

Roquette:

Leading the way in
plant-based solutions

Roquette is a family-owned French company that is active internationally in refining of the renewable agricultural raw materials, wheat, corn, potatoes and peas, to produce proteins, fibres, starch and starch derivatives.

With several production units in the European Union, North America and in Asia, Roquette is well placed to deliver to the pet food industry worldwide.

Our expertise in food processing, human and animal nutrition is supported by innovation centres in America, Europe and Asia.



Summary

Roquette solutions for :



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**SOLUTIONS
FOR DRY
PET FOOD**

Looking for high quality proteins?

Thanks to a wet milling process (using only water and physical separation) all Roquette proteins have low levels of ash, fibre and oligosaccharides. In addition, the proteins are dried carefully to preserve their high digestibility and functionality.



Typical analysis (on product as-is)

	Moisture	Crude protein	Crude fibre	Ash	Potassium	Magnesium
	%	%	%	%	g/kg	g/kg
ROQUETTE	Maize gluten meal	11	60	1.5	1*	0.5
	Vital wheat gluten VITEN®	6	80	0.5	1	0.3
	Pea protein LYSAMINE®	8	80	1	8	1
	Potato protein TUBERMINE®	8.5	78	0.5	7	0.4
Other protein sources	Soyabean meal	12	45	6	20	3
	Meat and bone meal	9	54	-	5	6
	Poultry meal	10	58	-	5	1
	Fish meal	8	72	-	9	2

Suitable for grain-free pet food

*Low ash content

Benefits of Roquette proteins in extruded products



VITEN® - Vital wheat gluten

- Binding effect to reduce dust and give kibble hardness
- Light colour
- Low ash content



LYSAMINE® - Pea protein

- Neutral effect on extrusion
- Light colour
- High lysine content



TUBERMINE® - Potato protein

- Neutral effect on extrusion
- Light colour
- Balanced amino acid content



ROQUETTE Maize gluten

- Small binding effect due to starch content (17%)
- Bright yellow colour from natural carotenoids



Why should I use starch rather than whole grains?

Purified starch can be a useful tool when formulating dry pet food.



Wheat starch



Pea starch



Potato starch



Maize starch

- To modify texture and density of the kibbles by varying the level of expansion.
- Replacing grains with purified starch eliminates the risk of mycotoxins in pet food.
- Purified starches do not contain anti-nutritional compounds, that are found in whole ingredients (oligosaccharides, glycoalkaloids)
- Potato starch and pea starch are useful ingredients when formulating grain-free recipes.



Starches become highly digestible when cooked in the presence of moisture

Different starches cook at different temperatures:

	Waxy maize	Potato	Maize	Wheat	Pea	Amylo maize
Gelatinization temperature (°C)	72°C	65°C	75°C	85°C	80°C	95°C
Viscosity max (Brabender Unit)	2000	3200	1100	400	900	*
Retrogradation	Low	High	High	High	High	Very high
Granule size	5-25 µm	15-100 µm	5-25 µm	2-38 µm	5-10 µm	5-25 µm
Aspect	Transparent	Transparent	Opaque	Opaque	Opaque	Opaque
Texture	Very long	Long	Short	Short	Short	Short
Taste	Cereals	Neutral	Cereals	Cereals	Neutral	Cereals

* not applicable



Typical analysis of Roquette purified starch (as-is)

Origin	Waxy maize	Potato	Maize	Wheat	Pea	Amylo maize
Amylose* (%)	0.8	20	24	25	35	60
Amylopectin* (%)	99.2	80	76	75	65	40
Starch (%)	86	80	86	86	85	86
Moisture (%)	12.5	19	12.5	11.5	14	12.5
Protein (%)	0.3	0.3	0.3	0.2	0.4	0.3
Ash (%)	0.2	0.3	0.2	0.15	0.1	0.2

* % of total starch



Starch origin influences kibble expansion

How can I create a softer texture?

To create a softer texture, the water content of the kibble must be higher. Roquette ingredients help to control the water activity in the product, which also helps prevent unwanted microbiological activity.



BLEND OF POLYOLS AND GLYCEROL: POLYSORB®

- Good plasticiser
- Control of water activity
- Humectant properties

LIQUID SORBITOL: NEOSORB®

- Good plasticiser
- Controls of water activity
- Humectant properties

ROQUETTE GLUCOSE SYRUP: Range available

- Controls water activity
- Enhances palatability

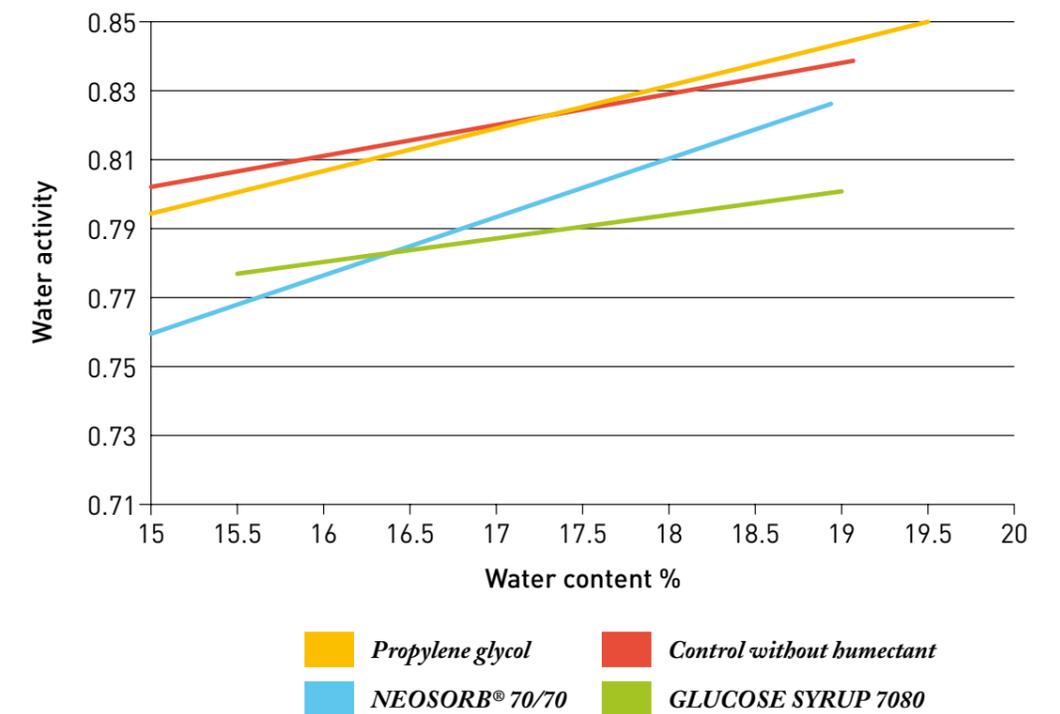
Roquette solutions are sustainable alternatives to existing humectants used in complete pet food:

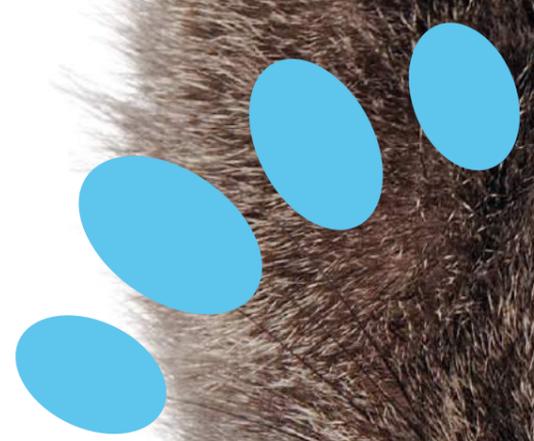
- Propylene glycol: toxic for cats
- Glycerin: volatile market with supply and quality issues.



*Instron® analysis –
Roquette innovation center*

**Relation between water activity & water content in semi-moist kibbles
Influence of humectants**





**SOLUTIONS
FOR WET
PET FOOD**

How can I improve the appearance of my gravy products?

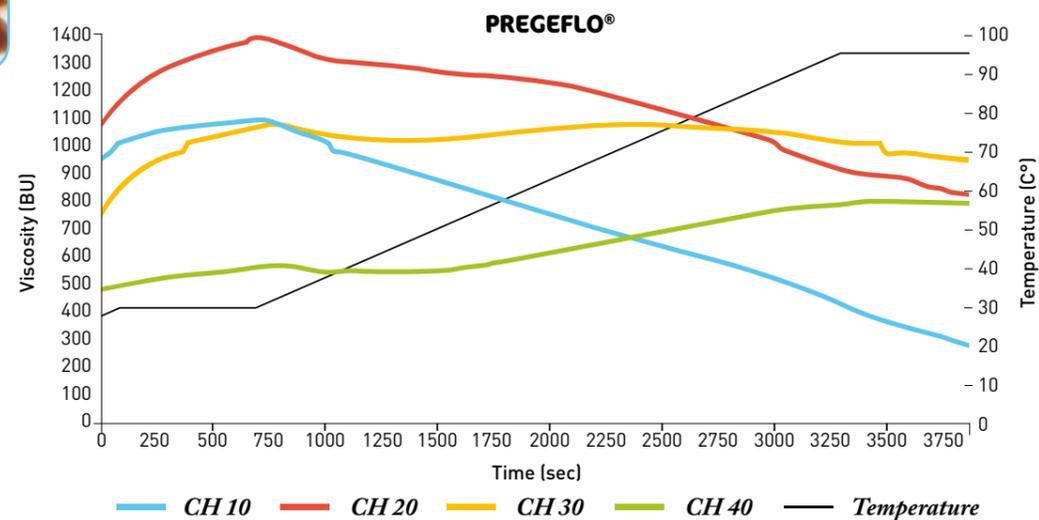
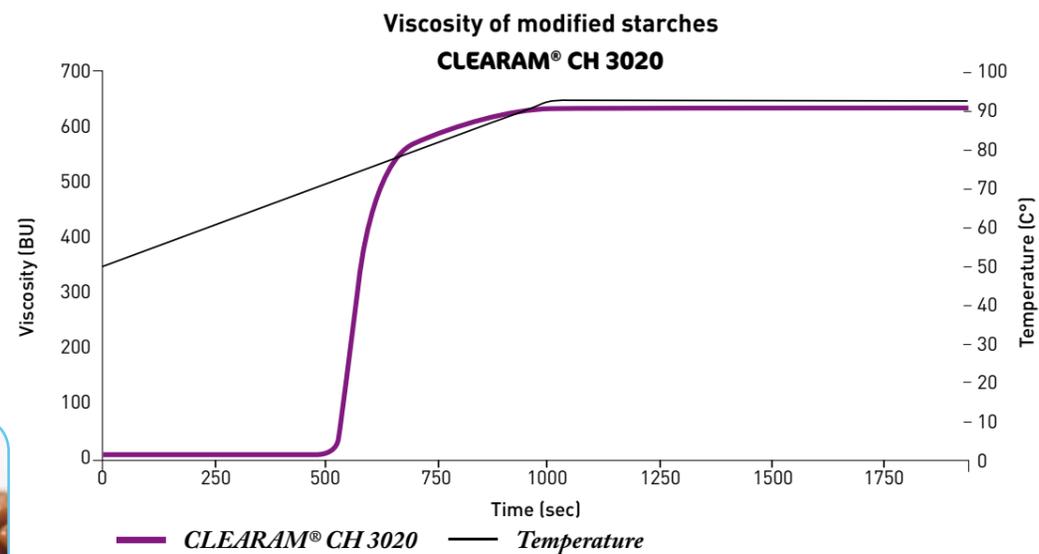
Roquette offers a large range of food grade modified starches:

- cook up starches: **CLEARAM®**
- precooked starches: **PREGEFLO®**

which can help to enhance texture, performance and appearance of pet food gravies.

Waxy starches are preferred for:

- Long texture
- Good clarity
- High viscosity
- Resistance to sterilisation process applied in wet pet food.



To improve the viscosity of the gravy in the first phases of the process, products from the **PREGEFLO®** range can be used.

The combination of **PREGEFLO®** and **CLEARAM®** starches produces an excellent gravy during processing and in the finished products.



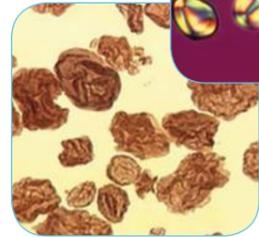
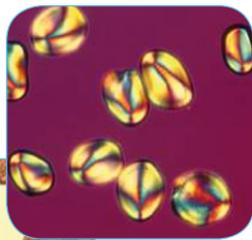
The colour of the gravy is important in the appearance of the products. This could be achieved by the addition of:

- Caramel colour, produced by Sethness-Roquette (www.sethness-roquette.com)
- Dextrose as a reducing sugar able to give brown colour during sterilisation.



How can I obtain a pâté without end gel formation?

Raw granule



Well cooked granule

Water retention and gel formation

During cooking, native starches, modified starches and Pea fibre I50M are able to absorb a large amount of water.

This holds the moisture within the pâté or chunks preventing end gel formation.

Emulsifying & Texturizing properties

The emulsifying properties of Pea fibre I50M can prevent fat separating from the pâté.

Emulsifying properties test - Illustrative recipe

Internal pea fibre 50 g
Water 250 g
Vegetable Oil 250 g
Salt 11 g
Cooking parameters: 120°C during 20 min



Texturizing properties test

Internal pea fibre 10 g
Water 90 g
Cooking parameters: 95°C during 10 min



Grain-Free Formulation

Roquette Pea Fibre I50M can be used as an alternative to wheat flour. At an inclusion rate of 1 – 2%, Roquette Pea Fibre I50M forms a stable gel during chunk cooking and remains stable after sterilisation.

How can I obtain good quality chunks?

Binding properties

Blood plasma is commonly used to improve the quality of chunks. However it is often expensive or difficult to source. Roquette can offer alternative solutions to blood plasma:

● VITEN® – Vital Wheat Gluten

Due to its capacity to form a strong network when cooked, 3% of vital wheat gluten – VITEN® – can be used to replace 1% of blood plasma in chunk formulations.

VITEN® gives:

- strength to the chunk
- reduced waste when chunks are cut



Beef meat analogues



Chicken meat analogues

Textured Vegetable Protein

By using a special extrusion process, realistic meat analogues can be created based on pea protein NUTRALYS® and/or vital wheat gluten – VITEN®.



**SOLUTIONS
FOR TREATS**

Looking for some new treats ideas...?

Treats are a growing sector worldwide. Developing successful new products requires innovation in both technology and ingredients.

Roquette has a wide range of functional ingredients that can help you with your development projects.



Application	Roquette solutions
Soft texture treats	SORBITOL® liquid POLYSORB® Glucose Syrup
Hard texture treats	TACKIDEX® pea starch ROQUETTE Amylomaize VITEN® Wheat Gluten
Shiny coating	GLUCIDEX® Maltodextrins
Flexible texture	VITEN® Wheat Gluten PREGEFLO® precooked starches Native starches
Soft centre treats	SORBITOL® liquid POLYSORB® Glucose Syrup NUTRALYS® pea protein PREGEFLO® precooked starches
Expanded treats	ROQUETTE Waxy maize starch ROQUETTE Potato starch
Sugar Free	ROQUETTE polyols NUTRIOSE®
Reduced calories	ROQUETTE Pea fibres ROQUETTE Potato fibres

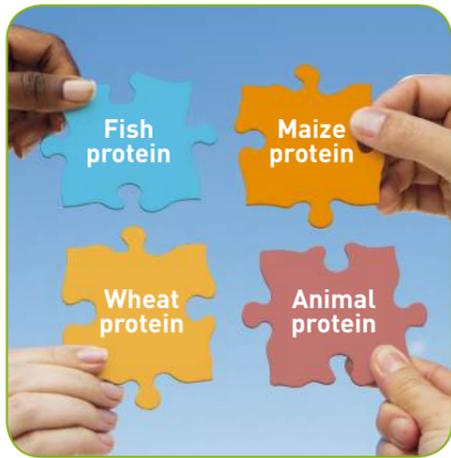




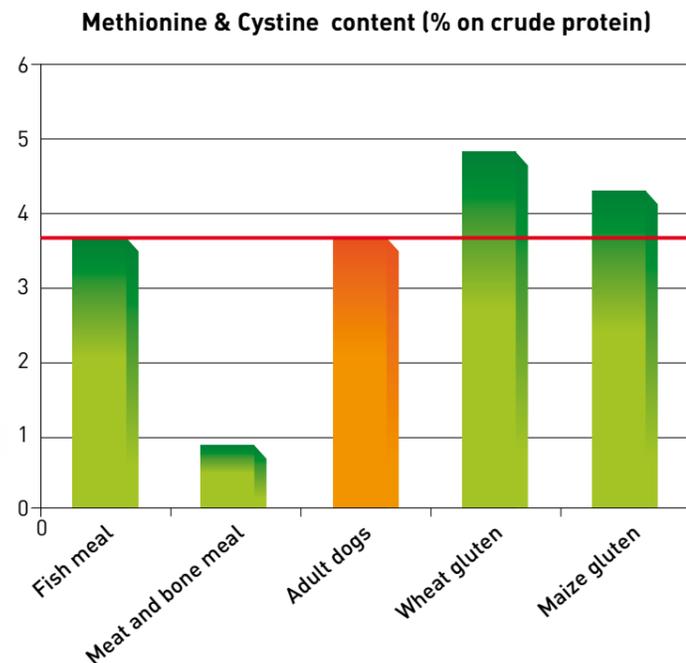
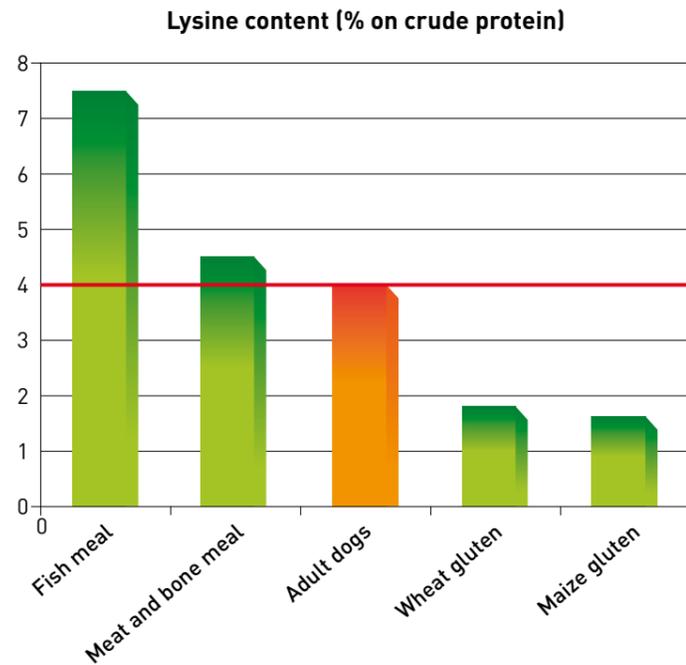
**FOCUS ON
HEALTH AND
NUTRITION**

How can I deliver a good amino acid balance in my recipe?

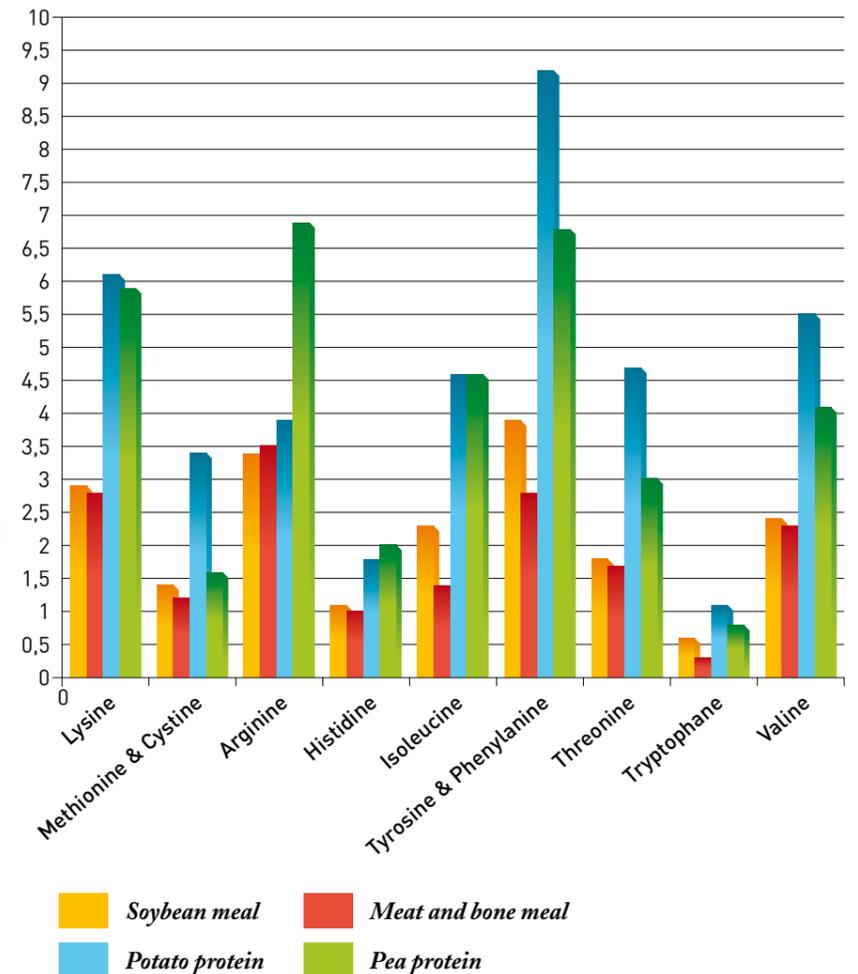
Using both animal meals and Roquette's cereal proteins results in a more balanced amino acid profile.



Mix of animal and vegetable proteins



For specific needs, such as breeding, Roquette's pea and potato proteins deliver superior levels of many essential amino acids.



Roquette plant proteins also provide a lower ash level compared to fish and animal meals.

Looking for ingredients that support health claims?

What benefits can fibres bring to my pet food formulations?



Maize germs

Skin and coat condition

- Maize oil and maize germs are good sources of Omega 6 poly-unsaturated fatty acids and natural Vitamin E.

Eye health and immunity

- Roquette maize gluten is a natural source of carotenoids: 300 ppm xanthophyll, mainly lutein and zeaxanthin.



Fibres play an important role in pet health:

- Soluble and fermentable fibres as a prebiotic nutrient to ensure good gut fermentation
- Non fermentable fibre for good stool quality and calorie reduction.

Products	Characteristics	Functionality
NUTRIOSE®	Dextrin	Prebiotic Soluble Fibre
Internal Pea Fibre	Starch and pectin	Fibre for Wet Pet food
Potato fibre	Starch, pectin, cellulose, low ash	Fermentable fibre source for Dry Pet food
COREX® Maize fibre	Hemi-cellulose and cellulose, starch	Improve stool quality
MILUREX® Wheat fibre	Hemi-cellulose and cellulose, starch	Improve stool quality
Pea hulls	High cellulose, low starch	Low calorie diet High crude fibre



Looking for ingredients suitable for hypoallergenic diets?



Alternative ingredients

The range of Roquette pea and potato products offers many alternatives to produce soya-free or grain-free recipes.

POTATO DERIVED

- **TUBERMINE®** potato protein
- Roquette potato pulp pellets

PEA DERIVED

- **LYSAMINE®** pea protein
- Roquette pea hulls
- Roquette internal pea fibre

PURIFIED STARCHES

They can replace grains or flours in extruded and baked products. This is essential to give good expansion to extruded kibbles.

- Wheat starch
- Maize starch
- Potato starch
- Pea starch

INNOVATION

For more specific diets where the presence of any potential allergens has to be eliminated.

- Hydrolysed protein

Hypoallergenic diets aim to avoid the ingredients commonly used in petfood that trigger allergic reactions. Roquette has several ingredients that offer solutions for this market.

During our process, starches are purified to remove proteins and fibre. As the protein is the allergenic component, Roquette maize and wheat starches can safely be used in hypoallergenic diets.

