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Nitrite in Bacon

A summary analysis of a ban
on the use of nitrite in curing bacon

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U.S. DEPARTMENT OF AGRICULTURE
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PREFACE

Nitrite and nitrate use in curing meat has become increasingly controversial since it was discovered that nitrite can interact with secondary and tertiary amines to form carcinogenic nitrosamines. Recent evidence that sodium nitrite itself may be a carcinogen has intensified the debate. Regulatory actions restricting the use of these curing agents have already been taken, and others are being discussed.

This report presents a summary assessment of possible economic impacts from a ban on the use of sodium nitrite to cure bacon. It is issued to fill an immediate need for such information while the full report is in the publishing process. Those wishing a copy of the full report, "An Analysis of a Ban on the Use of Nitrite in Curing Bacon" should fill in the request form on the back cover of this publication and send it to: ESCS Information, Room 1664-S, U.S. Department of Agriculture, Washington, D.C. 20250.

NITRITE IN BACON:

A Summary Analysis of a Ban on the Use of Nitrite in Curing Bacon

INTRODUCTION

During the past decade, the use of nitrates and nitrites in curing meat has become increasingly controversial. Nitrite has been found to interact with secondary and tertiary amines to produce nitrosamines--compounds that are carcinogenic to laboratory animals. Recent evidence suggests that sodium nitrite itself may be a carcinogen.

The potential problems associated with use of these chemicals present a major dilemma to policymakers. Continued use could pose a significant longrun threat to public health. Prohibiting their use, however, may imply an immediate health threat from botulism (food poisoning caused by toxin from the bacterium Clostridium botulinum). In addition, consumers would need to adjust their eating patterns, and producers and meat processors would be required to make any resulting economic adjustments.

This report summarizes a recent assessment of the economic impacts that might occur in the agricultural and food sector from an immediate ban on the use of sodium nitrite to cure bacon made from pork bellies. Only the direct impacts on production, prices, and consumption are estimated. The extent of any higher health care costs or the benefits to society from a lower incidence of cancer are not estimated. There are no impact estimates based on a phaseout of nitrite contingent upon the development of other curing agents. Finally, the analysis does not consider explicitly any impacts relating to present uncertainty regarding future nitrite use.

Bacon was selected for analysis, because regulatory actions have already been published by the U.S. Department of Agriculture which reduce the use of these food additives in bacon processing. Focusing on a single product understates the broader consequences of a possible ban on nitrite in other pork, beef, poultry, and fish products. However, the analysis does provide insight into the complex interactions involved and highlights the problems associated with attempts to measure the economic impacts of such regulatory actions.

STUDY PROCEDURES

If the use of nitrite to cure bacon were banned, alternative uses for pork bellies would have to be found. While some nitrite-free bacon would be sold, a ban on the sale of nitrite-cured bacon would yield fewer pounds of pork meat from each hog carcass, because part of the bellies would be diverted to the animal fat market. Two assumptions about the consumption of nitrite-free bacon are considered to place bounds on likely carcass use:

* Scenario A assumes that 50 percent of the pork bellies now used for bacon would be consumed as bacon-like products. The remainder would be processed into sausage, other meat products, and lard.

* Scenario B assumes that 15 percent of the pork bellies would be consumed as bacon-like products, with the remainder diverted to other uses.

A computer model of the agricultural economy was used to help trace the impacts of these changes in pork carcass use over a 5-year period. Commodity analysts then combined their expertise and the results of the computer solutions to develop the impact estimates. Changes reported are based on a projected set of prices, quantities, and

incomes (referred to as baseline estimates) expected annually if nitrite curing of bacon is continued and consumers follow historical bacon consumption patterns.

RESULTS

A ban on nitrite use in curing bacon would create the need for some economic adjustments in the agricultural and food system. Food prices would probably increase, reflecting the somewhat higher costs of pork processing, lower hog production, and increased demand for other meats. Net income from farming also would be lower, reflecting lower cash receipts from hogs and such crops as corn and soybeans.

Under scenario A, liveweight hog prices would decrease initially by 4 percent (\$2 per hundredweight). Over the 5-year period, hog prices would recover somewhat from their initial decline and stabilize at about 2 percent below the baseline estimate. Ultimately, fewer hogs would be produced and retail prices for meat products would be slightly higher (table 1).

Producers of substitute meat products would respond to these generally higher prices by increasing production. However, the somewhat unique consumption pattern of bacon as a breakfast food would limit the substitution of beef and broilers for pork. By the fifth year, total per capita meat production would stabilize slightly below the baseline estimate (table 1).

The timing of a ban would be crucial to the production estimates. If a ban were imposed at a time when red meat production was at a low point, the first-year price impact would be more dramatic and could persist longer than indicated. Also important would be the first-year response by hog producers. Lower prices could discourage producers, resulting in a more rapid liquidation of stock.

Disposing of the relatively larger quantities of lard would have a significant impact on the soybean and oilseed sector. Lard production would increase by as much as 35 percent. Soybean prices would be lower, and soybean oil exports would be higher. Crude oil prices could fall by about 8 percent under scenario A.

A nitrite ban would result in reduced net farm income. If the ban had gone into effect during 1976, hog producers' receipts would have been \$580 million less. Receipts to crop producers would have been about 1 percent below the baseline. For scenario A, net farm income would be 2 percent below the baseline (table 2).

The higher meat-product prices resulting from a nitrite ban also would be reflected in the Consumer Price Index (CPI) for food. The All Food CPI would be 0.3 percent higher for scenario A, and 0.7 percent higher for scenario B. In either case, the effect on the total CPI would be negligible (table 3).

Higher retail prices for pork products would be responsible for most of the 0.3-percent increase in the food CPI. The pork CPI would be about 3 percent above the baseline for scenario A. Poultry and beef prices also would be slightly higher.

Results of this study only suggest the types of adjustments a ban on nitrite use would require. Data limitations and available analytical methods complicate deriving precise impact estimates. However, the study does provide a snapshot of the potential effects and indicates the expected direction of changes in prices, production, and consumption.

Table 1--Deviation from base projections of livestock and poultry prices and production after banning nitrite in curing bacon

Item	Unit	Year 1	Year 2	Year 3	Year 4	Year 5
<u>Scenario A</u>						
Prices:						
Barrows and gilts (live-weight prices)	:Dol./cwt.:	-1.89	-1.01	-0.81	-0.93	-0.89
	: Pct. :	-4.09	-2.38	-1.70	-2.06	-1.80
Broilers (RTC wholesale prices) <u>1/</u>	:Cts./lb. :	.27	.29	.34	.47	.56
	: Pct. :	.69	.73	.59	.86	.94
Fed beef (steer price, Omaha)	:Dol./cwt.:	.39	.47	.49	.50	.50
	: Pct. :	.97	1.21	.99	.95	.85
<u>Scenario B</u>						
Barrows and gilts (live-weight prices)	:Dol./cwt.:	-3.19	-1.69	-1.36	-1.56	-1.42
	: Pct. :	-6.90	-3.99	-2.86	-3.45	-3.00
Broilers (RTC wholesale prices) <u>1/</u>	:Cts./lb. :	.45	.49	.58	.80	.96
	: Pct. :	1.16	1.24	1.01	1.16	1.61
Fed beef (steer price, Omaha)	:Dol./cwt.:	1.02	1.24	1.34	1.33	1.33
	: Pct. :	2.65	3.16	2.68	2.56	2.32
<u>Scenario A</u>						
Production:						
Barrows and gilts (carcass weight)	:Mil. lbs.:	-432.00	-520.00	-517.00	-490.00	-477.00
	: Pct. :	-3.40	-3.90	-3.80	-3.40	-3.20
Broilers (RTC) <u>1/</u>	:Mil. lbs.:	34.00	38.00	36.00	30.00	29.00
	: Pct. :	.38	.41	.42	.34	.33
Fed beef (carcass weight)	:Mil. lbs.:	35.00	66.00	55.00	38.00	38.00
	: Pct. :	.20	.36	.33	.18	.18
<u>Scenario B</u>						
Barrows and gilts (carcass weight)	:Mil. lbs.:	-719.00	-884.00	-878.00	-832.00	-810.00
	: Pct. :	-5.85	-6.59	-6.37	-5.72	-5.44
Broilers (RTC) <u>1/</u>	:Mil. lbs.:	56.00	65.00	61.00	51.00	49.00
	: Pct. :	.62	.71	.72	.57	.56
Fed beef (carcass weight)	:Mil. lbs.:	80.00	160.00	144.00	89.00	88.00
	: Pct. :	.45	.88	.77	.44	.42

1/ RTC = ready to cook.

Table 2--Deviation from base projections for selected farm income indicators after banning nitrite in curing bacon

Item	Year 1	Year 2	Year 3	Year 4	Year 5
			<u>Percent</u>		
Receipts:					
Cattle and calves:					
Scenario A	1.0	1.3	1.3	1.2	1.3
Scenario B	2.4	3.2	3.3	3.0	3.1
Hogs:					
Scenario A	-6.6	-5.6	-5.2	-5.5	-4.9
Scenario B	-13.0	-10.5	-9.9	-10.6	-9.2
Broilers					
Scenario A	1.2	1.6	1.6	2.3	2.3
Scenario B	2.8	3.5	3.9	4.7	4.9
All livestock and products:					
Scenario A	-.4	-.1	-.1	.2	.1
Scenario B	-.8	-.2	-.1	-.2	0
Corn:					
Scenario A	-2.7	-3.5	-3.4	-3.4	-3.4
Scenario B	-6.5	-8.5	-8.3	-8.2	-8.1
Soybeans:					
Scenario A	-2.3	-2.4	-2.3	-2.3	-2.4
Scenario B	-5.3	-5.6	-5.5	-5.4	-5.6
All crops:					
Scenario A	-.9	-1.1	-1.1	-1.1	-1.1
Scenario B	-2.2	-2.6	-2.6	-2.6	-2.6
Net farm income:					
Scenario A	-2.3	-2.5	-2.1	-2.4	-2.5
Scenario B	-5.4	-4.9	-4.5	-5.5	-5.5

Table 3--Deviation from base projections of selected Consumer Price Indexes after banning nitrite in curing bacon

Item	Year 1		Year 2		Year 3		Year 4		Year 5	
	Mod- erate	High	Mod- erate	High	Mod- erate	High	Mod- erate	High	Mod- erate	High
	<u>Percent</u>									
Beef and veal	0.6	1.8	1.0	2.2	1.0	1.8	1.0	1.8	1.0	1.6
Pork	2.6	4.4	3.5	5.9	3.4	5.9	3.5	5.9	3.6	6.2
All red meats	1.0	2.4	1.5	2.9	1.4	2.7	1.4	2.7	1.4	2.6
Poultry	.5	.7	.5	.7	.4	.7	.5	.8	.6	1.0
Total meat, poultry, and fish	1.0	1.9	1.2	2.4	1.1	2.2	1.1	2.1	1.1	2.2
Total livestock and products	.6	1.3	.8	1.7	.7	1.5	.7	1.5	.7	1.4
Total food	.3	.6	.4	.7	.3	.6	.3	.7	.3	.7
Total CPI	.05	.11	.07	.12	.05	.11	.05	.12	.05	.12

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