

**PRODUCT CATEGORY:**

Instant and hot cereals are dry mix cereal grains that contain flavorings and sweeteners. Prior to serving, the products are heated and mixed either with boiling water or cooked to boiling for a few minutes. The products are consumed immediately upon cooling.

The manufacturing process is typical for dry mix blending with product packaged into either single serving pouches or larger bulk containers. The packaging is typical plastic or foil coated paper to protect the product from moisture.

Cereals are usually purchased and consumed within 9-12 months of manufacture.

**FUNCTIONALITY:**

Analytical

Prototype products were prepared by adding a known concentration of aspartame to the already pre-mixed samples and the resulting cereals were "cooked" by two different methods. The instant type was heated by adding boiling water and stirring. The samples were cooled down to less than 70°F by placing in an ice water bath and samples tested after standing at 2, 7 and 17 minutes.

The "regular type" oatmeal was cooked in a microwave at a high setting for 2 minutes, then cooled in an ice water bath with samples analyzed after standing at 1, 6 and 16 minutes.

The samples were analyzed for aspartame and diketopiperazine content according to the method in Appendix I. Because of the extraction techniques, all results were corrected for recovery as compared to a spiked placebo.

The aspartame content ranged from 1400 to over 2000 ppm calculated on a dry basis.

For the instant type, the percent recovery for aspartame (Table 1) was 97.3% after 2 minutes, 96.3% after 7 minutes and 94.2% after 17 minutes.

**TABLE 1**

Percent Recovery of Aspartame and Diketopiperazine  
from Instant Oatmeal Exposed to Boiling Water

Holding Conditions	Theoretical Aspartame (ppm)	Percent Recovery		
		APM	DKP	
Two minutes	1599	95.7	< 1	
		97.9	< 1	
		96.5	< 1	
	1837	97.2	1.2	
		95.6	1.5	
Seven minutes	1873	97.2	2.0	
		95.6	2.2	
		95.9	2.2	
	1679	96.2	2.1	
		96.7	2.4	
		96.4	2.5	
	Seventeen minutes	1803	94.5	3.1
			93.5	3.1
		1539	94.4	2.9
94.5			3.1	

The results for microwave cooked oats (Table 2) were similar to those of the instant type in that recovery of aspartame was approximately 95 percent.

**TABLE 2**

Percent Recovery of Aspartame and Diketopiperazine  
from Microwave Cooked Oats

Holding Conditions	Theoretical Aspartame (ppm)	Percent Recovery	
		APM	DKP
One minute	1621	97.1	1.0
		96.6	1.4
	2069	95.9	1.4
		95.9	1.3
Six minutes	1868	96.5	1.8
		95.5	1.8
	1403	97.9	1.8
		97.8	< 1
Sixteen minutes	1714	97.9	2.3
		97.5	2.3
	2034	97.8	2.9
		97.6	2.8

The results indicate that the stability of aspartame in this product type is identical to that previously reported for dry base gelatins, puddings and fillings (FAP 3A2885). Unlike prepared gelatins or puddings, cooked cereal is not stored or held prior to consumption.