Dr. Thomas Strandt
Senior Processing
Technology Manager
CESCO EPC GmbH

Dry milling for deep processing of yellow peas

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As consumers around the world have become more mindful about their diets, there is an ever-growing demand in plant-derived proteins. Consumers are increasingly seeking more wholesome foods and beverages that contain natural ingredients.

For decades plant-derived proteins have been used for a range of everyday foodstuffs, fitness foods and infant formulas. Today they make for a main ingredient in vegan or vegetarian food alternatives substituting their animal-based counterparts. Yellow peas are one of the main sources for manufactured protein of this kind. They provide essential amino acids and have the practical feature as functional ingredients to add texture and/or optimize the viscosity, emulsification, stability, foaming or fat-binding properties to its basic foodstuff.

Claims, that could be given to pea protein:

- Gluten free
- Non-GMO
- High value vegetarian protein
- Low glycemic index (high amylose)
- Environmentally friendly pea production

Manufacturers need to be confident that they can produce vegetable proteins that meet customer demands for product purity and functionality, and with an optimum yield.

The food industry in addition faces increasing challenges with respect to cost-saving, water and energy use, and other environmentally sustainable goals. These objectives coupled with the need to meet utmost efficiency and safety requirements have become important drivers for technology improvement. To succeed in these fast-moving, highly competitive global markets producers need flexibility to develop new products and processes.

We as CESCO see ourselves as an essential partner in the whole chain of creating value-added products. CESCO as a group of companies including MMW for grain milling has a long-standing experience and has created new

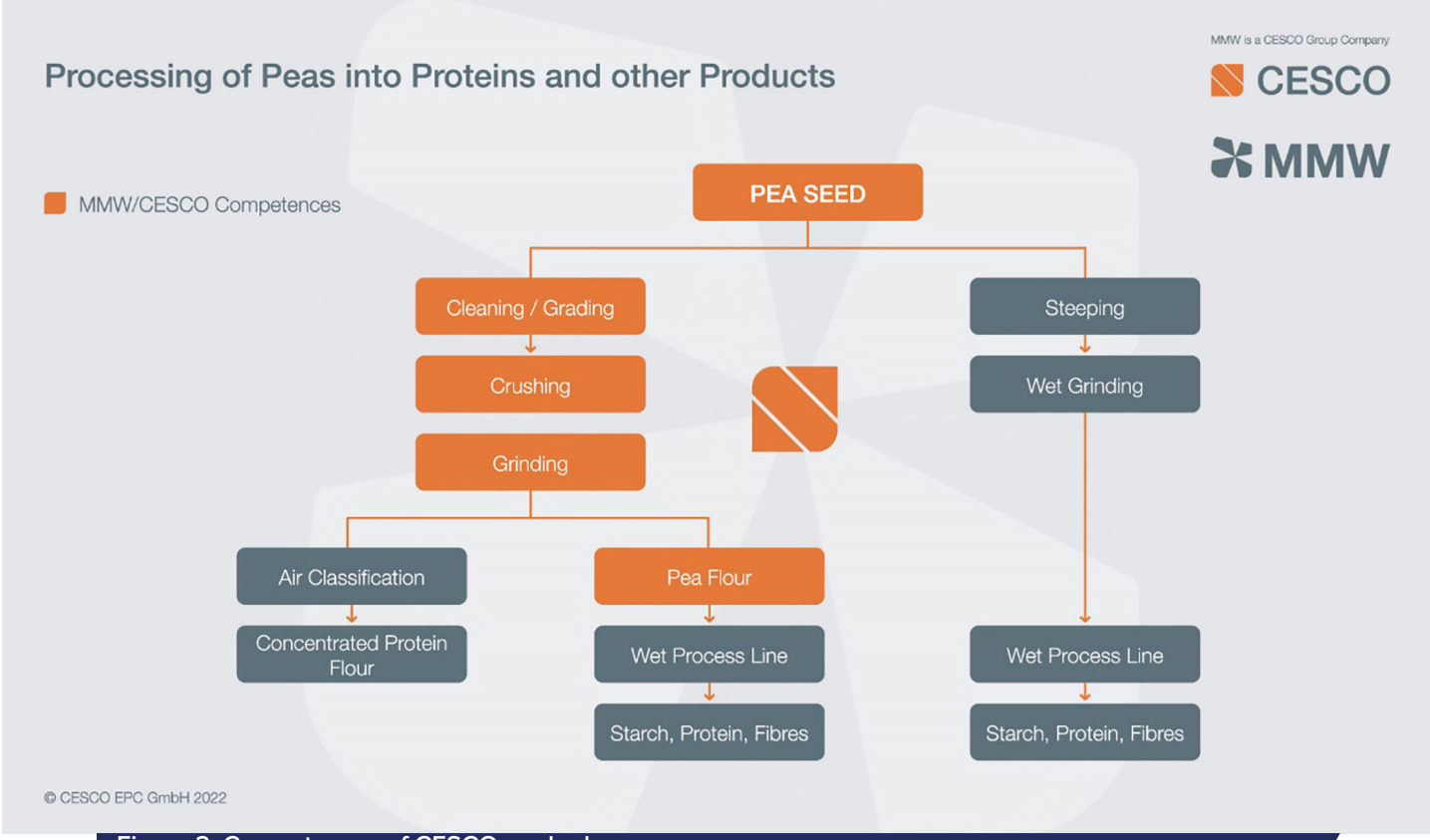

Figure 2: Competences of CESCO marked orange.

competences in the dry milling process with references for wheat but also for pulses like yellow peas.

The production of pea proteins is mainly done by wet separation process out of pea flour. Naturally, the focus while producing pea flour lies on achieving the highest yield on protein inside the flour. Another aspect is to create a uniform granulation accordingly to different requests of the wet technology of different suppliers. Finally, also the content of remaining flour in removed husk should be as minimal as possible.

Figure 1: Trend towards wholesome foods with vegan or vegetarian food alternatives.

CESCO COMPETENCES

Our CESCO competences lie in the first steps in the whole technological line with handling and milling of peas. That's why we have to follow with our technology-specific require-

Raw Yellow peas			
Moisture	14 ± 1	% of total	
Impurity content (to the mill)	appr.	2,0	%
Starch content	min.	52	% db
Protein (N x 5.7)	min.	25	% db
Fat	max.	2,0	% db
Raw fibre	max.	1,2	% db
Ash	max.	5,0	% db
Pea Flour			
Remains on 250 my sieve	max.	2,0	%
Ash	max.	3,0	%db
Damaged starch:	max.	6,0	%db
Flour fraction yield	appr.	88-90	%
Cleanliness of flour	appr.	99	%

Figure 3: Crushing with roller stand only

ments to the flour by the supplier of the following wet separation process into fibre, starch and protein fraction.

TECHNICAL DESCRIPTION OF FLOUR PRODUCTION

CESCO can deliver the whole complex of Dry Mill designed to process of peas and to create pea flour according to above specifications. For a standard line of 12 t/h the fine cleaning sections contains all needed machines like separators, de-stoners and color sorter and ensures the optimal cleaning from main impurities and also the reduction of mycotoxin pollution.

The implemented milling diagram is designed as an intensive short milling diagram where modern MMW roller stands RM-1250-250, plansifters PLS-08, air sifters and other surrounding equipment are used.

The diagram as well as machine configuration (rollers parameters, plansifter sieve schemata, air sifter setting) are the result of our own investigation with a long-term partnership to the Potsdam Grain Research Institute IGV and new investigations with a private R&D centre, services provider of technical and scientific expertise focused on proteins - IMPROVE located in Amiens, France.

Investigations have led us to conclude that the way of shelling peas is essential for the efficiency of the plant. To indicate the effect different test runs were executed with using abrasive shelling machines and without shelling machines, meaning by using roller stands only.

This investigation has shown that separate shelling with abrasive shelling machines is not necessary and can be sufficient combined with a crushing process inside the milling line with roller stands.

The CESCO technology simplifies the whole mill diagram and lowers the whole investment while the product yield and quality are even better related to yield and cleanness of the flour. Also the structure of the husk is a “fluffy” one compared with a powder if using abrasive shelling.

CONCLUSION

In a fast-moving, highly competitive global markets of vegetarian proteins, we need the flexibility to develop new products and processes.

CESCO provides modern solution from grain intake to flour and acts as a competent partner inside the biotechnological chain of adding value to grain and legumes.

- Techniques for upgrading of wheat/grain quality
- High efficient Dry Milling Technology focused on:
- Highest yield on flour and protein
- High-capacity operation 24h/7d
- Flour granulation profile according to request of wet process
- Lowest degree on protein damage
- Full utilization of by-products
- State of the Art Machines made in Germany/EU
- Complete Engineering + Turnkey solutions for Silo and Dry Mill Complexes
- Long term experiences and actual references

For more information, please contact info@cesco-group.com

Figure 4: Samples of raw peas and milled pea fractions