EXPERIENCE WITH THE FEEDING OF RAPESEED MEAL IN GERMANY

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As a trade mark for quality, "made in Germany" is well-known throughout the world. Rapeseed, however, does not seem to fit into this frame. May I, therefore, briefly give you some details as to the situation of rapeseed and especially of rapeseed meal in the Federal Republic of Germany. To start with, I want to call your attention to the growing importance which the European market has and will have in future.

Generally speaking, none or - as you may realize - very few oilseeds are produced in Europe compared with other parts of the world. The few exceptions are sunflowerseed in southeastern Europe, rapeseed in France, Poland, Germany, Scandinavia, and Holland.

The German farmer's decision to grow rapeseed is not so much a matter of the market situation for vegetable oils or to have domestically grown rapeseed. It is much more a question of lacking alternatives, especially for the big farming units in Schleswig-Holstein. This state in the very north of Germany accounts for more than 60% of the domestically grown rapeseed. In the crop rotation pattern rapeseed has similar or equal significance to sugar beets, potatoes, and others. Rapeseed can be easily harvested with combines, which is certainly an advantage. Secondly, the role of Government subsidies should be mentioned, but this will be dealt with later on.

In Germany, the total rapeseed crop can be sub-divided into rapeseed varieties as follows:

approx. 82 %	Winter rapeseed (Brassica napus)
approx. 15.5%	Summer rapeseed (Brassica napus)
approx. 2.5%	Turnip rapeseed (Brassica campestris)

As we have learned, the corresponding Canadian figures are entirely different, since mainly summer rapeseed is grown in Canada. Winter rapeseed has higher yields, namely more than 2 metric tons per hectare or in Anglo-American units: 41 bushels per acre.

This is briefly the general situation, but my topic is not rapeseed or rapeseed oil. In order to illustrate the rapeseed meal situation in more detail, I have prepared the following Tables.

Table I shows the overall imports of rapeseed by the Federal Republic during 1964 to 1969. Imports - again generally speaking - increased steadily and consequently more seed was crushed in our oil-mills. An increasing part of the rapeseed meal, however, went into export as you will observe from Table II.

Especially during 1968 and 1969 a considerable surplus was available for export which the local market could not absorb. As to the total West German consumption, the figures reflect that there has been neither an increase nor a decrease in domestic consumption.

With regard to total West German imports divided according to countries of origin, we see - no matter how much we feel sorry about it - that during 1964 to 1969 not a single ounce of Canadian rapeseed meal was shipped to Germany (Table III). Italy with her large import volume must be regarded as trading rather than consuming country. Rapeseed meal, however, is not the sole ingredient of processed feedstuffs. All the other ingredients and raw materials were imported to a larger extent as you will see from Table IV, since the feed industry has expanded enormously during the last years. See Table V.

In Germany rapeseed meal is used only in feeds for beef cattle and in feeds for dairy cattle. As far as poultry and swine feeds are concerned no rapeseed meal is utilized (Table VI).

This Table illustrates two facts:

Firstly, and I have pointed this out before, rapeseed meal is not used at all in some feeds. Secondly, in Germany we are faced with a specific problem,namely the open declaration of feed formulations. The law requires that each individual ingredient must not only be named as in the U.S.A., but the percentage has to be given too. These percentages must be shown on each label. It is my opinion that due to this open declaration, rapeseed meal cannot be found in poultry or swine feeds. Rapeseed meal has a very poor image in the German agricultural industry. It would deserve a better reputation. When a German farmer hears or reads about rapeseed meal, he is thinking in terms of erucic acid or thioglucosides without knowing what this is all about. He thinks in terms of the smell of mustard oil and of bitter substances and of goitrogenic effects with which rapeseed meal is associated in his mind. Moreover he is not too fond of the high crude-fibre content. To put it bluntly, rapeseed meal has a reputation of being cheap and being used as a filler in feeds. As a manufacturer of mixed feeds, especially if one produces mainly cattle feed, as in the case of my company, it is absolutely necessary to have a first-class reputation and a very good trade-mark, so that one's quality image will not suffer when rapeseed meal is utilized.

T A B L E 1

IMPORTS OF RAPESEED
BY THE
FEDERAL REPUBLIC OF GERMANY
1964 - 1969
(1000 TONS)

YEAR	TOTAL	FRANCE	NETHERLANDS	SWEDEN	DENMARK	CANADA	POLAND	OTHERS
1964	32	3	6	5	16	2	-	-
1965	101	10	1	29	24	34	1	2
1966	91	13	5	3	22	48	-	-
1967	68	17	3	10	14	4	20	-
1968	108	7	13	42	6	1	39	-
1969	136	46	3	56	1	11	19	-

T A B L E II

RAPESEED MEAL DEVELOPMENT
IN THE
FEDERAL REPUBLIC OF GERMANY
1964 - 1969
(IN METRIC TONS)

YEAR	IMPORTS	EXPORTS	IMPORT SURPLUS	EXPORT SURPLUS	DOMESTIC PRODUCTION	DOMESTIC CONSUMPTION
1964	41,000	23,000	18,000		79,000	97,000
1965	43,000	38,000	5,000		116,000	121,000
1966	50,000	40,000	10,000		106,000	116,000
1967	54,000	38,000	16,000		105,000	121,000
1968	27,000	50,000		23,000	154,000	131,000
1969	29,000	66,000		37,000	155,000	118,000

T A B L E III

ORIGIN OF RAPESEED MEAL IMPORTED
BY THE
FEDERAL REPUBLIC OF GERMANY
1964 - 1969
(1000 TONS)

YEAR	TOTAL	FRANCE	ITALY	ALGERIA	CHILE	ARGENTINA	DENMARK	POLAND	CANADA	OTHERS
1964	41	4	17	8	8	3	-	-	-	1
1965	43	4	33	1	5	-	-	-	-	-
1966	50	3	34	-	12	-	-	-	-	1
1967	54	1	40	-	8	-	1	1	-	3
1968	27	6	15	-	3	-	1	1	-	1
1969	29	4	21	-	1	-	1	1	-	1

T A B L E IV

IMPORTS OF OILSEED CAKES AND MEALS

BY THE

FEDERAL REPUBLIC OF GERMANY

1964 - 1969

(1000 TONS)

YEAR	COPRA	PALM KERNEL	GROUNDNUTS	SOYBEANS	SUNFLOWER	RAPESEED	LINSEED	OTHERS	TOTAL
1964	285	220	112	337	39	41	234	261	1,529
1966	383	248	178	755	110	50	239	441	2,404
1967	323	207	142	789	109	54	184	331	2,139
1968	366	194	163	697	118	27	167	380	2,112
1969	374	231	147	980	109	29	194	483	2,547

T A B L E V

MANUFACTURED FEEDSTUFFS
BY THE
FEDERAL REPUBLIC OF GERMANY
1964 - 1969
(1000 TONS)

YEAR	POULTRY	SWINE	RUMINANTS	OTHERS	TOTAL
1964	2,463	1,524	1,460	129	5,576
1965	2,812	1,864	1,747	171	6,594
1966	3,200	2,122	2,016	193	7,531
1967	3,281	2,252	1,969	220	7,722
1968	3,197	2,221	1,908	219	7,545
1969	3,165	2,620	2,226	176	8,187

T A B L E VI

MIXED FEED FORMULATIONS

OF

C.B. MICHAEL & CO., HAMBURG.

INGREDIENT	DAIRY	SWINE (1)	LAYING HENS (2)
		(P E R C E N T)	
Crude Protein	20.0	15.0	20.0
Crude Fibre	14.0	5.5	4.0
Fat	3.5	-	-
Ash	-	-	13.0
Calcium	-	0.6	3.0
Phosphorus	-	0.5	0.7
Corn	-	20	45
Soybean Meal	-	14.5	25
Corn Gluten	-	7	6.5
Barley	-	10	-
Rapeseed Meal	12	-	-
Tapioca Flour	-	20	5.569
Wheat	-	5	-
Fishmeal	-	2	5
Bonemeal	-	1	1
Molasses	8	2	2
Fat	-	-	2
Copra Expeller/Meal	25	-	-
Cottonseed Meal/Cake	15	-	-
Tapioca Roots	12	-	-
Sunflowerseed Meal	11	-	-
Alfalfa	-	1	-
Rye Bran	10	-	-
Palm Kernel Meal/ Cake	5	-	-
Mineral Mixture	2	2	1.5
Rye	-	15	-

(1) Also contains: 0.48% vitamin mixture, 0.02% antibiotica, 5 g. flavophospholipol.
(2) Also contains: 6.0% $CaCO_3$, and 0.431% vitamin mixture.

In this connection it sounds rather strange that the growing of rapeseed is officially encouraged by West Germany's agricultural authorities. However, production is only subsidized and not protected against imports.

The same applies to the other Common Market countries. In August 1970 the world market price for rapeseed was $(US) 130, per metric ton, whereas the German Government at the same time had to buy home-grown rapeseed at the rate of about $(US) 175, per metric ton. When exporting rapeseed, the Government is granting the differential between the world market price and the actual domestic price. German oil mills are granted a socalled crushing premium which compensates for the difference from the world market price.

The German oil milling industry is not compelled to crush domestically grown rapeseed, however, it is understood that they have done so in order to assist with the marketing problems of the farming industry. Should the crushing premium or the export subsidy be abolished, I am convinced that the oil mills would discontinue the crushing of domestic rapeseed. If the price for rapeseed should reach the world-market level, I assume that less rapeseed would be grown in Germany.

Rapeseed production in Germany has never been a preferred crop from the farmer's point of view. Today less than 1% of the agricultural area is used for rapeseed production. In times of liberalization the acreage used for rapeseed tends to decline, whereas in times when selfsufficiency is promoted or in periods of a high degree of protection of the farming industry, the rapeseed acreage tends to increase at the Government's expense. In order to illustrate the foregoing, here are some details concerning acreage:

1914	(before World War I)	80,000 acres
1919	(End of World War I)	250,000 "
1933	(Third Reich)	25,000 "
1944	(Toward the end of World War II)	500,000 "
1950	(after division of Germany)	100,000 "
1970	(Subsidized in Federal Republic)	200,000 "

Returning to the above-mentioned subject, our farming industry would abstain from producing rapeseed at world market price levels. In contrast, Canada can export her rapeseed at world market prices and from the history of the development of rapeseed cultivation in Germany, you will realize that it does not require great efforts to introduce this product into our market. Rapeseed and rapeseed meal are well-known products.

We have seen that rapeseed growing is subsidized in Germany, and that this acts as an incentive to German farmers. The same legislative authority, however, does not subsidize or encourage the consumption of rapeseed meal. It is important that the German feedstuff legislation restricts the percentage of rapeseed meal permitted for use in a variety of feeds. For instance, in broiler and laying rations the maximum is 10%.

The use of rapeseed meal is completely prohibited in starter rations.

The feed industry in Germany hopes that the closed form of declaration, or at least a half-open declaration similar to the Canadian practice, will be in force from 1972 onwards. Some of the Common Market countries are already operating under a more liberal legislation. I am sure Germany will follow this example since the other countries have little interest in following the German practice.

Of what use is it to the farmer that he can read on the label of every bag that a given feed contains 20% soybean meal? Of what value is it, if it does not clearly state whether this meal contains 44% protein and 7% crude fibre, or whether it is a meal with 44% protein and without guarantee of maximum fibre content? Or whether it is a meal with 50% protein and 3% fibre? The contradictory thing about this is, that human beings are not informed of the composition of hot dogs or hamburgers. The essential thing should be the guarantee of the nutritional value of a feedstuff and nothing else.

I am giving you these details in order to demonstrate what the future holds for Canadian rapeseed meal in Germany, once we switch to a more rational legislation in Germany, i.e., the introduction of the closed declaration. The image of rapeseed meal fails to do justice to its real value. Scientific research in Germany and particularly in Canada have proved this. Canada is the leader in rapeseed meal research, as was shown in a lecture given by Prof. Clandinin in Hamburg on July 8, 1970. I have confidence in the scientists regarding the effect of rapeseed meal on the thyroid gland of animals. The scientists will certainly also discover the effect of rapeseed meal on humans, in case there is any.

It seems that Canadian rapeseed (campestris) has a lower thioglucoside content (0.15 to 0.30%) than German rapeseed (napus) (0.9 - 1.0%). Improved crushing techniques built into the pre-press solvent method could further reduce the effect.

If rapeseed meal is fed in a wet or moist condition, a smell of mustard oil will appear when the myrosinase has not been deactivated during processing. In most of these cases animals

will refuse to accept such ration. The average mustard oil content varies from 0.20% to 0.50% while Canadian campestris species contain less.

Unfortunately, rapeseed meal has a lower content of essential and limiting amino acids like methionine and lysine than soybean meal. If it should be possible to further reduce the undesirable factors, the lower amino acids level might become more important.

The amazing aspect of most of the animal tests carried out by nutritionists in Canada is, that they have the courage to utilize rapeseed meal in quantities normally not dreamt of. While in Germany we do not use any rapeseed meal in poultry rations, your experts use as much as 10% and more. The reason for that must be the specific quality of the Canadian product. I would like to refer to the research results reported by the Federal Research Institute for Breeding Small Animals in Celle, near Hannover.

All recent German research work reflects the fact that one is prepared to use rapeseed meal on a larger scale because of the favourable combination of nutritional value and price.

Practical research carried out by Vogt, Hannover, has shown that upon feeding rapeseed meal to broilers up to an age of six weeks no negative results were observed. The following percentages of rapeseed meal have been incorporated into isocaloric rations: 0%, 8.75%, 17.5%, and 35%.

Smaller gains were observed only after the sixth week. However, broilers are fed only until the end of the 6th week. The results were lower in the case of rations containing 35% rapeseed meal. After the 6th week the feed conversion declined considerably in comparison with the ration not containing any rapeseed meal. This could be the result of the length of the feeding period or of the fact that younger animals convert rapeseed meal more easily.

It was found, however, that during a 14-day feeding period the weight of the thyroid doubled which means that the reason must be sought in the length of time of feeding. The dosage of rapeseed meal as such does not play an important role. It is recommended, however, not to include more than 10 - 12% rapeseed meal in broiler rations.

In Germany broiler production does not have the same significance as egg production. About half of our total broiler consumption is imported. Broilers live for approximately six weeks, whereas layers must be fed for another year after having gone through the pullet stage of 20 weeks. Egg consumption in

Germany is met almost entirely by domestic production. As for layers, not only the weight but other factors such as laying performance, colour of the yolk, taste of the eggs, eggshell and size, etc., are of importance. I think that the results known so far do not justify the optimism you show in Canada. Tests have been carried out in Germany using the following levels of rapeseed meal: 0%, 10%, 20%.

Even at the 10% level a decline of 15% in egg-production has been observed over a period of 350 days. As a businessman I do not need any further investigation, because even the relatively low price of rapeseed meal cannot compensate for this negative aspect. When using a mix containing 20% rapeseed meal, egg-production decreased by 23%. At this level a decline in egg-weight has been observed as well. Only the eggshell showed improvements. The colour of the yolk is a matter of philosophy or "Weltanschauung", as we say. In the USA the demand is for a yolk having a very light colour. In Germany, on the other hand, eggs having a red-yellowish yolk are preferred. Consumers have curious ideas and perhaps the Canadian housewife might prefer yolks with a greenish colour, I do not know. It is certain, however, that after feeding rapeseed meal the colour of the yolks became lighter, which is a drawback in Germany, but very positive in the USA. Apart from the foregoing, changes in odor and taste have unfortunately been observed (mustard oil). The feed intake was lower since the animals were apparently not too fond of the rapeseed meal in the ration.

In order to determine the palatability range as accurately as possible new tests have been carried out using 3, 4, 6, and 8 % rapeseed meal in the ration. When using 4% no negative effects with regard to smell and palatability were observed. It seems, therefore, possible to allow 5% in the ration.

The best utilization of rapeseed meal obviously occurs in ruminants. Even when feeding rapeseed meal at a 25% level, no increase in the thyroid could be detected. The natural limit is set by its palatability and should not be exceeded.

Of particular interest, in the case of dairy cattle, is that when using rapeseed meal or expeller cake and when reducing copra expellers and/or soybean meal in the ration no negative results with regard to milk yield and butter fat were observed.

It appears that 25% rapeseed meal or cake can easily be taken without any danger. The fact that we in Germany are somewhat reluctant to do so, must probably be attributed to the palatability, but another reason is the requirement for the open declaration.

Little information is available on feeding of rapeseed meal to swine. In Germany swine rations are produced widely and mixed by the farmers or by the local wholesaler. The feed industry by and large supplies the necessary concentrates or supplementary feeds. The protein content of the concentrates must be as high and valuable as possible. The resulting problem is, that the industry has no possibility of checking whether the farmer is using the prescribed formulation. There is, therefore, no guarantee that the farmer uses the concentrate in the best and most economical fashion. For this reason we should be very careful with using rapeseed meal in swine rations. Particularly in swine finishing and breeding rations the low lysine level appears to create a problem. When my Company tested comparable feeds with and without rapeseed meal at our Company-operated experimental farm, the animals showed a very poor intake of the rapeseed meal ration. Figures proving that half of the protein concentrate could be made up from rapeseed meal have for the time being, no validity for Germany. In my opinion 10% are by far too much, but 5% in the finishing mix could be tolerated. (Table VII).

This Table shows the percentages of rapeseed meal which can be expected in feed rations. These figures are compared with the Canadian research results. I am afraid that the German research work up to now cannot match with Canadian results, as can be seen in Column 2. Column 3 shows the current utilization in feeds. Column 4 shows the development which I expect as soon as the closed declaration becomes effective.

During 1970, more than 8 million tons of mixed feeds will again be produced. Since rapeseed meal in contrast to soybean meal will not be fed by the farmers directly, the total amount of rapeseed meal, whether produced from German or Canadian seed or imported as meal will go to the feed industry. At the 1969 level of 118,000 tons of rapeseed meal, this accounts for less than 1.5% of the total output. You can see what increase in demand for rapeseed meal or cake will develop in Germany if you base your projections on the figures in Column 4.

This demand, however, will have to be dealt with by you. The German rapeseed acreage will not be extended, since the Government was already forced this year to buy part of the rapeseed crop. The oil mills did not take all of it, or gave preference to Canadian seed or crushed other oilseeds.

T A B L E VII

HIGHEST RAPESEED MEAL RATIONS

	CANADA	GERMANY		
	Results of Research	Results of Research	Today Possible (open feed formulation)	Possible in Future (closed feed formulation)
Poultry				
Chicken Starter	15%	no results	prohibited	-
Broiler	15%	12%	3%	5%
Laying hens	10%	5%	-	3%
Swine				
Starter ration	4%	no results	-	-
Finisher ration	10%	no results	-	5%
Sows	3%	no results	-	2%
Ruminants				
Cattle	10%	25%	20%	25%