

Crambe Meal: Application for Exemption from Environmental  
Impact Statement Concerning the Feeding  
of Crambe Meal (heat toasted) to Feedlot Cattle

Proposed Action: Feed defatted seed meal from Crambe abyssinica (heat toasted) to feedlot cattle as 4.2% or less of their ration to provide an additional source of a high-protein feed.

Probable Impact: Since the proposed action does not significantly affect the quality of the human environment, an environmental impact statement is not required because the proposed action meets the requirements of Environmental Impact Considerations paragraph 25.1 (f)(1)(iv) as follows:

- (a) The animal feed additive is composed of a substance or its derivatives which naturally occurs in the environment and which may reasonably be considered to be nontoxic in the amounts used; and
- (b) the animal feed additive is metabolized in tissues and the metabolites in the amounts excreted into the environment are naturally occurring in the environment; and
- (c) the use of the animal feed additive can reasonably be expected not to alter significantly the prevalence or distribution of the substance or its derivatives of metabolites in the environment.

Data Pertinent to Subparagraph (b) Above:

epi-Progoitrin or its derivatives are absorbed by the animal body: They disappear from the alimentary canal of cattle fed crambe meal (Experiment 5348:39-43). Three cattle were fed 2 weeks on a ration containing 0.9% epi-progoitrin (8.9% epi-progoitrin in crambe meal which comprised 10% of the ration). No epi-progoitrin, 1-cyano-2-hydroxy-3-butene, or goitrin were found in samples of contents of rumen, omasum, abomasum, small intestine, cecum, and colon taken from these three cattle.

epi-Progoitrin of crambe meal is slowly hydrolyzed to goitrin in rumen fluid from cattle that were fed crambe meal (heat toasted). Six hours incubation of rumen fluid gave the results shown in the following table (Experiment 10341: 13-16):

Animal No.	Ration	e-PG <sup>1</sup> Added, mg	Fate of e-PG, %		Recovery of e-PG, % of Total
			Hydrolyzed to Goitrin	Unchanged	
69	No crambe meal	20	10	67	78
		40	4	82	86
94	10% dehulled crambe <sup>2</sup> , 30 days	20	10	63	73
		40	3	85	88
127	7.8% crambe <sup>2</sup> with hulls, 200 days	20	3	89	92
		40	0	75	75

<sup>1</sup>e-PG is epi-progoitrin.

<sup>2</sup>Heat-toasted crambe meal.

Crambe meal contains the glucosinolate epi-progoitrin, one of a group of glucosinolates occurring throughout the Crucifer plant family. Progoitrin is found in rapeseed, turnips, cabbage, and in other vegetables. Progoitrin and its stereoisomer epiprogoitrin are hydrolyzed in nature to form goitrin or organic nitriles. Available evidence indicates the same physiological activity for these products when formed from either glucosinolate. At the allowable rate of 4.2% crambe meal (heat toasted) in cattle ration, epiprogoitrin would constitute a maximum level of 1,680 ppm in the cattle ration. For comparison, turnips average 3,000 ppm progoitrin (on a comparable dry basis), and cabbage averages 170 ppm progoitrin and 5,930 ppm total glucosinolates. The progoitrin from the 30 million cwt annual cabbage crop is fed directly to humans in the U.S. at the rate of 153,625 tons progoitrin per year. Thus, it is evident that progoitrins or their derivatives are widespread in nature and may reasonably be considered to be nontoxic to humans in the amounts proposed.