NOTIFICATION

|  |  |
| --- | --- |
| **1.** | **Notifying Member:** UGANDA**If applicable, name of local government involved:**  |
| **2.** | **Agency responsible:** Uganda National Bureau of Standards |
| **3.** | **Products covered (provide tariff item number(s) as specified in national schedules deposited with the WTO; ICS numbers should be provided in addition, where applicable):** Insects, fit for human consumption (HS code(s): 041010); Other standards related to farming and forestry (ICS code(s): 65.020.99) |
| **4.** | **Regions or countries likely to be affected, to the extent relevant or practicable:****[X] All trading partners** **[ ] Specific regions or countries:**  |
| **5.** | **Title of the notified document:** DUS DARS 1296:2024, Edible insects — Guideline on safety of foods based on edible insects, First edition. **Language(s):** English. **Number of pages:** 32<https://members.wto.org/crnattachments/2024/SPS/UGA/24_06615_00_e.pdf> |
| **6.** | **Description of content:** This Draft Uganda Standard addresses food safety requirements for foods based on edible insects and their products.Note: This Draft Uganda Standard was also notified to the TBT Committee. |
| **7.** | **Objective and rationale: [X] food safety, [X] animal health, [ ] plant protection, [X] protect humans from animal/plant pest or disease, [ ] protect territory from other damage from pests.**  |
| **8.** | **Is there a relevant international standard? If so, identify the standard:****[ ] Codex Alimentarius Commission *(e.g. title or serial number of Codex standard or related text)*:** **[ ] World Organization for Animal Health (OIE) *(e.g. Terrestrial or Aquatic Animal Health Code, chapter number)*:** **[ ] International Plant Protection Convention *(e.g. ISPM number)*:** **[X] None****Does this proposed regulation conform to the relevant international standard?** **[ ] Yes [ ] No****If no, describe, whenever possible, how and why it deviates from the international standard:**  |
| **9.** | **Other relevant documents and language(s) in which these are available:** 1. ARS 53, General principles of food hygiene— Code of practice
2. ARS 56, Pre-packaged foods — Labelling
3. CODEX STAN 193, Codex general standard for contaminants and toxins in food and feed
4. ISO 22000, Food safety management systems— Requirements for any organization in the food chain
5. van Huis, A. (2016) Edible Insects are the Future? Proceedings of the Nutrition Society, 75, 294–305. <https://doi.org/10.1017/S0029665116000069>
6. Jongema, Y. (2017Apr) List of Edible Insects of the World [Internet]. Wageningen University & Research (WUR), Wageningen, The Netherlands. p. 1–100.
7. González-Escobar, J.L., Grajales-Lagunes, A., Smoliński, A., Chagolla-López, A., De Léon- Rodríguez, A. and Barba de la Rosa, A.P. (2018) Microbiota of Edible *Liometopum apiculatum* Ant Larvae Reveals Potential Functions Related to Their Nutritional Value. Food Research International, 109, 497–505.

<https://doi.org/10.1016/j.foodres.2018.04.049>1. Okyere, A.A. (2023) Food Safety Management of Insect-Based Foods. In: Andersen V, Lelieveld H, and Motarjemi Y, editors. Food Safety Management: A Practical Guide for the Food Industry, 2nd Edition. Academic Press/ Elsevier Inc., London, United Kingdom; San Diego, CA, USA. p. 223–33. <https://doi.org/10.1016/B978-0-12-820013-1.00036-X>
2. EFSA. (2015) Risk Profile Related to Production and Consumption of Insects as Food and Feed. EFSA Journal, 13, 4257(1-60). <https://doi.org/10.2903/j.efsa.2015.4257>
3. van Huis, A. (2013) Edible Insects: Future Prospects for Food and Feed Security [Internet]. Food and Agriculture Organization of the United Nations (FAO), Rome, Italy.
4. Eilenberg, J., Vlak,J., Nielsen-Leroux, C., Cappellozza, S. and Jensen, A.B. (2015) Diseases in Insects Produced for Food and Feed. Journal of Insects as Food and Feed, 1, 87–102. <https://doi.org/10.3920/JIFF2014.0022>
5. Cappellozza, S., Saviane, A., Tettamanti, G., Squadrin, M., Vendramin, E., Paolucci, P. et al. (2011) Identification of *Enterococcus mundtiias* a pathogenic agent involved in the "flacherie" disease in *Bombyx mori* L. larvae reared on artificial diet. Journal of Invertebrate Pathology, 106, 386–93. <https://doi.org/10.1016/j.jip.2010.12.007>
6. Hirose, E., Panizzi, A.R. and Cattelan, A.J. (2006) Potential use of antibiotic to improve performance of laboratory-reared *Nezara viridula* (L.) (Heteroptera: Pentatomidae). Neotropical Entomology, Sociedade Entomológica do Brasil. 35, 279–81. <https://doi.org/10.1590/S1519-> 566X2006000200022
7. Brinker, P., Fontaine, M.C., Beukeboom, L.W. and Salles,J.F. (2019) Host, Symbionts, and the Microbiome: The Missing Tripartite Interaction. Trends in Microbiology, Elsevier. 27, 480–8. <https://doi.org/10.1016/j.tim.2019.02.002>
8. Gurung, K., Wertheim, B. and Falcao Salles, J. (2019) The microbiome of pest insects: it is not just bacteria. Entomologia Experimentalis et Applicata, 167, 156–70. <https://doi.org/10.1111/eea.12768>
9. Dicke, M., Eilenberg, J., Salles, J.F.,Jensen, A.B., Lecocq,A., Pijlman, G.P. et al. (2020) Edible insects unlikely to contribute to transmission of coronavirus SARS-CoV-2. Journal of Insects as Food and Feed, 6, 333–9. <https://doi.org/10.3920/JIFF2020.0039>
10. Marshall, D.L., Dickson, J.S. and Nguyen, N.H. (2016) Ensuring Food Safety in Insect Based Foods: Mitigating Microbiological and Other Foodborne Hazards. In: Dossey AT, Morales- Ramos JA, and Rojas MG, editors. Insects as Sustainable Food Ingredients: Production, Processing and Food Applications, Academic Press, London, United Kingdom; San Diego, CA, USA. p. 223–53.

<https://doi.org/10.1016/B978-0-12-802856-8.00008-9>1. Igbabul, B.D., Agude, C. and Inyang, C.U. (2015) Nutritional and Microbial Quality of Dried Larva of *Cirina forda*. International Journal of Nutrition and Food Sciences, Science Publishing Group. 3, 602–6. <https://doi.org/10.11648/j.ijnfs.20140306.28>
2. Braide, W., Oranusi, S., Iyen, I., Oguoma, O., Akobondu, C. and Nwaoguikpe, R. (2010) Microbiological quality of an edible caterpillar of an emperor moth, *Bunaea alcinoe*. Journal of Ecology and the Natural Environment, 3, 176–80.
3. Grabowski, N.T. and Klein, G. (2017) Microbiology of Cooked and Dried Edible Mediterranean Field Crickets (*Gryllus bimaculatus*) and Superworms (*Zophobas atratus*)Submitted to Four Different Heating Treatments. Food Science and Technology International, SAGE Publications Ltd STM. 23, 17–23.

<https://doi.org/10.1177/1082013216652994>1. Wynants, E., Crauwels, S., Verreth, C., Gianotten, N., Lievens, B., Claes, J. et al. (2018) Microbial dynamics during production of lesser meal worms (*Alphitobius diaperinus*) for human consumption at industrial scale. Food Microbiology, 70, 181–91. <https://doi.org/10.1016/j.fm.2017.09.012>
2. Imathiu, S. (2020) Benefits and Food Safety Concerns Associated with Consumption of Edible Insects. NFS Journal, 18, 1–11. <https://doi.org/10.1016/j.nfs.2019.11.002>
3. Brown, W.V., Doyen,J.T., Moore, B.P. and Lawrence, J.F. (1992) Chemical Composition and Taxonomic Significance of Defensive Secretions of Some Australian Tenebrionidae (coleoptera). Australian Journal of Entomology, 31, 79–89.

https://doi.org/10.1111/j.1440- 6055.1992.tb00461.x1. Charlton, A.J., Dickinson, M., Wakefield, M., Fitches, E., Kenis, M., Han, R. et al. (2015) Exploring the chemical safety of fly larvae as a source of protein for animal feed. Journal of Insects as Food and Feed, 1, 7–16.

<https://doi.org/10.3920/JIFF2014.0020>1. Lindqvist, L. (1992)Accumulation of Cadmium, Copper, and Zinc in Five Species of Phytophagous Insects. Environmental Entomology, 21, 160–3.

<https://doi.org/10.1093/ee/21.1.160>1. Zhuang, P., Zou, H. and Shu, W. (2009) Biotransfer of heavy metals along a soil-plant-insect- chicken food chain: Field study. Journal of Environmental Sciences, 21, 849–53. <https://doi.org/10.1016/S1001-0742>(08)62351-7
2. Zagrobelny, M., Dreon, A.L., Gomiero,T., Marcazzan, G.L., Glaring, M.A., MøLler, B.L. et al. (2009) Toxic Moths: Source of a Truly Safe Delicacy. Journal of Ethnobiology, SAGE Publications. 29, 64–76. <https://doi.org/10.2993/0278-0771-29.1.64>
3. Berenbaum, M. (2012) Sequestered Plant Toxins and Insect Palatability.
4. Duffey, S.S. (1980) Sequestration of Plant Natural Products by Insects. Annual Review of Entomology, 25, 447–77. <https://doi.org/10.1146/annurev.en.25.010180.002311>
5. Nishida, R. (2002) Sequestration of Defensive Substances from Plants by Lepidoptera. Annual Review of Entomology, 47, 57–92.

<https://doi.org/10.1146/annurev.ento.47.091201.145121>1. Brower, L.P. (1969) Ecological Chemistry. Scientific American, 220, 22–9. <https://doi.org/10.1038/scientificamerican0269-22>
2. Aliabadi, A., Renwick, J.A.A. and Whitman, D.W. (2002) Sequestration of glucosinolates by harlequin bug *Murgantia histrionica*. Journal of Chemical Ecology, 28, 1749–62. [https://doi.org/10.1023/a:1020505016637](https://doi.org/10.1023/a%3A1020505016637)
3. Blum, M.S. (1994) The Limits of Entomophagy: A Discretionary Gourmand in a World of Toxic Insects. The Food Insects Newsletter, 7.
4. Crespo, R., Villaverde, M.L., Girotti, J.R., Güerci, A., Juárez, M.P. and de Bravo, M.G. (2011) Cytotoxic and genotoxic effects of defence secretion of Ulomoides dermestoides on A549 cells.
5. Journal of Ethnopharmacology, 136, 204–9. <https://doi.org/10.1016/j.jep.2011.04.056>
6. Schabel, H.G. (2010) Forest Insects as Food: A Global Review. In: Durst PB, Johnson DV, Leslie RN, and Shono K, editors. Forest Insects as Food: Humans Bite Back: Proceedings of a Workshop on Asia-Pacific Resources and Their Potential for Development, 19-21 February 2008, ChiangMai, Thailand, Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Pacific, Bangkok, Thailand. p. 37–64.
7. Mcmillian, W.W.,Widstrom, N.W. and Wilson, D.M. (1981) Rearing the Maize Weevil1onMaize Genotypes When Aflatoxin-Producing *Aspergillus flavus* and *A. parasiticus Isolates* Were Present 2. Environmental Entomology, 10, 760–2. <https://doi.org/10.1093/ee/10.5.760>
8. Babarinde, S.A., Mvumi, B.M., Babarinde, G.O., Manditsera, F.A., Akande, T.O. and Adepoju,
9. A.A. (2021) Insects in Food and Feed Systems in Sub-Saharan Africa: The Untapped Potentials. International Journal of Tropical Insect Science, 41, 1923–51. <https://doi.org/10.1007/s42690-020-00305-6>
10. Kunatsa, Y., Chidewe, C. and Zvidzai, C.J. (2020) Phytochemical and anti-nutrient composite from selected marginalized Zimbabwean edible insects and vegetables. Journal of Agriculture and Food Research, 2, 100027.

<https://doi.org/10.1016/j.jafr.2020.100027>1. Alamu, O., Amao, A., Nwokedi, C., Oke, A. and Lawal,I. (2013) Diversity and nutritional status of edible insects in Nigeria: A review. International Journal of Biodiversity and Conservation, 5, 215–22. <https://doi.org/10.5897/IJBC12.121>
2. Ganguly, A., Chakravorty, R., Das, M., Gupta, M., Mandal, D.K., Haldar, P. et al. (2013) A preliminary study on the estimation of nutrients and anti-nutrients in *Oedaleus abruptus* (Thunberg) (Orthoptera: Acrididae). International Journal of Nutrition and Metabolism, Academic Journals. 5, 50–6.

<https://doi.org/10.5897/IJNAM12.022>1. Omotoso, O.T. and Adesola,A.A. (2018) Comparative studies of the nutritional composition of some insect orders. International Journal of Entomology and Nematology Research, 2, 1–9.
2. Omotoso, O.T. (2015) Nutrient Composition, Mineral Analysis and Anti-nutrient Factors of *Oryctes rhinoceros* L. (Scarabaeidae: Coleoptera) and Winged Termites, Marcrotermes nigeriensis Sjostedt. (Termitidae: Isoptera). Current Journal of Applied Science and Technology, 8, 97–106. <https://doi.org/10.9734/BJAST/2015/15344>
3. Gachihi, A., Tanga, C., Nyambaka, H. and Kimiywe, J. (2023) Effect of processing methods on nutrient and anti-nutrient composition of grasshopper and termites. CyTA - Journal of Food
4. Taylor & Francis.21, 745–50. <https://doi.org/10.1080/19476337.2023.2281984>
5. Belluco, S., Losasso, C., Maggioletti, M., Alonzi, C.C., Paoletti, M.G. and Ricci, A. (2013) Edible Insects in a Food Safety and Nutritional Perspective: A Critical Review. Comprehensive Reviews in Food Science and Food Safety, 12, 296–313. https://doi.org/10.1111/1541- 4337.12014
6. Cloutier, J. (2015) Edible Insects in Africa - An Introduction to Finding, Using and Eating Insects. 1st Edition. Technical Centre for Agricultural and Rural Cooperation (CTA), Wageningen, The Netherlands.
7. Fraqueza, M.J.R. and Patarata, L.A. da S.C. (2017) Constraints of HACCP Application on Edible Insect for Food and Feed. In: MikkolaH, editor. Future Foods, INTECH Open Access Publisher, Rijeka, Croatia. p. 89–113.
8. Dolan, L.C., Matulka, R.A. and Burdock, G.A. (2010) Naturally Occurring Food Toxins.Toxins, 2, 2289–332. <https://doi.org/10.3390/toxins2092289>
9. Knightingale, K.W. and Ayim, E.N. (1980) Outbreak of Botulism in Kenya After Ingestion of White Ants. British Medical Journal, 281, 1682–3. <https://doi.org/10.1136/bmj.281.6256.1682-a>
10. Andersen, V., Lelieveld, H.L.M. and Motarjemi, Y., editors. (2023) Food Safety Management: A Practical Guide for the Food Industry [Internet]. 2nd Edition. Academic Press /Elsevier, London, United Kingdom; San Diego, CA, United States of America.
11. Uganda Gazette.

(available in English) |
| **10.** | **Proposed date of adoption *(dd/mm/yy)*:** To be determined.**Proposed date of publication *(dd/mm/yy)*:** To be determined. |
| **11.** | **Proposed date of entry into force: [ ] Six months from date of publication**, **and/or** ***(dd/mm/yy)*:** To be determined.**[X] Trade facilitating measure**  |
| **12.** | **Final date for comments: [X] Sixty days from the date of circulation of the notification and/or *(dd/mm/yy)*:** 8 December 2024**Agency or authority designated to handle comments: [ ] National Notification Authority, [ ] National Enquiry Point. Address, fax number and e-mail address (if available) of other body:** Uganda National Bureau of StandardsPlot 2-12 ByPass Link, Bweyogerere Industrial and Business ParkP.O. Box 6329Kampala, UgandaTel: +(256) 4 1733 3250/1/2Fax: +(256) 4 1428 6123E-mail: info@unbs.go.ugWebsite: <https://www.unbs.go.ug> |
| **13.** | **Text(s) available from: [ ] National Notification Authority, [ ] National Enquiry Point. Address, fax number and e-mail address (if available) of other body:** Uganda National Bureau of StandardsPlot 2-12 ByPass Link, Bweyogerere Industrial and Business ParkP.O. Box 6329Kampala, UgandaTel: +(256) 4 1733 3250/1/2Fax: +(256) 4 1428 6123E-mail: info@unbs.go.ugWebsite: <https://www.unbs.go.ug> |