that required after drying and before irradiation should be for as short a time as possible. Appropriate measures to minimise insect infestation should be taken.

6. Irradiation

6.1 Facility requirements and operations; process parameters and critical operational points; ionising radiation sources employed

6.1.1 The requirements and guidance regarding certain irradiation process parameters and irradiation facilities and their operations should be referred to MS 1265: Part 1.

6.1.2 The ionising radiation which may be employed in irradiating animal food is limited to:

- a) Gamma rays from the radionuclides Cobalt-60 and Caesium-137;
- b) X-rays generated from machine sources operated at or below an energy level of 5 MeV (Million Electron Volts); and
- c) Electrons generated from machine sources operated at or below an energy level of 10 MeV.

6.1.3 The selection of the irradiation source to be employed in the treatment should be appropriately considered, for example the use of electrons has its limitations due to their poor penetration ability.

6.1.4 It is not possible to distinguish irradiated products from non-irradiated products by inspection. Therefore, it is important that, in the operation of an irradiation facility, any appropriate means, such as physical barriers, be used for keeping the irradiated and non-irradiated product separate.

MS 1265: PART 10:2005

6.1.5 Indicators which change colour or which otherwise undergo some easily determined and time-stable change when exposed to radiation at the doses required are commercially available. Such devices, common in the radiation-sterilisation industry which is used as a paper sticker (or equivalent) and attached to each product unit, such as a carton, could assist the operator in identifying irradiated product.

6.1.6 It is important to keep adequate records of the operation of the irradiation facility. Foods which have been irradiated should be identified by lot numbers or other suitable means. Such measures which enable verification of the irradiation treatment carried out are likely to be required by the regulatory agencies.

6.2 Amount of radiation used (absorbed dose)

6.2.1 General

6.2.1.1 The most important process parameter in irradiation treatment of food is the amount of ionising energy absorbed by the target material. This is termed "absorbed dose". The unit of absorbed dose is known as Gray (Gy). One Gray is equal to the absorption of one joule per kg. The dose employed is determined by the level of the initial contamination (number of organisms), the kind of organisms, and the purpose of the treatment.

6.2.1.2 The irradiation procedure is controlled to deliver a prescribed dose which involves a number of considerations. Among which is important is the technology for measuring dose, given the termed "dosimetry". The manuals on dosimetry procedures should be consulted. Refer to bibliography for the list of references on dosimetry procedures.

6.2.2 Dried meat

The most common organisms that contaminate dried meat are mould and bacterial pathogen. The dose used for the control of moulds and reducing bacterial pathogen should not be less than 2.0 kGy.

6.2.3 Dried salted meat

The most common organisms that contaminate dried salted meat are mould and bacterial pathogen. The dose used for control of moulds and reducing bacterial pathogen should not be less than 2.0 kGy.

6.3 Irradiation conditions

The conditions usually practiced for irradiating materials at ambient temperatures may be employed. The irradiation areas should be ventilated to minimise ozone build-up.

7. Post-irradiation storage and handling

7.1 Storage of dried meat

Generally, there are no special requirements for storage of irradiated meat with the maximum moisture content of 15 % which is packed in suitable packaging materials. Such dried meat may be stored up three months to nine months without moulding.

7.2 Storage of dried salted meat

The storage requirements for dried salted meat vary according to its moisture content. Only low moisture product can be stored at ambient temperatures without moulding. Higher moisture product (e.g. approaching 50 %) requires refrigeration.

7.3 Transport of dried meat and dried salted meat

There are no special requirements for the transport of dried meat and dried salted meat. The integrity of the packages should be maintained in order to prevent re-infestation of insects.

8. Labelling

8.1 Foods that have been irradiated shall be labelled and labeling shall be in accordance to the current national legislation requirements.

8.2 Labelling should not only identify the food as irradiated, but also serve to inform the purchaser as to the purpose and benefits of the treatment.

8.3 Each package containing the food treated by ionising radiation may bear on it the international food irradiation symbol given in MS 1265: Part 1.

9. Re-irradiation

Generally, irradiation of the same product more than once is not recommended. Where re-irradiation is allowed to control subsequent insect infestation, the total absorbed dose should not exceed the maximum dose permitted. MS 1265: Part 1 may be referred for provisions on re-irradiation of certain foods.

10. Quality of irradiated dried meat and dried salted meat

The quality of dried meat and dried salted meat is not changed by the irradiation treatment for insect disinfestations.

11. Final product specification

In terms of this standard, the associated final product specification is that both dried meat and dried salted meat should be free of insects and insect damage. Recognition should be given to the possibility of product spoilage occurring in other ways as a result of other factors, for example, moulding or sensory changes not controlled by the irradiation treatment.

Bibliography

MS ISO ASTM 51204: 2005, *Practice for dosimetry in gamma irradiation facilities for food processing*

MS ISO ASTM 51261: 2005, *Guide for selection and calibration of dosimetry systems for radiation*

MS ISO ASTM 51431: 2005, *Practice for dosimetry in electron and bremsstrahlung irradiation facilities for food processing*

Acknowledgements

Dr Muhamad Lebai Juri (Chairman)

Puan Seri Azalina Mohd Ghazalli (Secretary)

Encik Ahmad Hazizi Aziz

Dr Maznah Ahmad

Dr Noraini Mohd Khalid

Encik Mohd Sidek Othman

Puan Shamsinar bt Abdul Talib

Prof Madya Dr Russly Abdul Rahman

Malaysian Institute for Nuclear Technology
Research

SIRIM Berhad

Department of Fisheries Malaysia

Department of Veterinary Services Malaysia

Malaysian Agricultural Research and
Development Institute

Malaysian Institute for Nuclear Technology
Research

Ministry of Health Malaysia

Universiti Putra Malaysia

