



BC Centre for Disease Control
An agency of the Provincial Health Services Authority

Environmental Health Services

Food Issue

Notes from the Field

Shelf-life for refrigerated partially dried pasta

Request received from:	Regional Health Authority
Date of request:	September 16, 2013
Issue (brief description):	Is there any documentation on shelf stability for typical fresh pasta products?

Disclaimer: The information provided in this document is based on the judgement of BCCDC's Environmental Health Services Food Safety Specialists and represents our knowledge at the time of the request. It has not been peer-reviewed and is not comprehensive.

Summary of search information

1. Internet sources: pasta sites, general search "pasta safety", CFIA site
2. Google scholar and specific journal title search
3. ICMSF text on food commodity

Background information

Pasta is made with flour and water, prepared with or with-out eggs.^{1,2} Several types of flour can be used to make pasta, such as semolina, farina, and wheat flour.³ Fresh pasta is defined as a product with greater than 24% moisture, and a water activity ranging from 0.92 to 0.99, requiring refrigeration.^{3,4} A high water activity makes this product vulnerable to several hazards, such as *Salmonella*, *Staphylococcus aureus* and spoilage molds.³ In this form, without the addition of preservatives or use of reduced oxygen packaging to reduce spoilage organism growth, the pasta will have a shelf-life under refrigerated temperatures for only 2 to 3 days.¹ Pastas without any additives will show pH drop (more acidity indicating spoilage organism growth), and increase in coliforms between 3 and 4 days stored at refrigerated temperatures.⁵

Drying the pasta and removing moisture improves the stability of the product. Fully dried commercial pasta can typically be stored at room temperature for one to two years. Drying temperatures for pasta vary, in industrial settings the conventional drying temperature is 55°C, and upwards to steam pasteurization greater than 100 °C.^{2,3} The water activity of fully dried pastas are typically in the range of 0.4 to 0.6.⁶ Web-site blogs, such as http://www.culinate.com/columns/ask_hank/drying_homemade_pasta, indicate that completely dried home-made pastas can be stored in air-tight containers for several months at room temperature. Partially drying the pasta also improves stability. Moisture resorption, slow drying and prolonged storage of pasta under refrigeration may cause spoilage from bacterial or mold sources.³ Studies have shown that water activity is more important than temperature to controlling mold (fungal) growth.⁷

BCCDC comments on partially dried pasta

There is very little documented information in the literature describing best practices for partially dried pasta. The method of drying the pasta, specifically at what temperature the pasta is dried, is an important control point. Room temperature drying of pasta made with eggs can potentially allow *Salmonella*, and *Staphylococcus aureus* to grow in the product. Once consumers boil the pasta, the risk of *Salmonella* is mitigated; however, handling might be an issue should the consumer touch the pasta, and transfer bacteria to their mouths or other surfaces. Should *S. aureus* grow, and enterotoxin be elaborated into the pasta, the risk of enterotoxin remains, as this toxin is heat-stable. Guidance in Canada from the CFIA puts the onus on the manufacturer to establish a shelf-life of the product.⁸ Without knowing the actual water activity value of the product being manufactured, it is very difficult to judge whether 7 days at refrigerated temperature is adequate control for food safety.

BCCDC recommendations

1. The water activity value of the pasta should be tested.
 - a. If the water activity is below 0.6, room temperature storage is fine for several months in an air-tight container.
 - b. If the water activity is above 0.6, recommend pasta be stored in refrigerator in an air-tight container. A shelf-life of 7 days should be acceptable, however, recommend that routine food quality testing be done for coliforms. This should be done on freshly made pasta, and again at 7 and 14 days to ensure no coliform growth occurs during this period, and in order to establish a shelf-life.
2. The method of drying should be investigated, and advice provided to the manufacturer as appropriate. Recommend that drying occurs at temperatures above 55°C. The rationale for this is that if bacteria are present the dough, they would not multiply at this drying temperature before the water activity is low enough to prevent further growth.
3. To reduce the risk of *Salmonella* and *Staphylococcus aureus* from eggs, recommend the use of pasteurized eggs to the manufacturer.
4. To reduce the risk of risk of *Staphylococcus aureus* from improper handling/hygiene in food handlers, recommend strict hygiene and sanitation during preparation of pasta, including education for the manufacturer on the importance of good hygiene.

Disclaimer: The information provided in this document is based on the judgement of BCCDC's Environmental Health Services Food Safety Specialists and represents our knowledge at the time of the request. It has not been peer-reviewed and is not comprehensive.

References

1. University of Illinois Extension Service. Making fresh pasta. In: U.S. Department of Agriculture, editor. p. 1-3.
2. Pasta. 2013 [cited 2013 Sep 20]; Available from: <http://www.madehow.com/Volume-2/Pasta.html>.
3. ICMSF Members. Microbial ecology of food commodities. 2nd edition. ed. Roberts TA, Pitt JI, Cordier JL, Gram L, Tompkin RB, Gorris LGM, et al., editors. New York: Kluwer Academic/Plenum Publishers; 2005.
4. Costa C, Lucera A, Mastromatteo M, et al. Shelf life extension of durum semolina-based fresh pasta. International Journal of Food Science & Technology. 2010;45(8):1545-51.
5. Del Nobile MA, Di Benedetto N, Suriano N, et al. Use of natural compounds to improve the microbial stability of Amaranth-based homemade fresh pasta. Food Microbiology. 2009;26(2):151-6.
6. Vahavipe. Barrier paper container - foods. 2004 [cited 2013 Sep 23]; Available from: <http://81.209.16.114/Aineistopankki/PDF/Dry%20Foods/pasta.pdf>.
7. Sautour M, Soares Mansur C, Divies C, et al. Comparison of the effects of temperature and water activity on growth rate of food spoilage moulds. J Ind Microbiol Biotech. 2002/06/01;28(6):311-5.
8. Canadian Food Inspection Agency. Food safety practices guidance for fresh non-filled alimentary paste manufacturers. 2013 [cited 2013 Sep 20]; Available from: <http://www.inspection.gc.ca/food/safe-food-production-systems/haccp-generic-models-and-guidance-documents/guidance-non-filled-alimentary-paste/eng/1364412028942/1364414870197?chap=0#s11c5>

Disclaimer: The information provided in this document is based on the judgement of BCCDC's Environmental Health Services Food Safety Specialists and represents our knowledge at the time of the request. It has not been peer-reviewed and is not comprehensive.