



*Research article*

## **Consumer knowledge, attitudes, and food safety practices in livestock-based food systems: Evidence from buffalo meat consumption in Northern Thailand**

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**Table S1.** Questionnaire items used to assess consumer knowledge, attitudes, and practices regarding buffalo meat consumption and safety.

<b>Knowledge (K)</b>	
K1	Purchasing buffalo meat from certified sources (e.g., GMP or GAP accredited) helps reduce the risk of contamination.
K2	Improper transport and storage conditions negatively affect the quality of buffalo meat.
K3	The production system and source of buffalo meat (farm type, slaughtering conditions) significantly influence its quality, safety, and sensory characteristics.
K4	Quality and hygiene control systems in supermarkets make buffalo meat safer than that sold in traditional markets.
K5	Meat from “Livestock OK” certified sources carries a lower microbial risk than uncertified meat.
K6	Salmonella spp. contamination in raw meat can cause vomiting and diarrhea.
K7	Consuming raw buffalo meat increases the risk of bacterial and parasitic infection.
K8	Buffalo tapeworms can be transmitted to humans through consumption of raw meat.
K9	Brucella spp. found in raw buffalo meat can cause brucellosis in humans.
K10	E. coli can be present in raw buffalo meat.
K11	The optimal temperature for refrigerated storage of fresh buffalo meat from slaughterhouses is 0–4 °C to maintain safety and quality.
K12	Using separate cutting boards and knives for raw meat and produce helps prevent cross-contamination.
K13	Washing raw meat with clean water does not eliminate all bacteria.
K14	Freezing raw meat for a long period reduces but does not eliminate harmful bacteria.
K15	Handwashing after handling raw meat is essential to prevent cross-contamination.
<b>Attitude (A)</b>	
A1	Purchasing buffalo meat from certified or hygienically managed production systems reduces—but does not eliminate—the risks associated with raw meat consumption.
A2	Unsanitary meat transport can compromise consumer safety.
A3	Buffalo meat from certified sources is fresh and free from chemical residues.
A4	Meat sold at traditional markets poses a higher contamination risk than supermarket meat.
A5	Purchasing meat from certified farms reduces the risk of meatborne diseases.
A6	Consuming freshly processed buffalo meat from hygienic slaughter systems reduces the risk of Salmonella.
A7	Avoiding frequent consumption of raw meat helps prevent parasitic infection.
A8	Avoiding meat with cyst-like appearance prevents tapeworm infection.
A9	Raw meat may contain Brucella spp. bacteria.
A10	E. coli causes diarrhea and other complications.
A11	Prolonged soaking of meat does not eliminate bacteria.
A12	Using separate boards and knives for meat and vegetables reduces contamination.
A13	Washing meat thoroughly with water may reduce but not eliminate contamination.
A14	Freezing meat for extended periods does not necessarily kill all bacteria.
A15	Washing hands after handling raw meat reduces foodborne risk.

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**Practice (P)**

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- P1 I purchase buffalo meat only from certified or trusted sources (e.g., Livestock OK label).
- P2 I avoid buying meat from vendors who fail to maintain proper hygiene or cold-chain during transport.
- P3 I prefer meat that is freshly processed and handled hygienically to ensure safety and quality.
- P4 I purchase buffalo meat from supermarkets because of better hygiene control.
- P5 I selected buffalo meat with clear source traceability.
- P6 I purchase buffalo meat certified as “Livestock OK” to minimize Salmonella contamination risk.
- P7 I avoid eating raw buffalo meat, even from certified sources, to prevent parasitic infection.
- P8 I avoid consuming raw buffalo meat and follow local public health guidelines to prevent parasitic infections associated with tropical livestock products.
- P9 I consume only properly cooked meat to prevent *Brucella* spp. infection.
- P10 I seek medical care immediately if I experience diarrhea after eating buffalo meat.
- P11 I store buffalo meat at 0–4 °C for 1–2 days only.
- P12 I use separate kitchen tools for raw buffalo meat and vegetables to prevent cross-contamination.
- P13 I always rinse raw buffalo meat with clean water before cooking.
- P14 I do not assume frozen buffalo meat is completely safe from pathogens.
- P15 I always wash my hands properly after handling raw buffalo meat to prevent infection.
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