JBL

The new JBL Novo range:

1. **Optimal protein to fat ratio**
2. Clear water
3. **No fish meal, no whole fish**
4. Dermatologically tested

Speaker:
Dr. Ralf Rombach

JBL

The new JBL Novo range:

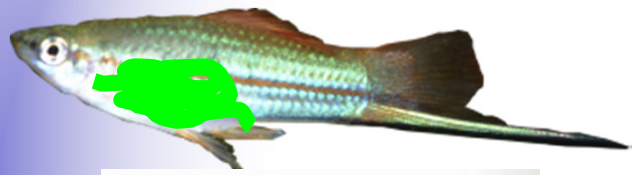
1. Optimal protein to fat ratio

What is an optimal protein to fat ratio ?

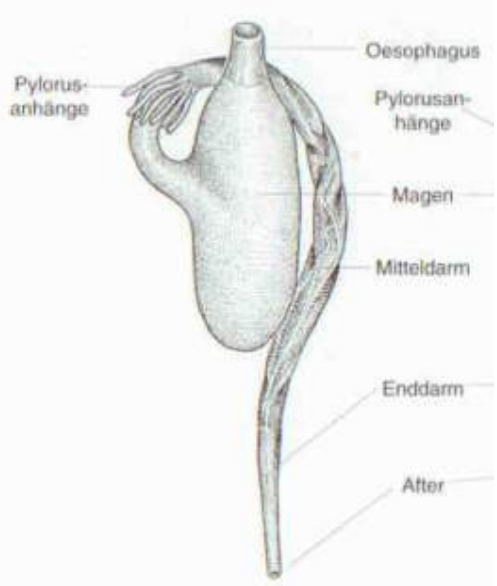
Fish with different nutritional needs have different digestive systems!

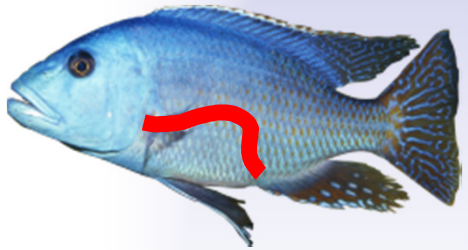
Herbivores with a long intestinal tract require less protein and fat, and lots of fibre instead!

Carnivores with a short intestinal tract need higher grade food with more protein, and less fibre instead!



Der lange Mitteldarm läßt darauf schließen, daß Oreochromis mossambicus zu einem großen Teil pflanzliche Nahrung zu sich nimmt.





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The new JBL Novo range:

Additives: colourings, antioxidant E306 (natural vitamin E extracts).

Vitamins (per 1000 g):

Vitamin A:	25,000 IU	Vitamin E:	330 mg	Inosit:	750 mg
Vitamin D_3:	2,500 IU	Vitamin C (stable):	400 mg		

Analytische Bestandteile / Analytical composition:

Protein Protein	43 %
Fettgehalt Fat content	8,3 % / 8.3 %
Rohfaser Raw fibre	1,9 % / 1.9 %
Rohasche Crude ash	8,1 % / 8.1 %

Crude protein
Is the sum of all of the compounds containing nitrogen. The content is usually ascertained by determining the nitrogen concentration of the sample first (e.g. by the Kjeldahl method). Afterwards, the result is multiplied by a factor that represents the reciprocal value of the typical N concentration in crude protein. This normally amounts to 6.25 (plant protein) or 6.38 (animal protein) – based on an average N concentration in crude protein of 16 % (plant) or 15.7 (animal). The proportion of crude protein that can actually be used is referred to as digestible crude protein (DCP).

Crude fat
The crude fat content is part of the food which dissolves in fat solvents such as petroleum ether. It is determined according to Soxhlet.

Crude fibre
"Crude fibre" refers to the proportion of a foodstuff that is left over as a "non-digestible" component after treatment with undiluted acids and lyes. Cellulose forms the main component of this substance class. Crude fibre cannot be equated with dietary fibres, since these are made up of only approx. one-third of cellulose and contain many other non-digestible components.

Crude ash
The crude ash content is determined by heating the sample until weight constancy and up to 550 °C in a muffle oven. As a result, all of the organic ingredients are muffled (burned) and the sediment is the crude ash content. This mostly comprises minerals and sand, depending on the sample. The value of the total mass of the food less the value of crude ash is the organic mass (OM). The organic mass consists of crude protein, crude fibre, crude fat and NfE (nitrogen-free extracts such as sugar, etc.)

http://de.wikipedia.org/wiki/Futtermittelanalytik

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The new JBL Novo range:

What does a fish eat in the wild ?

1) **Insect larvae**, including mosquito larvae (white, black, red), mayfly larvae**,** caddis worms, stonefly larvae, maybe adult insects.

	Protein	Crude fat	Crude fibre	Crude ash	Moisture	Protein	: Fat	Source
Common house mosquito larvae (Aedes, Culex)	10	4			82	2.5	: 1	Bremer
Mixed insect larvae	12	3			82	4.0	: 1	Bremer
Mayfly larvae	10	2.5			83	4.0	: 1	Averaged acc. to Bremer
Glass worms (Chaeborus spec.)	4.0	1.0			89	4.0	: 1	BettaUnited
Bloodworms (Chironomus)	6.5	1.5			86	4.3	: 1	Averaged acc. to Bremer
Common house mosquito larvae (Culex pipiens)	10.0	2.0			82	5.0	: 1	BettaUnited

Among other things, insect larvae are characterised by a chitin carapace (not at all or only barely digestible, therefore without appropriate dietary fibres).

The average protein to fat ratio is approx. 4-5:1.

Elisabeth Platzer: Nährwert der Frischsubstanz von Fischfutter. - http://www.bettaunited.at/verwandte%20themen/nahrwert.htm
Bremer, H. (1997): Aquarienfische gesund ernähren. – Stuttgart (Ulmer Verlag).

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The new JBL Novo range:

What does a fish eat in the wild ?

2) **Crustaceans**, including water fleas (Cladocera), copepods (Copepoda), shrimp (Praunus and others)**.**

	Protein	Crude fat	Crude fibre	Crude ash	Moisture	Protein	: Fat	Source
Water flea, Daphnia	2.5	0.75			95	3.3	: 1	Averaged acc. to Bremer
Cocepod, Cyclops	9	2.5			83	3.6	: 1	Bremer
Amphipods, Gammarus	7	1			86	7.0	: 1	Bremer
Mex. amphipod, Hyalella azteca	7.0	1.0			86	7.0	: 1	BettaUnited
Opossum shrimp Praunus	13	1			80	13.0	: 1	Bremer
Mysis	13.0	1.0			80	13.0	: 1	BettaUnited

Crustaceans have a comparatively low fat content along with an outside shell with a high mineral concentration.

The protein to fat ratio is between 3.3:1 and 13:1 !

Elisabeth Platzer: Nährwert der Frischsubstanz von Fischfutter. - http://www.bettaunited.at/verwandte%20themen/nahrwert.htm
Bremer, H. (1997): Aquarienfische gesund ernähren. – Stuttgart (Ulmer Verlag).

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The new JBL Novo range:

What does a fish eat in the wild ?

3) Fish !

	Protein	Crude fat	Crude fibre	Crude ash	Moisture	Protein	: Fat	Source
Whitefish	16	1.5			78	10.7	: 1	Bremer
Codfish	13.0	1.0			80	13.0	: 1	BettaUnited

Fish are high in protein and low in fat: **The average protein to fat ratio is approx. 10-13 :1 !**

4) Fattening feed and breeding feed

	Protein	Crude fat	Crude fibre	Crude ash	Moisture	Protein	: Fat	Source
Grindal worm Enchytraeus buchholzi	15.0	10.0			75	1.5	: 1	BettaUnited
Micro worms	40.0	20.0			74	2.0	: 1	BettaUnited
Vinegar eels	40.0	18.0			80	2.2	: 1	BettaUnited
Artemia decapsulated	60.0	24.0			17	2.5	: 1	BettaUnited
Heart of beef	70.0	20.0			10	3.5	: 1	BettaUnited

Breeding feed and fattening feed are marked by a high fat content:
The protein to fat ratio is between 1.5:1 and 3.5:1 !

Elisabeth Platzer: Nährwert der Frischsubstanz von Fischfutter. -
http://www.bettaunited.at/verwandte%20themen/nahrwert.htm
Bremer, H. (1997): Aquarienfische gesund ernähren. – Stuttgart (Ulmer Verlag).

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The new JBL Novo range:

Differences between fresh food or dry food are linked to water concentration:

	Protein	Crude fat	Moisture	Protein	: Fat	Source
Bosmiden, Bosmina longirostris	3.0	1.0	95	3.0	: 1	BettaUnited
Dry bosmiden, Bosmina longirostris	**67.5**	**22.5**	**10**	**3.0**	**: 1**	BettaUnited
Water flea, Daphnia	2.5	0.75	95	3.3	: 1	Averaged acc. to Bremer
Dry water flea, Daphnia	**69.2**	**20.8**	**10**	**3.3**	**: 1**	Averaged acc. to Bremer
Tubifex	8.4	2.5	84.5	3.4	: 1	Averaged acc. to Bremer
Dry Tubifex	**69.4**	**20.6**	**10**	**3.4**	**: 1**	Averaged acc. to Bremer
Cocepod, Cyclops	9	2.5	83	3.6	: 1	Bremer
Dry cocepod, Cyclops	**70.4**	**19.6**	**10**	**3.6**	**: 1**	Bremer
Mixed insect larvae	12	3	82	4.0	: 1	Bremer
Dry mixed insect larvae	**72.0**	**18.0**	**10**	**4.0**	**: 1**	Bremer
Mayfly larvae	10	2.5	83	4.0	: 1	Averaged acc. to Bremer
Dry mayfly larvae	**72.0**	**18.0**	**10**	**4.0**	**: 1**	Averaged acc. to Bremer
Glass worms, Chaeborus spec.	4.0	1.0	89	4.0	: 1	BettaUnited
Dry glass worms, Chaeborus spec.	**72.0**	**18.0**	**10**	**4.0**	**: 1**	BettaUnited
Bloodworms, Chironomus	6.5	1.5	86	4.3	: 1	Averaged acc. to Bremer
Dry bloodworms, Chironomus	**73.1**	**16.9**	**10**	**4.3**	**: 1**	Averaged acc. to Bremer
JBL NovoBel	43	8.3	7	5.2	: 1	Producer

When this is converted into 10 % moisture, we obtain high protein contents.

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The new JBL Novo range:

Quintessence:

In order to provide fish with a permanently healthy diet, **the protein to fat ratio should be > 4:1** !

	Protein	Crude fat	Crude fibre	Crude ash	Moisture	Protein	: Fat	Source
JBL NovoBel	43	8.3	1.9	8.1		5.2	: 1	Producer
JBL Gala	45	8	2	9		5.6	: 1	Producer

To provide fish with a high-fat diet, **the protein to fat ratio should be < 4:1 !**

	Protein	Crude fat	Crude fibre	Crude ash	Moisture	Protein	: Fat	Source
Competitor S1	41	17	1	6		2.4	: 1	Producer

A high fat content can lead to fatty liver, especially when the protein content is low.

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The new JBL Novo range:

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Vitamins (per 1000 g):

Vitamin A:	25,000 IU	Vitamin E:	330 mg	Inosit:	750 mg
Vitamin D_3:	2,500 IU	Vitamin C (stable):	400 mg		

Analytische Bestandteile / Analytical composition:

Protein Protein	43 %
Fettgehalt Fat content	8,3 % / 8.3 %
Rohfaser Raw fibre	1,9 % / 1.9 %
Rohasche Crude ash	8,1 % / 8.1 %

	Protein	Crude fat	Crude fibre	Crude ash	Protein	: Fat	Source
Competitor A	48	9	3	9	5.3	: 1	Producer
JBL NovoBel	43	8.3	1.9	8.1	5.2	: 1	Producer
Competitor M	48	9	3	9	5.3	: 1	Producer
Competitor S2	46.2	8.9	2.3	11.9	5.2	: 1	Producer
Competitor S1	41	17	1	6	2.4	: 1	Producer
Competitor T	47	10	3	11	4.7	: 1	Producer

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The new JBL Novo range:

How food ingredients influence protein utilisation in fish

Example: 400 litre tank

Population: 6 discus fish 125 g ea = 750 g fish

Feeding: 2 % of fresh matter* = 15 g food per day

* based on dry food with min. 90 % dry matter

	Protein [%]	15 g food contain protein [g]	Protein for energy digested [%]	Yields nitrogen [N] in 15 g food [mg]	Yields NH_4 [mg]	NH_4 in 400 l [mg/l]	Yields NO_3 [mg]	NO_3 in 400 l [mg/l]
Competitor S1	41	6.15	30	295.2	380	0.95	1307	3.27
JBL NovoBel	43	6.45	30	309.6	398	1.00	1371	3.43
Competitor T	47	7.05	30	338.4	435	1.09	1499	3.75
Competitor S2	46.2	6.93	30	332.64	428	1.07	1473	3.68
Competitor A	48	7.2	30	345.6	444	1.11	1531	3.83

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Foods with these ingredients…

Food for herbivores

Untersuchung auf:	Deklaration	Befund	Einheit	Methode
Wasser		5,5	%	VDLUFA III 3.1/2/5
Rohprotein (N*6.25)		39,8	%	VDLUFA III 4.1.2
Rohfett		22,4	%	VDLUFA III 5.1.1/3
Rohfaser		<0,1	%	VDLUFA III 6.1.1
Rohasche		6,6	%	VDLUFA III 8.1/4
N-Freie Extr.-stoffe		25,7	%	
Phosphor		1,05	%	VDLUFA VII 2.2.2.6

Food for carnivores

Untersuchung auf:	Deklaration	Befund	Einheit	Methode
Wasser		6,3	%	VDLUFA III 3.1/2/5
Rohprotein (N*6.25)		41,7	%	VDLUFA III 4.1.2
Rohfett		19,3	%	VDLUFA III 5.1.1/3
Rohfaser		<0,01	%	VDLUFA III 6.1.1
Rohasche		6,7	%	VDLUFA III 8.1/4
N-Freie Extr.-stoffe		26,0	%	
Phosphor		1,06	%	VDLUFA VII 2.2.2.6

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… are not good for fish in terms of a healthy diet!

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Fatty acids:

Freshwater fish have a high requirement for omega-6 fatty acids.

Values in % fat content	Competitor S1[1] ω-3; ω-6	JBL NovoBel [2] ω-3; ω-6
Sum of omega-3 fatty acids	**12.245**	**7.7**
Sum of omega-6 fatty acids	**6.48**	**25.9**

[1] Source: producer‘s Internet site
[2] LUFA Speyer (fatty acid sample JBL NovoBel; No. F19358/11 of 18.08.2011)

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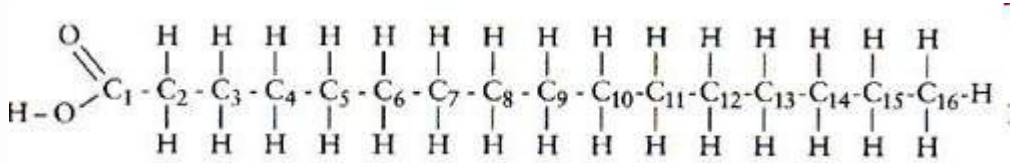
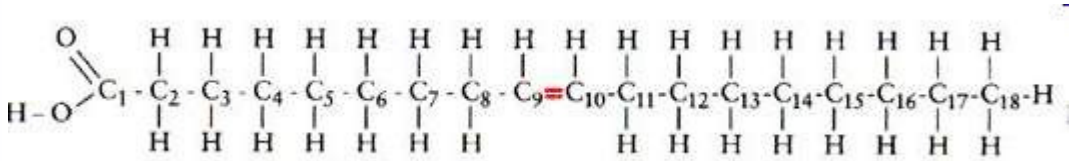
What are fatty acids ?

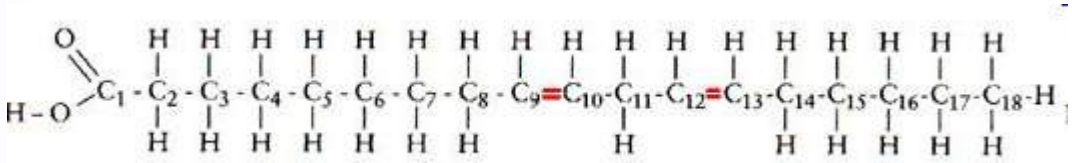
We distinguish between saturated and unsaturated fatty acids.



Saturated fatty acid – example: Palmitic acid (Code C18:0)



Unsaturated fatty acid – example: Oleic acid (Code C18:1c)



Polyunsaturated fatty acid – example: Linoleic acid (Code C18:2 ω-6))
An omega-6 fatty acid.

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Summary of Fatty Acids

	LUFA
Sums	**JBL NovoBel Values in % of crude fat**
Saturated fatty acids	25.7
Monounsaturated fatty acids	39.1
Polyunsaturated fatty acids	33.6
Trans fatty acids	0.3
Essential fatty acids	**28.1**
Sum of omega-3 fatty acids	**7.7**
Sum of omega-6 fatty acids	**25.9**

1) JBL NovoBel has a high concentration of polyunsaturated fatty acids.

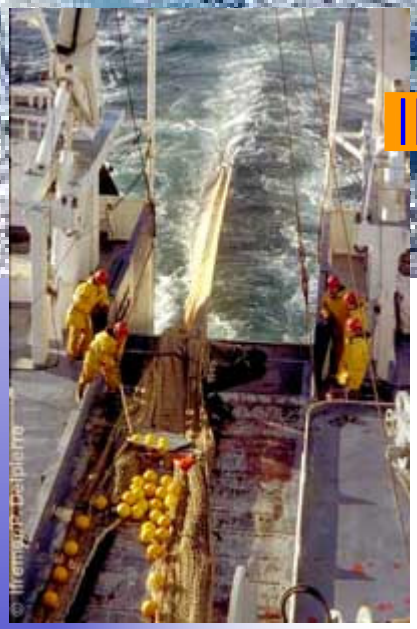
2) JBL NovoBel has a high concentration of essential fatty acids. LUFA Speyer (fatty acid sample: JBL NovoBel; No. F19358/11 of 18.08.2011)

3) JBL NovoBel has a high concentration of omega-6 fatty acids.

JBL's production

In Europe's most important fishing port:

Fillet factory



Raw materials for cosmetics and pet food

Ultramodern enzymatic processing

A modern and highly digestible "super protein" of fish

Fish bone meal, a valuable source of minerals

JBL's production

…therefore:

Without fish meal !

We were able to do that a long time ago already!

… BUT ..."ecology friendly“, abiding by the motto:

The large fillet for people, the small one for the fish!

Apropos of nothing:

Besides this "small fillet for the fish", JBL fish food also contains protein from other aquatic animals to offer maximum variety in accordance with the fish's needs.

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Summary

JBL NovoBel

1. Ideal protein to fat ratio of **5.2 : 1**
2. **Low concentration of non-digestible crude fibre.**
3. **Lowest fat content** of all comparable staple foods, thereby preventing fatty degeneration of the liver**.**
4. **Low crude ash concentration**, no fish meal**.**
5. High concentration of **polyunsaturated fatty acids** (7.7 % omega-3 fatty acids, 25.9 % omega-6 fatty acids).
6. High concentration of **essential fatty acids (28.1 %)**.

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JBL Novo range – may your fish live long and enjoy good health

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