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Apricot processing suitability linked to its macronutrient composition: a part of DeshyFruit project

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To limit losses and wastes in the Fruit & Vegetable sector, the DeshyFruit project aims to study the feasibility of rotary drying applied to fruit purees to obtain powder or flakes, with four main focus :

- influence of the variety and of fruit ripening stage
- optimization of the drying parameters (contact time, addition of texturing agent (malto-dextrin, starch...))
- evolution of sensorial and nutritional qualities (fruit, powder, reconstituted puree)
- elaboration of a predictive processing model by spectral analysis (PIR, MIR)

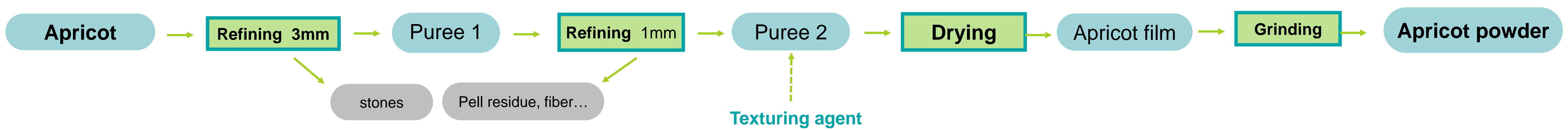
Initial results obtained on apricot are presented.



The DUPRAT dryer allows continuous flash-drying by heating a puree on the surface of a cylinder heated by pressurized steam with a short contact time (fresh product / heated cylinder).

The drastic reduction in water activity allows long storage at room temperature of the dried flakes before rehydration, with a good microbiological stability.

Drying process



Apricot 9 cultivars were selected for their various typology and harvested close to maturity

Clone	Iranien	A4034	Colomer	Hargrand	Goldrich	A4049	Bergeron	Medflo	Jengat
Color									
Texture	crunchy / juicy	little juicy	mealy	firm	firm	firm / juicy	juicy	firm / juicy	firm / juicy
Acidity	---	--	+++	+	+++ (citric)	+	+	+	+
Sugar	+++	++	--	++	++	+	+	++	+++
Typicity		slow ripening		floral aroma	cooking --	Sharka resistance	postharvest	aromatic	aromatic

Drying conditions

- 4 to 6.5 bars (130 - 165 °C)
- Rotary speed: 4 to 6 rpm

Process faisability



Fig 1: Drying process for 2 apricot cultivars: A4049 (left) and A4034 (right).

According apricot cultivars, refining yields varied from 90% (Medflo) to 50% (A4034) and drying process leads to obtaining a nice continuous film or a sticky paste (Fig1).

The drying conditions also influence the quality of the film. A minimum pressure of 5 bars seems necessary (equivalent to 150 °C) and better results were obtained with a 4 rpm rotation than 6 rpm.

Adding malto-dextrin or starch to apricot puree before drying increases Tg and can provide technical assistance to obtain powders with good properties (less hygroscopic). This is not always necessary for apricot, making the film more difficult to peel off the roll, but must be adapted according cultivars and maturity stages.

Glass-transition temperature Tg

Tg characterizes the range of temperature over which the glass-transition occurs. It is analyzed by Differential Scanning Calorimetry-ThermoGravimetric Analysis (DCS-ATG).

Table 1: Glass-transition temperature (Tg) of 3 apricot cultivars powders obtained from puree with drying aids. Process conditions: 160 °C / 4 rpm

Cultivar	Drying aids	Tg (°C)	Visual quality
Medflo	-	5.9	sticky
	10% starch	48.4	powdery
	20% starch	65.4	powdery
Jengat	-	17.3	powdery
	5% malto dextrose	48.8	powdery
Colomer	-	3.3	powdery
	20% arabic gum	48.9	powdery

At the end of the first year of the DeshyFruit project, the preliminary results conducted on nine apricot cultivars highlighted:

- the clear interest of the process to obtain fruit powder
- the technological and organoleptic quality of the end-products
- the huge influence of the variety and maturity stage on the drying parameters settings.

Next step is a further analysis of the relationship between fruit biochemical composition and the more or less suitability for drying.

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