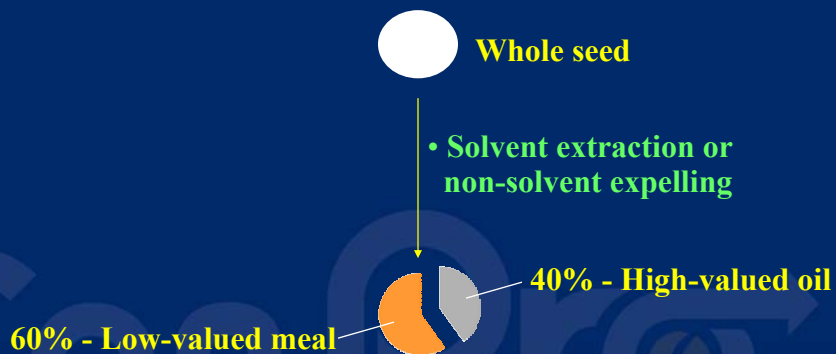


# Can Pro Ingredients: A Commercial Scale Bio-Refinery for The Production of Canola Protein Concentrates

David D. Maenz  
Chief Scientific Officer

**MCN BioProducts Inc.**  
and  
**Can Pro Ingredients Ltd**

## Conventional Canola Processing



	Canola Meal	Soybean Meal
Protein (%)	36	48
Crude Fiber (%)	12	3.9
Methionine (% of meal)	0.74	0.67
(% of protein)	2.05	1.40
(% digest. - swine)	82	86
Lysine (% of meal)	2.08	3.02
(% of protein)	5.78	6.29
(% digest. - swine)	74	85
Phytate (%)	3.1	1.7

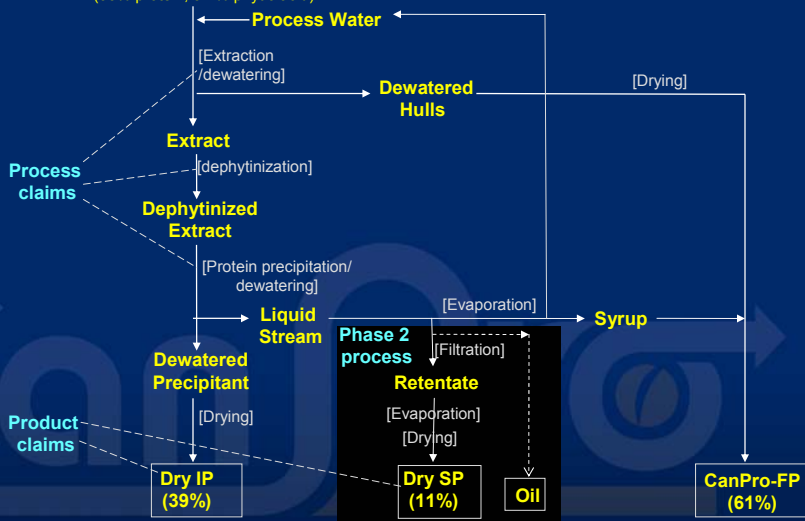
**Canola protein amino acid balance – very good**

**Canola meal value is diminished by high fiber and phytate**

**Canola meal trades ~ 60% of the value of soybean meal**

**To “unlock” the potential of canola protein through fractionation and generation of high-valued protein concentrates.**

**Solvent-Extracted Flake or  
Non-Solvent Expeller Meal**  
(38% protein; 3.2% phytic acid)



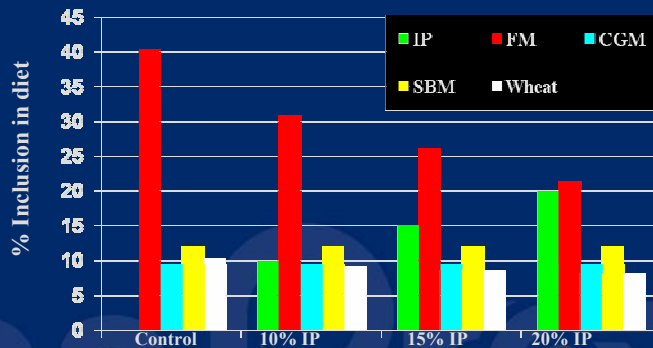
## Nutrient Content of Protein Sources

	IP	FM	CGM	SBM
<b>Dry Matter</b>	95.3	91.8	90.8	88.7
<b>Crude Protein</b>	66.7	68.2	63.1	47.0
<b>Fat</b>	0.73	7.93	0.96	1.33
<b>Ash</b>	10.70	16.48	1.42	5.75
<b>Crude Fiber</b>	3.64	0.00	0.52	2.15
<b>Amino Acids</b>				
Arginine	4.16	4.01	1.93	3.48
Lysine	3.48	5.46	1.02	3.02
Methionine	1.55	2.04	1.43	0.67
Threonine	2.78	3.02	2.08	1.85
<b>Minerals</b>				
Ca	0.95	2.40	0.05	0.34
P (% available)	1.40(100)	1.76(100)	0.44(15)	0.69(23)
Mg	0.69	0.18	0.08	0.30
Na	0.86	0.61	0.02	0.02
<b>Antinutritional Factors</b>				
Phytic acid	0	0	1.2	1.7
Glucosinolates (umole/g)	3.44			
Antigenic potential	↓	↓	↑	↑

## Nutrient Digestibility in Rainbow Trout

	IP	FM	CGM	SBM
<b>Crude protein</b>	89.9 <sup>a</sup>	89.6 <sup>a</sup>	91.1 <sup>a</sup>	95.0
<b>Amino Acids<sup>4</sup></b>				
<b>Arginine</b>	95.4 <sup>a</sup>	93.2 <sup>b</sup>	93.2 <sup>b</sup>	96.8
<b>Lysine</b>	93.5 <sup>b</sup>	96.3 <sup>a</sup>	89.8 <sup>c</sup>	97.4
<b>Methionine</b>	95.4 <sup>a</sup>	94.9 <sup>a</sup>	95.3 <sup>a</sup>	98.4
<b>Threonine</b>	89.3 <sup>b</sup>	93.2 <sup>a</sup>	90.2 <sup>b</sup>	96.0
<b>Isoleucine</b>	92.1 <sup>a</sup>	94.1 <sup>a</sup>	91.7 <sup>a</sup>	95.8
<b>Leucine</b>	90.4 <sup>c</sup>	94.4 <sup>a</sup>	92.5 <sup>b</sup>	94.6
<b>Histidine</b>	92.9 <sup>b</sup>	94.4 <sup>a</sup>	91.8 <sup>b</sup>	98.4
<b>Phenylalanine</b>	86.9 <sup>b</sup>	88.9 <sup>b</sup>	91.2 <sup>a</sup>	99.8
<b>Valine</b>	92.8 <sup>ab</sup>	94.1 <sup>a</sup>	91.9 <sup>b</sup>	95.6

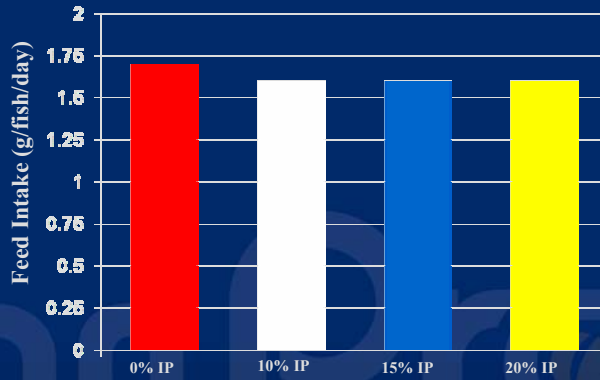
## Replacement of Fishmeal with IP in Diets Fed to Atlantic Salmon (105 day feeding trial)



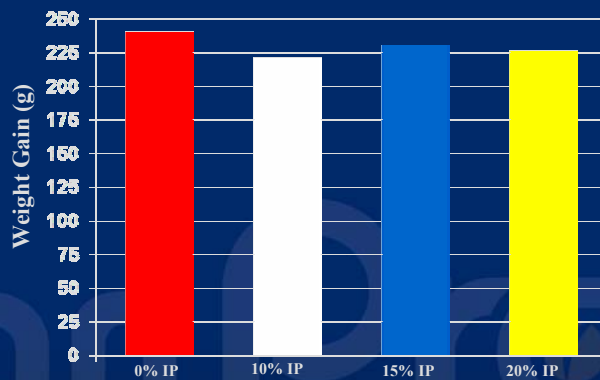
•Protein digestibility = 89.1% fishmeal; 90.5% IP

•Dietary crude protein 44.0-45.5; digestible protein/energy ratio = 18.1-18.8 g/MJ

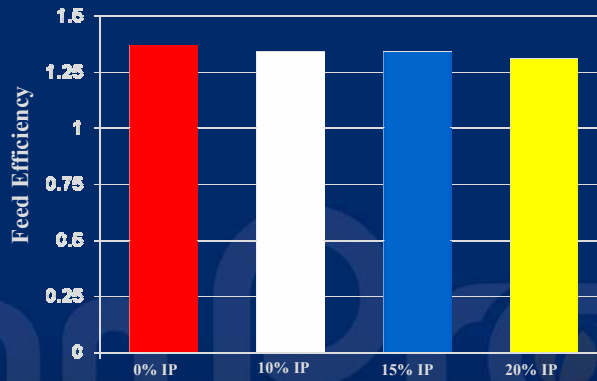
## Replacement of Fishmeal with IP in Diets Fed to Atlantic Salmon (105 day feeding trial)



## Replacement of Fishmeal with IP in Diets Fed to Atlantic Salmon (105 day feeding trial)



## Replacement of Fishmeal with IP in Diets Fed to Atlantic Salmon (105 day feeding trial)

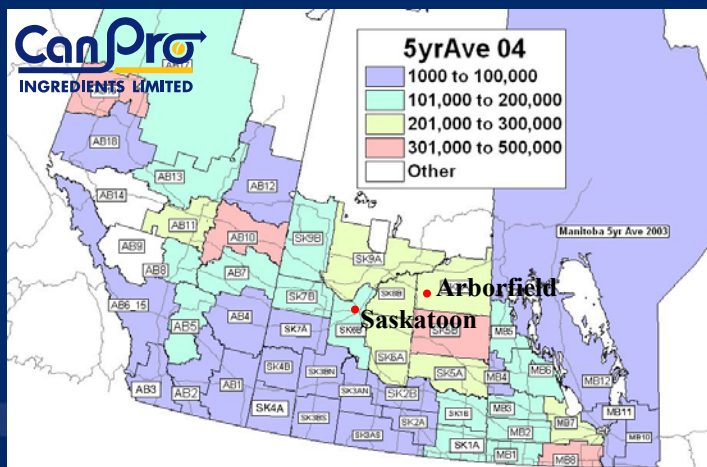


## Conclusion: Animal Trials

**IP from the MCN process can be used as replacement for substantial levels of dietary fishmeal without a negative effect on the performance of:**

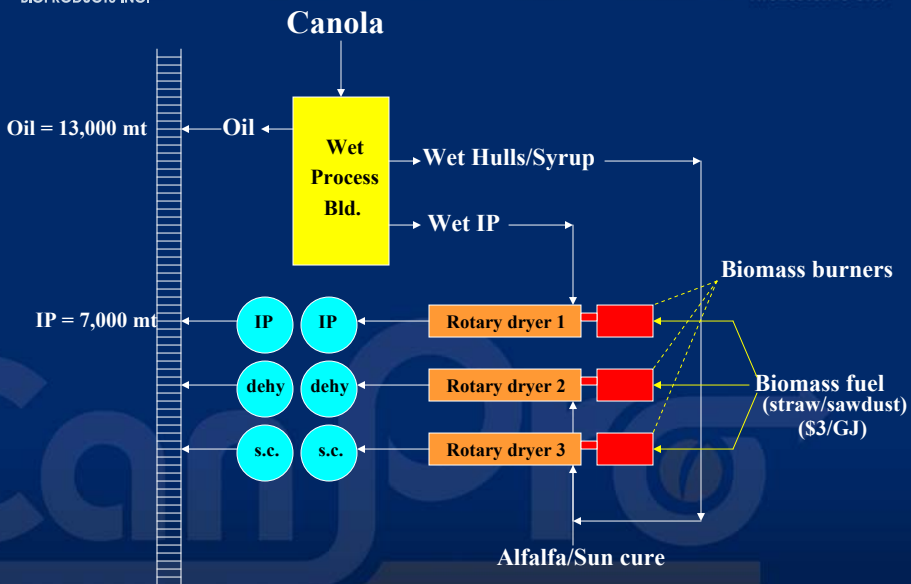
- Rainbow trout
- Atlantic salmon
- Phase 1 baby pig
- Shrimp

- **Can Pro Ingredients Ltd – established April 2007**
  - **Obtained license for canola fraction technology from MCN**
  - **Secured capital for plant construction**
  - **Acquired assets of an exiting alfalfa dehydration plant in Arborfield Saskatchewan**
  - **Completed detailed site specific engineering design, construction and equipment procurement**
  - **Start up – February 2009**



**CPI Plant: Non-solvent expeller plant (107 mt/day whole seed)  
Annual production - 13,000 mt oil; 7,000 mt IP**

- Access to abundant biomass fuel (wood and straw)
- Access to seed
- Strategic integration with an exiting Ag processing facility



Why develop and introduce a new protein technology plus biomass fuel and extensive mechanical dewatering?

**1. Maximize mass flow to valued products.**

- Phase 1 process – 61% of whole seed to Oil + IP
- Phase 2 process – 73% of whole seed to Oil + IP + SP (near theoretical maximum yield)

**2. Minimize drying costs**

- Combination of efficient mechanical dewatering plus \$3/GJ biomass fuel results in overall phase 1 thermal drying costs of \$20/mt of whole seed processed.

**Fishmeal Prices and Production**

- Current price - \$800/810 USD/mt (Peru –FAQ 65)
- Projected long term pricing for SA fishmeal - \$850-\$1200/mt
- World fishmeal production “plateau” = 6.4 million mt
- Projected 2010 world aquafeed production = 32.4 million mt

**Canola Protein Concentrate Pricing**

- MCN technology and CPI plant design allows for product pricing at a discount to fishmeal to facilitate market uptake.







**mcn**  
BIOPRODUCTS INC.



**CanPro**  
INGREDIENTS LTD.

The central image shows a tall, vertical industrial distillation column or reactor. It is surrounded by a network of pipes, ladders, and structural supports. The ground is covered in snow, and a white pickup truck is visible in the background. The entire scene is framed by a dark blue background with the logos for mcn BIOPRODUCTS INC. on the left and CanPro INGREDIENTS LTD. on the right.





**CanPro**  
INGREDIENTS LTD.

Value Added Canola Processing  
Production to Commence Feb 09