1. **How is it possible that pathogens could be in wheat flour?**

Wheat is a raw agricultural product and is grown outdoors, where it may be exposed to pathogens in the soil, water or directly from birds and animals. Once on the wheat kernel, it is possible for pathogens to survive being transported to the elevator where wheat is stored, as well as through delivery to the flour mill where it is milled into flour. After wheat arrives at the mill it is mechanically separated to remove foreign materials – such as other grains – after which it is tempered and sent through the milling process. In general, flour produced using traditional milling methods does not go through a validated lethality step to kill any potential pathogens. Because of this, it is possible for pathogens such as E. Coli and Salmonella to survive all the way to the finished flour.

2. **Are whole grains or bran more susceptible to micro issues?**

The wheat kernel is composed of three essential parts: the bran, germ and endosperm. The bran layer is the outermost layer of the wheat kernel and therefore carries a greater likelihood of microbiological risk than the other parts because it’s directly exposed to environment as noted in question one.

Bran and whole wheat flour (which contains all of the components of the wheat kernel) may carry a greater risk of pathogens, but because there is no microbial separation during a patent flour milling process – which is used to produce traditional white flour – there is a risk that pathogens may be present in all types of flour. Therefore, all flour types should be accounted for in risk evaluations.
3. What studies have been done regarding pathogens in flour?

Several studies have been conducted on this topic, which we have cited and referenced in our white paper on Flour Food Safety. Our white paper can be downloaded at: http://www.ardentmills.com/uploads/download/Ardent_Mills_Flour_Food_Safety_White_Paper.pdf

The specific studies referenced in this paper are:

4. Does tempering contribute to the microbiological load of wheat or flour?

Tempering is a part of the milling process where wheat kernels are soaked in water for a period of time to soften the bran layer in preparation for milling.

Ardent Mills’ tempering systems are designed with potable water and proper flow characteristics to ensure that water moves continuously. Because of this, tempering systems are not considered to contribute risk to the microbiological load of wheat.

5. Is flour a medium for the growth of pathogens?

Flour is not documented to be a growth medium for bacterial organisms and pathogens based on the low-water activity within flour (less than 0.60 Aw).

It is important to note, however, that low-water activity is only a mechanism for growth inhibition and not lethality. In other words, bacteria may not grow in flour but they can survive.
6. What are the risk factors with raw flour and what applications are affected?

The FDA has issued an excellent summary of the risks associated with raw flour and the affected applications. For more information, please review the FDA’s document titled “Raw Dough’s a Raw Deal and Could Make You Sick,” issued on June 6, 2016.

7. Does Ardent Mills place warnings about the need to fully cook flour on labels or bags?

At Ardent Mills, food safety is a critical component of our foundational Safety value, and it has been since we began operation. You can learn more about our vision and values at ardentmills.com.

Ardent Mills prints a comprehensive food safety statement directly on all of our branded bags produced in the United States, and encourages all private-label customers we partner with to do the same.

The statement differs slightly between bags intended for distribution and further processing, and those intended for retail consumers:

**Food Safety Statement(s) for 25 lb. and 50 lb. bags:**

STORAGE AND SAFETY INSTRUCTIONS: Store in a clean, cool, and dry area away from strong odors. Recommended storage conditions are <75 F and <50% humidity. This is not a ready-to-eat food and must be thoroughly cooked before eating.

**Food Safety Statement for retail 2 lb., 5 lb. and 10 lb. bags**

Store in a clean, cool, and dry area away from strong odors. For longer shelf life, store in a refrigerator or freezer. This is not a ready-to-eat food and must be thoroughly cooked before eating.

8. What are the implications of the Food Safety Modernization Act for wheat flour, millers and customers?

The Food Safety Modernization Act (FSMA) is a major update in the area of food safety and is the most sweeping reform of our food supply regulations since the late 1930s.

FSMA shifts the focus from reacting to contamination to preventing contamination. All domestic and foreign facilities that are required to register under the Bioterrorism Act of 2002 are required to comply with the regulations that have been established for the Current Good Manufacturing Practice, and Hazard Analysis and Risk-Based Preventive Controls for food. This law requires comprehensive, science-based preventive controls to be applied across all food including human (flour) and animal food – (milling co-products).

Ardent Mills has issued communications to customers in accordance with the act detailing that flour is made from a raw agricultural product. It is the responsibility of customers to understand the risks of all of their ingredients and ensure the safety of their finished products.
9. **Can’t I just test my flour? If testing does not provide assurance, what does?**

   Many customers believe that testing can provide assurance of the food safety of flour ingredients. Because of the low occurrence of bacteria in flour and how bacteria tend to be distributed, testing does not provide 100% assurance that flour will be pathogen free without having gone through a lethality step. We have provided more details on this topic in our Flour Food Safety white paper.

   Regarding flour, testing is best deployed and provides food safety assurance when it is used to validate a kill step for pathogens. A validated kill step utilized as late as possible in the supply chain process coupled with good manufacturing processes provide a high degree of food safety assurance.

10. **What is SafeGuard® flour, and if it’s heat-treated, what is the impact on functionality?**

    SafeGuard® flour is flour produced under Ardent Mills’ patented SafeGuard Treatment & Delivery system. Using a carefully controlled, innovative heat treatment process, Ardent Mills is able to achieve up to 5 log pathogen reduction in flour while maintaining gluten functionality.

    SafeGuard flour can be used to support ready-to-eat (RTE) applications and high-risk known uses of non-RTE applications. The Ardent Mills technical group are highly skilled baking technicians who can help with recipe and functionality solutions.

For more information on Food Safety or SafeGuard flour, contact Ardent Mills at 800-851-9618 or visit ardentmills.com.