Supplementary material

Apple analysis

Three replicates were constituted by 10 apples of each cultivar. Each fruit with peel and core was prepared as described in Le Bourvellec et al. (2011). Alcohol-insoluble solids (AIS) were prepared according to the methods of Renard (2005) from the two cultivars (Bedan and Reinette de Flandre) and the apple purée. Three replicates were performed. Sugars (glucose, fructose and sucrose) and organic acids (malic acid and citric acid) were quantified using an enzymatic method with kits for food analysis (Boehringer Mannheim Co., Mannhein, Germany). These measurements were performed with a SAFAS flx-Xenius XM spectrofluorimeter (SAFAS, Monaco). Vitamin C was quantified using a method described by Bureau et al. (2015).

Processing of apple puree

Stalks from 9 kg of fruits from Bedan and 9 kg of fruits from Reinette de Flandre were removed, and then fruits were washed and drained for 5 minutes. Apples were placed in a 44 L-Stephan cutter (ProXES Hameln, Germany) and 250 mL of an ascorbic acid solution at 216 g/L were added. Fruits were crushed and heated to 95 °C in 6 minutes and the temperature was kept at 95 °C for 1 min. Puree was then crushed using a colloidal blender (Fryma, Rheinfelden, Switzerland) and then transfered back in the Stephan before deaeration under vacuum (-0.85 b) with stirring for 3 minutes. Apple puree was hot conditioned in 80 g-cans and pasteurized at 100 °C during 20 min. Finally, cans were sprayed with cold water to reach 30°C.

Supplemental references

Bureau, S., Mouhoubi, S., Touloumet, L., Garcia, C., Moreau, F., Bedouet, V., Renard, C.M.G.C. (2015). Are folates, carotenoids and vitamin C affected by cooking? Four domestic procedures are compared on a large diversity of frozen vegetables. Lebensmmittel- Wissenschaft und -Technologie, 64, 735-741.

Le Bourvellec C, Bouzerzour K, Ginies C, Regis S, Plé Y, Renard CMGC. Phenolic and polysaccharide composition of applesauce is close to that of apple flesh. Journal of Food Composition and Analysis. 2011;24:537-47.

Renard, C. M. G. C. (2005). Variability in cell wall preparations: Quantification and comparison of common methods. Carbohydrate Polymers, 60, 515–522.

Cultivar	Sample	AIS (mg/g FW)	Ascorbic acid (mg/kg FW)	Dehydroascorbic acid (mg/kg FW)	Glucose (g/kg FW)	Fructose (g/kg FW)	Sucrose (g/kg FW)	Malic acid (g/kg FW)	Citric acid (g/kg FW)
Bd	Fruit (pulp+peel+seed)	27.1	23.4±6.6	62.9±4.3	12.6±0.9	85.4±4.5	31.8±1.8	2.9±0.2	0.0±0.0
RdFl	Fruit (pulp+peel+seed)	19.1	60.6±0.4	172.1±14.3	18.1±0.3	56.9±1.5	36.5±1.1	14.3±0.4	0.24±0.01
Bd + RdFl	Raw apple mix (1:1)	23.1	41.5	159	15.3	71.1	34.1	8.6	0.12
Bd + RdFl	apple puree	36.4±0.7	1078.8±3.7	87.2±76.3	20.2±0.5	72.3±1.8	36.1±1.1	11.2±0.2	0.8±0.8

Suppl. Table 1: Composition of study apple products.

AIS : Alcohol Insoluble Solid, Bd: Bedan cultivar, RdFl: Reinette de Flandre cultivar, data are mean \pm standard deviation (n = 3) except for AIS from apples.

Suppl. Table 2: Phenolic composition and contents in fruit, apple puree and phenolic fraction from Bedan and Reinette de Flandre cultivars.

Sample	Dry matter (%)	Flavan-3-ols (mg/g DM)				Dihydrochalcones (mg/g DM)			Hydroxycinnamic acids (mg/g DM)		Flavonols ^c (mg/g DM)	Total Polyphenols (mg/g DM)
		CAT	EPI	PCA	DPN	XPL	PLZ	POPI ^A	5CQA	PCQA ^B		
Bd Fruit ^d	17.4	1.88±0.05	3.43±0.05	18.1±0.7	6.3±0.4	0.19±0.01	0.90±0.01	nd	4.90±0.48	0.41±0.01	0.26±0.09	30.6±2.0
RdFl Fruit ^d	16.5	0.43±0.01	1.41±0.05	19.8±0.3	8.6±0.7	0.19±0.01	0.82±0.1	nd	5.61±0.06	0.10±0.01	0.35±0.06	28.8±0.2
Bd+RdFl Fruit ^d	16.9	1.16	2.42	19.0	7.5	0.19	0.86	nd	5.25	0.25	0.30	29.7
Bd+RdFl Apple purée	18.2	1.07±0.07	2.28±0.12	12.4±0.5	8.9±0.4	0.13±0.01	0.90±0.02	0.41± 0.05	4.47±0.09	0.26±0.01	0.32±0.01	22.1±0.5
Bd+RdFl Phenolic fraction	-	35.7±1.6	75.6±3.8	525.1±26.4	6.3±0.5	5.5±0.3	26.9±0.7	nd	139.3±7.4	9.3±0.4	5.4±0.8	823±33

Bd: Bedan cultivar, RdFl: Reinette de Flandre cultivar, CAT: (+)-catechin, EPI: (-)-epicatechin, PCA: procyanidins, DPn: average degree of polymerisation of procyanidins, XPL: phloretin-2-xyloglucoside, PLZ: phloridzin, POPi: colourless phloridzin oxidation product, 5CQA: 5-caffeoylquinic acid, pCQA: 4-*p*-coumaroylquinic acid, nd: not determined. ^aquantified as phloridzin. ^bquantified as *p*-coumaric acid. ^cquantified as

quercetin, ^d pulp+peel+seed except for Bd+RdFl Fruit which represents the average data between Bd Fruit and RdFl Fruit. Data are mean \pm standard deviation (n = 3).

Suppl. Table 3: Microarray data with a significant FC>1.25 in at least one condition. Green: down-regulation; Red: up-regulation.

	Number of genes	Number of genes with the same modulation response than in response to HFM + PP extract							
	(all)	Total (% compared to all)	Down regulation	Up regulation					
Differentially expressed gen	es in response to:								
HFM + Raw apples	182	57 (31%)	28	29					
HFM + Apple puree	246	75 (30%)	40	35					
Common differentially expressed genes in response to:									
HFM+Raw apples vs HFM+Apple puree	139	51 (37%)	25	26					
HFM+Raw apples vs HFM+PP extract	66	57 (86%)	27	30					
HFM+Apple puree vs HFM+ PP extract	86	72 (84%)	39	33					
HFM+Raw apples vs HFM+Apple puree vs HFM+PP extract	59	51 (86%)	25	26					

Suppl Table 4 : Common gene modulation mode.