

# Admissibility Grid to Support the Decision for the Preferential Routing of Portuguese Endogenous Waste Biomass for the Production of Biogas, Advanced Biofuels, Electricity and Heat

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From the application of the Admissibility Grid for the *Solid Residues and Thick Sludges* matrix (Figure 1a) and the *Liquid sludges and fats* matrix (Figure 1b) it was concluded on the admissibility of each set of samples. The application of the Admissibility Grid for the *Solid Residues and Thick Sludges* matrix of the organic fractions of MSW and sludges from WWTP samples are presented in Figures S1-S5 whereas the application for the organic fractions from industrial wastes, sludges, and by-products samples are presented in Figures S6-S18. Figures S19-S24 present the application of the Admissibility Grid for the *Liquid sludges and fats* matrix for to the organic fractions of MSW, industrial wastes, sludges, and by-products samples.

Solid residues and thick sludges

Food waste (FW)

FW1

FW2

1 <sup>st</sup> step	TECHNOLOGIES →	T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	70 – 86					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	3.6 – 7.2	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.18 – 1.1		≥ 0.01							
Total Volatile Solids, (% w/w), ar	14 – 26		≥ 0.5							
Carbon / Nitrogen ratio	16		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	31 – 40			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	2.6 – 7.2					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	2.3					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	0.22 – 0.27					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	22 – 24					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.89 – 1.0						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	--						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.13 – 0.14									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✓	✓	✓	✗	✗	✗	✗	✗

→, not analysed because the characteristics of the sample were outside the scope of the analytical procedure




2 <sup>nd</sup> step	Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**									
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		✗	✓	✓	✓	✗	✗	✗	✗	✗

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S1.** Application of the Admissibility Grid to the organic fractions of MSW and sludges from WWTP samples within the *Solid Residues and Thick Sludges* matrix: Food waste (FW).

Solid residues and thick sludges

Green and brown wastes (GBW)

1 <sup>st</sup> step	TECHNOLOGIES →	T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis	T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid
Total Moisture (% w/w), ar	33 – 72					≤ 40	≤ 20	≤ 20	≤ 20
Oil (% w/w), ar	1.4 – 1.6	≥ 40	≤ 30						≥ 30
Kjeldahl Nitrogen (% w/w), ar	0.73 – 0.81		≥ 0.01						
Total Volatile Solids, (% w/w), ar	23 – 46		≥ 0.5						
Carbon / Nitrogen ratio	20 – 36		10 – 60						
Total Hydrolysed Sugars (as glucose) (% w/w), db	12 – 22			≥ 20	≥ 25				
Ash at 815 °C (% w/w), db	14 – 30					≤ 20	≤ 20	≤ 20	≤ 20
Total Chloride (% w/w), db	0.33 – 0.56					≤ 1	≤ 1	≤ 1	≤ 1
Total Sulphur (% w/w), db	0.02 – 0.19					≤ 2	≤ 2	≤ 2	≤ 2
Higher Heating Value, (MJ/kg), db	13 – 17					≥ 16	≥ 16	≥ 16	
Bulk Density (kg/L), ar	0.09 – 0.20						≥ 0.12		
Mean Particle Diameter, d <sub>50</sub> (mm), ar	5.2 <sup>+</sup> – 58 <sup>+</sup>						≤ 80	≤ 2	≤ 10
Hydrogen / Carbon ratio	0.08 – 0.10								0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils	
Samples admissibility as received ⇨		✗	✓	✓	✗	✓	✗	✗	✗

<sup>+</sup>, values determined in pre-dried samples

2 <sup>nd</sup> step	Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**
Total moisture, % (w/w), after adjustment *	≤ 40
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *	1 < R <sub>M</sub> ≤ 1.5
Mean Particle Diameter, d <sub>50</sub> (mm), ar	≤ 80
Samples admissibility after adjustment ⇨	✗

\* , Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\* , Milling

**Figure S2.** Application of the Admissibility Grid to the organic fractions of MSW and sludges from WWTP samples within the *Solid Residues and Thick Sludges* matrix: Green and brown wastes (GBW).

Solid residues and thick sludges

Fraction obtained after mechanical and biological treatment (MBT)

1 <sup>st</sup> step		TECHNOLOGIES →								
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	5.1 – 34					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	0.48 – 3.5	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.59 – 1.7		≥ 0.01							
Total Volatile Solids, (% w/w), ar	18 – 44		≥ 0.5							
Carbon / Nitrogen ratio	15 – 24		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	6.1 – 18			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	37 – 77					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	0.20 – 0.69					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	0.12 – 0.42					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	4.7 – 12					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.40 – 0.87						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	1.6 <sup>+</sup> – 6.9 <sup>+</sup>						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.08 – 0.10									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✓	✗	✗	✗	✗	✗	✗	✗

<sup>+</sup>, values determined in pre-dried samples

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		✗	✓	✗	✗	✗	✗	✗	✗	✗

<sup>\*</sup>, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); <sup>\*\*</sup>, Milling

**Figure S3.** Application of the Admissibility Grid to the organic fractions of MSW and sludges from WWTP samples within the *Solid Residues and Thick Sludges* matrix: Fraction obtained after mechanical and biological treatment (MBT).



Solid residues and thick sludges

# Fraction obtained after mechanical treatment (MT)

1 <sup>st</sup> step		TECHNOLOGIES →								
		T1 Trans- esterification	T2 Anaerobic Digestion	T3 Alcoholic Fermentation	T4 Dark Fermentation	T5 Combustion	T6 Gasification	T7 Pyrolysis		T8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	7.4 – 56					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	0.89 – 4.1	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.52 – 1.4		≥ 0.01							
Total Volatile Solids, (% w/w), ar	21 – 46		≥ 0.5							
Carbon / Nitrogen ratio	17 – 32		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	13 – 30			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	32 – 48					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	0.31 – 0.85					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	0.20 – 0.32					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	9.8 – 15					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.30 – 0.51						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	10 <sup>+</sup> – 29 <sup>+</sup>						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.11 – 0.13									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✓	✓	✓	✗	✗	✗	✗	✗

†, values determined in pre-dried samples

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		✗	✓	✓	✓	✗	✗	✗	✗	✗

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S4.** Application of the Admissibility Grid to the organic fractions of MSW and sludges from WWTP samples within the *Solid Residues and Thick Sludges* matrix: Fraction obtained after mechanical treatment (MT).

Solid residues and thick sludges

Sewage sludge (SS)

1 <sup>st</sup> step		TECHNOLOGIES →								
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	80					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	0.60 – 0.92	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.43 – 1.7		≥ 0.01							
Total Volatile Solids, (% w/w), ar	16		≥ 0.5							
Carbon / Nitrogen ratio	5.5 – 5.7		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	11 – 13			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	17 – 19					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	0.32 – 0.40					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	0.87 – 1.0					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	19 – 20					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.62 – 0.66						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	--						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.12 – 0.13									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✗	✗	✗	✗	✗	✗	✗	✗

--, not analysed because the characteristics of the sample were outside the scope of the analytical procedure

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		✗	✗	✗	✗	✗	✗	✗	✗	✓

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S5.** Application of the Admissibility Grid to the organic fractions of MSW and sludges from WWTP samples within the *Solid Residues and Thick Sludges* matrix: Sewage sludge (SS).

Solid residues and thick sludges

Olive pomace (OP)

OP1

OP2

OP3

1 <sup>st</sup> step		TECHNOLOGIES →								
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	13 – 62					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	0.83 – 5.7	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.22 – 1.7		≥ 0.01							
Total Volatile Solids, (% w/w), ar	36 – 77		≥ 0.5							
Carbon / Nitrogen ratio	21 – 54		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	23 – 28			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	4.0 – 9.3					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	<0.14–0.35					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	0.10 – 0.11					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	20 – 23					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.64 – 1.1						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	--						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.10 – 0.13									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✓	✓	✓	✓	✓	✓	✗	✓

--, not analysed because the characteristics of the sample were outside the scope of the analytical procedure

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		✗	✓	✓	✓	✓	✓	✓	✗	✓

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S6.** Application of the Admissibility Grid to the organic fractions from industrial wastes, sludges, and by-products samples within the *Solid Residues and Thick Sludges* matrix: Olive pomace (OP).

Solid residues and thick sludges

Olive tree leaves (OL)

OL1

OL2

1 <sup>st</sup> step	TECHNOLOGIES →	T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	22 – 44					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	3.0 – 7.7	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.63 – 0.81		≥ 0.01							
Total Volatile Solids, (% w/w), ar	52 – 69		≥ 0.5							
Carbon / Nitrogen ratio	46 – 48		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	20 – 23			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	6.7 – 10					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	< 0.14					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	0.11 – 0.12					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	22 – 23					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.11 – 0.12						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	2.5 <sup>†</sup> – 7.7 <sup>†</sup>						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.12									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✓	✓	✗	✗	✗	✗	✗	✗

†, values determined in pre-dried samples

2 <sup>nd</sup> step	Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**
Total moisture, % (w/w), after adjustment *	
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *	
Mean Particle Diameter, d <sub>50</sub> (mm), ar	
Samples admissibility after adjustment ⇨	

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S7.** Application of the Admissibility Grid to the organic fractions from industrial wastes, sludges, and by-products samples within the *Solid Residues and Thick Sludges* matrix: Olive leaves (OL).

Solid residues and thick sludges

Olive stone (OS)

OS

1 <sup>st</sup> step		TECHNOLOGIES →								
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	23					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	3.7	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.28		≥ 0.01							
Total Volatile Solids, (% w/w), ar	76		≥ 0.5							
Carbon / Nitrogen ratio	97		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	18			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	1.2					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	< 0.14					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	0.04					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	22					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.67						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	1.5 <sup>†</sup>						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.11									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		×	×	×	×	✓	×	×	×	×

<sup>†</sup>, values determined in pre-dried samples

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		×	×	×	×	✓	✓	✓	×	×

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S8.** Application of the Admissibility Grid to the organic fractions from industrial wastes, sludges, and by-products samples within the *Solid Residues and Thick Sludges* matrix: Olive stone (OS).



Solid residues and thick sludges

# Chestnut shells (CS)

1 <sup>st</sup> step		TECHNOLOGIES →								
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	64 – 80					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	0.29 – 0.80	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.21 – 0.49		≥ 0.01							
Total Volatile Solids, (% w/w), ar	20 – 35		≥ 0.5							
Carbon / Nitrogen ratio	42 – 65		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	31 – 36			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	1.5 – 2.5					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	< 0.14					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	0.07–0.09					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	20					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.31 – 0.79						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	2.4 <sup>†</sup> – 7.3 <sup>†</sup>						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.09 – 0.10									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✓	✓	✓	✗	✗	✗	✗	✓

<sup>†</sup>, values determined in pre-dried samples

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		✗	✓	✓	✓	✗	✗	✗	✗	✓

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S9.** Application of the Admissibility Grid to the organic fractions from industrial wastes, sludges, and by-products samples within the *Solid Residues and Thick Sludges* matrix: Chestnut shells (CS).



Solid residues and  
thick sludges

Carob pulp (CP)

CP

1 <sup>st</sup> step		TECHNOLOGIES →								
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	15					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	0.35	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.44		≥ 0.01							
Total Volatile Solids, (% w/w), ar	83		≥ 0.5							
Carbon / Nitrogen ratio	79		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	29			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	2.4					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	< 0.14					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	< 0.03					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	18					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.51						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	5.4						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.09									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✗	✓	✓	✓	✓	✗	✗	✗

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		✗	✗	✓	✓	✓	✓	✓	✗	✗

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S10.** Application of the Admissibility Grid to the organic fractions from industrial wastes, sludges, and by-products samples within the *Solid Residues and Thick Sludges* matrix: Carob pulp (CP).

Solid residues and thick sludges

Grape marc (GM)

GM

1 <sup>st</sup> step		TECHNOLOGIES →								
Parameter	Results	T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
								Solid	Liquid	
Total Moisture (% w/w), ar	8.4					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	4.2	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	1.8		≥ 0.01							
Total Volatile Solids, (% w/w), ar	85		≥ 0.5							
Carbon / Nitrogen ratio	26		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	21			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	5.6					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	< 0.14					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	< 0.03					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	21					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.28						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	2.7						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.11									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✓	✓	✗	✓	✓	✗	✗	✗

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		✗	✓	✓	✗	✓	✓	✓	✗	✗

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S11.** Application of the Admissibility Grid to the organic fractions from industrial wastes, sludges, and by-products samples within the *Solid Residues and Thick Sludges* matrix: Grape marc (GM).

Solid residues and thick sludges

Tomato pomace (TP)

TP1

TP2

1 <sup>st</sup> step		TECHNOLOGIES →								
Parameter	Results	T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
								Solid	Liquid	
Total Moisture (% w/w), ar	60 – 94					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	1.8 – 2.1	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.58 – 1.7		≥ 0.01							
Total Volatile Solids, (% w/w), ar	6.0 – 40		≥ 0.5							
Carbon / Nitrogen ratio	18 <sup>†</sup>		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	13 – 58			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	0.20 – 2.5					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	< 0.14 <sup>†</sup>					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	0.13 <sup>†</sup>					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	25 <sup>†</sup>					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.43 – 1.0						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	2.8 <sup>††</sup>						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.13 <sup>†</sup>									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✓	✓	✓	✗	✗	✗	✗	✓

†, values determined in pre-dried samples

†, analysed only in one sample

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		• ≤ 10
Samples admissibility after adjustment ⇨		✗	✓	✓	✓	✓	✓	✓	✗	✓

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S12.** Application of the Admissibility Grid to the organic fractions from industrial wastes, sludges, and by-products samples within the *Solid Residues and Thick Sludges* matrix: Tomato pomace (TP).

Solid residues and  
thick sludges

## IWWTP sludge from tomato processing (TS)



TS

1 <sup>st</sup> step TECHNOLOGIES →		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	55					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	0.12	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.91		≥ 0.01							
Total Volatile Solids, (% w/w), ar	6.3		≥ 0.5							
Carbon / Nitrogen ratio	5.8		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	1.2			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	84					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	n.a.					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	n.a.					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	n.a.					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.12						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	--						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.18									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio- Ethanol	Bio- Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✗	✗	✗	✗	✗	✗	✗	✗

--, not analysed because the characteristics of the sample were outside the scope of the analytical procedure  
 n.a., not analysed because the sample was too inorganic to fall within the scope of the procedures

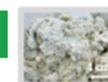
2 <sup>nd</sup> step Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**										
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		✗	✗	✗	✗	✗	✗	✗	✗	✗

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S13.** Application of the Admissibility Grid to the organic fractions from industrial wastes, sludges, and by-products samples within the *Solid Residues and Thick Sludges* matrix: IWWTP sludge from tomato processing (TS).

Solid residues and  
thick sludges

## Residue from yogurt production (DR)



DR

1 <sup>st</sup> step		TECHNOLOGIES →								
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrotherma Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	50					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	40	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.20		≥ 0.01							
Total Volatile Solids, (% w/w), ar	50		≥ 0.5							
Carbon / Nitrogen ratio	-		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	0.21			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	0.28					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	n.a.					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	n.a.					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	n.a.					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.76						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	--						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	-									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio- Ethanol	Bio- Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✓	✗	✗	✗	✗	✗	✗	✗	✗

n.a., not analysed because the samples were too greasy or too inorganic to fall within the scope of the procedures  
-, ratios were not estimated because CHN analysis was not performed as the sample characteristics were outside the scope of the analytical procedure  
--, not analysed because the characteristics of the sample were outside the scope of the analytical procedure

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		✓	✗	✗	✗	✗	✗	✗	✓	✗

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S14.** Application of the Admissibility Grid to the organic fractions from industrial wastes, sludges, and by-products samples within the *Solid Residues and Thick Sludges* matrix: Residue from yogurt production (DR).



Solid residues and  
thick sludges

IWWTP sludge from yogurt production (DS)

DS

1 <sup>st</sup> step		TECHNOLOGIES →								
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	84					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	7.0	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.84		≥ 0.01							
Total Volatile Solids, (% w/w), ar	16		≥ 0.5							
Carbon / Nitrogen ratio	12		10 - 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	2.7			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	4.1					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	< 0.14					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	0.32					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	32					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.97						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	n.a.						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.15									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✓	✗	✗	✗	✗	✗	✗	✗

n.a., not analysed because the samples were too greasy to fall within the scope of the procedures

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 - 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		✗	✓	✗	✗	✗	✗	✗	✗	✗

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S15.** Application of the Admissibility Grid to the organic fractions from industrial wastes, sludges, and by-products samples within the *Solid Residues and Thick Sludges* matrix: IWWTP sludge from yogurt production (DS).



Solid residues and  
thick sludges

## IWWTP sludge from fruit processing (FPS)



FPS

1 <sup>st</sup> step TECHNOLOGIES →		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	91					≤ 40	≤ 20	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	0.29	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	0.27		≥ 0.01							
Total Volatile Solids, (% w/w), ar	8.1		≥ 0.5							
Carbon/ Nitrogen ratio	10		10 - 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	36			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	8.2					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	0.18					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	0.14					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	21					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.96						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	--						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.12									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio- Ethanol	Bio- Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✓	✓	✓	✗	✗	✗	✗	✗

--, not analysed because the characteristics of the sample were outside the scope of the analytical procedure

2 <sup>nd</sup> step Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**										
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 - 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		✗	✓	✓	✓	✗	✗	✗	✗	✗

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S16.** Application of the Admissibility Grid to the organic fractions from industrial wastes, sludges, and by-products samples within the *Solid Residues and Thick Sludges* matrix: IWWTP sludge from fruit processing (FPS).

Solid residues and thick sludges

Poultry litter (PL)

PL1

PL2

1 <sup>st</sup> step		TECHNOLOGIES →								
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	29 - 64					≤ 40	≤ 20	≤ 20	≤ 20	50 - 80
Oil (% w/w), ar	0.52 - 1.5	≥ 40	≤ 30						≥ 30	
Kjeldahl Nitrogen (% w/w), ar	1.6		≥ 0.01							
Total Volatile Solids, (% w/w), ar	29 - 60		≥ 0.5							
Carbon / Nitrogen ratio	12 - 17		10 - 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	42 - 45			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	14 - 19					≤ 20	≤ 20	≤ 20		≤ 20
Total Chloride (% w/w), db	0.37 - 0.50					≤ 1	≤ 1	≤ 1		≤ 1
Total Sulphur (% w/w), db	0.29 - 0.39					≤ 2	≤ 2	≤ 2		≤ 2
Higher Heating Value, (MJ/kg), db	15 - 17					≥ 16	≥ 16	≥ 16		
Bulk Density (kg/L), ar	0.25 - 0.59						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar	--						≤ 80	≤ 2		≤ 10
Hydrogen / Carbon ratio	0.12									0.08 - 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✓	✓	✓	✗	✗	✗	✗	✗

--, not analysed because the characteristics of the sample were outside the scope of the analytical procedure

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	≤ 20	50 - 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2		≤ 10
Samples admissibility after adjustment ⇨		✗	✓	✓	✓	✗	✗	✗	✗	✓

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S17.** Application of the Admissibility Grid to the organic fractions from industrial wastes, sludges, and by-products samples within the *Solid Residues and Thick Sludges* matrix: Poultry litter (PL).

Solid residues and  
thick sludges

## Primary sludge (PPS)



1 <sup>st</sup> step	TECHNOLOGIES →	T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis	T 8 Hydrothermal Liquefaction
Parameter	Results							Solid Liquid	
Total Moisture (% w/w), ar	52 – 69					≤ 40	≤ 20	≤ 20	50 – 80
Oil (% w/w), ar	0.10 – 0.15	≥ 40	≤ 30						≥ 30
Kjeldahl Nitrogen (% w/w), ar	0.03 – 1.1		≥ 0.01						
Total Volatile Solids, (% w/w), ar	11 – 35		≥ 0.5						
Carbon / Nitrogen ratio	6.9–1.3×10 <sup>2</sup>		10 – 60						
Total Hydrolysed Sugars (as glucose) (% w/w), db	3.0 – 74			≥ 20	≥ 25				
Ash at 815 °C (% w/w), db	7.1 – 63					≤ 20	≤ 20	≤ 20	≤ 20
Total Chloride (% w/w), db	<0.14–0.16					≤ 1	≤ 1	≤ 1	≤ 1
Total Sulphur (% w/w), db	<0.03–0.20					≤ 2	≤ 2	≤ 2	≤ 2
Higher Heating Value, (MJ/kg), db	5.6 – 15					≥ 16	≥ 16	≥ 16	
Bulk Density (kg/L), ar	0.51 – 1.0						≥ 0.12		
Mean Particle Diameter, d <sub>50</sub> (mm), ar	2.4 <sup>†</sup> – 4.7 <sup>†</sup>						≤ 80	≤ 2	≤ 10
Hydrogen / Carbon ratio	0.08 – 0.12								0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils	
Samples admissibility as received ⇨		✗	✓	✓	✓	✗	✗	✗	✗

†, values determined in pre-dried samples



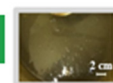
2 <sup>nd</sup> step	Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20	≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3	1 < R <sub>M</sub> ≤ 3	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar							≤ 80	≤ 2	≤ 10
Samples admissibility after adjustment ⇨		✗	✓	✓	✓	✗	✗	✗	✓

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S18.** Application of the Admissibility Grid to the organic fractions from industrial wastes, sludges, and by-products samples within the *Solid Residues and Thick Sludges* matrix: Primary sludge (PPS).

Liquid sludges  
and fats

## Food waste hydrolysate for organic valorisation (FW)



FW3

1 <sup>st</sup> step		TECHNOLOGIES ➡		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction	
Parameter	Results									Solid	Liquid		
Total Moisture (% w/w), ar	93							≤ 40	≤ 20	Technology not applicable to this matrix	≤ 20	50 – 80	
Oil (kg/L), ar	0.02	≥ 0.30	≤ 0.25								≥ 0.25		
Kjeldahl Nitrogen, (g/L), ar	3.1		≥ 0.10										
Total Volatile Solids, (kg/L), ar	0.05		≥ 0.001										
Carbon / Nitrogen ratio	11		10 – 60										
Total Hydrolysed Sugars (as glucose) (% w/w), db	6.8			≥ 20	≥ 25								
Ash at 815 °C (% w/w), db	24							≤ 20	≤ 20				≤ 20
Total Chloride (% w/w), db	1.6							≤ 1	≤ 1				≤ 1
Total Sulphur (% w/w), db	0.81							≤ 2	≤ 2				≤ 2
Higher Heating Value, (MJ/kg), db	22							≥ 16	≥ 16				
Bulk Density (kg/L), ar	0.99								≥ 0.12				
Mean Particle Diameter, d <sub>50</sub> (mm), ar		Parameter not applicable to this matrix											
Hydrogen / Carbon ratio	0.15											0.08 – 0.15	
PRODUCTS ➡		Biodiesel	Biogas	Bio- Ethanol	Bio- Hydrogen	Electricity and Heat	Syngas	Bio-oils					
Samples admissibility as received ➡		✗	✓	✗	✗	✗	✗	✗					



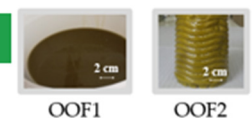
2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20		≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3		1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar		Parameter not applicable to this matrix								
Samples admissibility after adjustment ⇨		✗	✓	✗	✗	✗	✗	✗		

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S19.** Application of the Admissibility Grid to the organic fractions organic fractions of MSW, industrial wastes, sludges, and by-products samples within the *Liquid sludges and fats* matrix: Food waste hydrolysate for organic valorisation (FW).

Liquid sludges  
and fats

## Olive oil residual organic fraction with high fat content (OOF)



1 <sup>st</sup> step		TECHNOLOGIES ➡						T 7 Pyrolysis		T 8							
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	Solid	Liquid	Hydrothermal Liquefaction							
Parameter	Results	<div>Technology not applicable to this matrix</div>	<div>Technology not applicable to this matrix</div>	<div>Technology not applicable to this matrix</div>	<div>Technology not applicable to this matrix</div>	<div>Technology not applicable to this matrix</div>	<div>Technology not applicable to this matrix</div>	<div>Technology not applicable to this matrix</div>	<div>Technology not applicable to this matrix</div>	<div>Technology not applicable to this matrix</div>							
Total Moisture (% w/w), ar	9.6 – 13										≤ 40	≤ 20	≤ 20	50 – 80			
Oil (kg/L), ar	0.46 – 0.76										≥ 0.30	≤ 0.25	≥ 20	≥ 25	≤ 20	≤ 1	≤ 2
Kjeldahl Nitrogen, (g/L), ar	0.08 †										≥ 0.10	≥ 16	≥ 16				
Total Volatile Solids, (kg/L), ar	0.81 – 0.86										≥ 0.001						
Carbon / Nitrogen ratio	-										10 – 60						
Total Hydrolysed Sugars (as glucose) (% w/w), db	0.03 – 0.08																
Ash at 815 °C (% w/w), db	0.11 – 0.29																
Total Chloride (% w/w), db	n.a.																
Total Sulphur (% w/w), db	n.a.																
Higher Heating Value, (MJ/kg), db	n.a.																
Bulk Density (kg/L), ar	0.93 – 0.95						≥ 0.12										
Mean Particle Diameter, d <sub>50</sub> (mm), ar		Parameter not applicable to this matrix															
Hydrogen / Carbon ratio	-									0.08 – 0.15							
PRODUCTS ➡		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils									
Samples admissibility as received ➡		✓	✗	✗	✗	✗	✗	✓	✗	✗							

-, ratios were not estimated because CHN analysis was not performed as the sample characteristics were outside the scope of the analytical procedure

†, analysed only in one sample

n.a., not analysed because the samples were too greasy to fall within the scope of the procedures

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20		≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1<R <sub>M</sub> ≤ 1.5	1<R <sub>M</sub> ≤ 3		1<R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar		Parameter not applicable to this matrix								
Samples admissibility after adjustment ⇨		✓	✗	✗	✗	✗	✗	✗	✓	✗

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S20.** Application of the Admissibility Grid to the organic fractions organic fractions of MSW, industrial wastes, sludges, and by-products samples within the *Liquid sludges and fats* matrix: Olive oil residual organic fraction with high fat content (OOF).



Liquid sludges  
and fats

## IWWTP sludge from chestnut processing (CPS)



CPS

1 <sup>st</sup> step		TECHNOLOGIES →								
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Parameter	Results							Solid	Liquid	
Total Moisture (% w/w), ar	99					≤ 40	≤ 20	Technology not applicable to this matrix	≤ 20	50 – 80
Oil (kg/L), ar	< 0.01	≥ 0.30	≤ 0.25						≥ 0.25	
Kjeldahl Nitrogen, (g/L), ar	0.22		≥ 0.10							
Total Volatile Solids, (kg/L), ar	0.01		≥ 0.001							
Carbon / Nitrogen ratio	19		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	18			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	7.0					≤ 20	≤ 20			≤ 20
Total Chloride (% w/w), db	0.35					≤ 1	≤ 1			≤ 1
Total Sulphur (% w/w), db	0.35					≤ 2	≤ 2			≤ 2
Higher Heating Value, (MJ/kg), db	19					≥ 16	≥ 16			
Bulk Density (kg/L), ar	0.99						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar		Parameter not applicable to this matrix								
Hydrogen / Carbon ratio	0.14									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✓	✗	✗	✗	✗	✗	✗	✗

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20		≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3		1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar		Parameter not applicable to this matrix								
Samples admissibility after adjustment ⇨		✗	✓	✗	✗	✗	✗	✗	✗	✗

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S21.** Application of the Admissibility Grid to the organic fractions organic fractions of MSW, industrial wastes, sludges, and by-products samples within the *Liquid sludges and fats* matrix: IWWTP sludge from chestnut processing (CPS).



Liquid sludges  
and fats

Wine lees (WL)

WL1

WL2

1 <sup>st</sup> step		TECHNOLOGIES →											
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction			
Parameter	Results							Solid	Liquid				
Total Moisture (% w/w), ar	90					≤ 40	≤ 20	Technology not applicable to this matrix	≤ 20	50 – 80			
Oil (kg/L), ar	< 0.01	≥ 0.30	≤ 0.25						≥ 0.25				
Kjeldahl Nitrogen, (g/L), ar	3.5 – 4.5		≥ 0.10										
Total Volatile Solids, (kg/L), ar	0.07 – 0.08		≥ 0.001										
Carbon / Nitrogen ratio	10 – 11		10 – 60										
Total Hydrolysed Sugars (as glucose) (% w/w), db	17 – 19			≥ 20	≥ 25								
Ash at 815 °C (% w/w), db	16 – 28					≤ 20	≤ 20			≤ 20			
Total Chloride (% w/w), db	n.a.*					≤ 1	≤ 1			≤ 1			
Total Sulphur (% w/w), db	n.a.*					≤ 2	≤ 2			≤ 2			
Higher Heating Value, (MJ/kg), db	n.a.*					≥ 16	≥ 16						
Bulk Density (kg/L), ar	1.0						≥ 0.12						
Mean Particle Diameter, d <sub>50</sub> (mm), ar		Parameter not applicable to this matrix											
Hydrogen / Carbon ratio	0.12 – 0.13									0.08 – 0.15			
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils					
Samples admissibility as received ⇨		✗	✓	✗	✗	✗	✗	✗ ✗					

n.a.\*, not analysed since these samples were not expected to be used in technologies T5, T6, or T7

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**									
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20		≤ 20	50 – 80	
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3		1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1	
Mean Particle Diameter, d <sub>50</sub> (mm), ar		Parameter not applicable to this matrix									
Samples admissibility after adjustment ⇨		✗	✓	✗	✗	✗	✗	✗ ✗			

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S22.** Application of the Admissibility Grid to the organic fractions organic fractions of MSW, industrial wastes, sludges, and by-products samples within the *Liquid sludges and fats* matrix: Wine lees (WL).

Liquid sludges  
and fats

Cheese whey (CW) and second cheese whey (SCW)

CW

SCW

1 <sup>st</sup> step		TECHNOLOGIES →								
Parameter	Results	T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Total Moisture (% w/w), ar	92 – 93					≤ 40	≤ 20	Technology not applicable to this matrix		50 – 80
Oil (kg/L), ar	< 0.01	≥ 0.30	≤ 0.25						≤ 20 ≥ 0.25	
Kjeldahl Nitrogen, (g/L), ar	0.91 – 2.0		≥ 0.10							
Total Volatile Solids, (kg/L), ar	0.06 – 0.07		≥ 0.001							
Carbon/ Nitrogen ratio	-		10 – 60							
Total Hydrolysed Sugars (as glucose) (% w/w), db	37 – 64			≥ 20	≥ 25					
Ash at 815 °C (% w/w), db	7.1 – 15					≤ 20	≤ 20			≤ 20
Total Chloride (% w/w), db	n.a.					≤ 1	≤ 1			≤ 1
Total Sulphur (% w/w), db	n.a.					≤ 2	≤ 2			≤ 2
Higher Heating Value, (MJ/kg), db	n.a.					≥ 16	≥ 16			
Bulk Density (kg/L), ar	1.0						≥ 0.12			
Mean Particle Diameter, d <sub>50</sub> (mm), ar		Parameter not applicable to this matrix								
Hydrogen/ Carbon ratio	-									0.08 – 0.15
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils		
Samples admissibility as received ⇨		✗	✗	✓	✓	✗	✗	✗		

-, ratios were not estimated because CHN analysis was not performed as the sample characteristics were outside the scope of the analytical procedure  
n.a., not analysed because the samples were too aqueous to fall within the scope of the procedures

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20		≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3		1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ P <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar		Parameter not applicable to this matrix								
Samples admissibility after adjustment ⇨		✗	✗	✓	✓	✗	✗	✗		

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S23.** Application of the Admissibility Grid to the organic fractions organic fractions of MSW, industrial wastes, sludges, and by-products samples within the *Liquid sludges and fats* matrix: Cheese whey (CW) and second cheese whey (SCW).

Liquid sludges  
and fats

Wastes from fruit processing (FPW)

FPW

1 <sup>st</sup> step		TECHNOLOGIES →									
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction	
Parameter	Results							Solid	Liquid		
Total Moisture (% w/w), ar	82					≤ 40	≤ 20	Technology not applicable to this matrix	≤ 20	50 – 80	
Oil (kg/L), ar	< 0.01	≥ 0.30	≤ 0.25						≥ 0.25		
Kjeldahl Nitrogen, (g/L), ar	0.12		≥ 0.10								
Total Volatile Solids, (kg/L), ar	0.19		≥ 0.001								
Carbon / Nitrogen ratio	58		10 – 60								
Total Hydrolysed Sugars (as glucose) (% w/w), db	50			≥ 20	≥ 25						
Ash at 815 °C (% w/w), db	1.5					≤ 20	≤ 20			≤ 20	
Total Chloride (% w/w), db	n.a.*					≤ 1	≤ 1			≤ 1	
Total Sulphur (% w/w), db	n.a.*					≤ 2	≤ 2			≤ 2	
Higher Heating Value, (MJ/kg), db	n.a.*					≥ 16	≥ 16				
Bulk Density (kg/L), ar	1.0						≥ 0.12				
Mean Particle Diameter, d <sub>50</sub> (mm), ar		Parameter not applicable to this matrix									
Hydrogen / Carbon ratio	0.17									0.08 – 0.15	
PRODUCTS →		Biodiesel	Biogas	Bio-Ethanol	Bio-Hydrogen	Electricity and Heat	Syngas	Bio-oils			
Samples admissibility as received ⇨		✗	✓	✓	✓	✗	✗	✗ ✗			

n.a.\*, not analysed since these samples were not expected to be used in technologies T5, T6, or T7

2 <sup>nd</sup> step		Criteria to be satisfied after eventual adjustments of moisture* and particle dimension**								
		T 1 Trans- esterification	T 2 Anaerobic Digestion	T 3 Alcoholic Fermentation	T 4 Dark Fermentation	T 5 Combustion	T 6 Gasification	T 7 Pyrolysis		T 8 Hydrothermal Liquefaction
Total moisture, % (w/w), after adjustment *						≤ 40	≤ 20		≤ 20	50 – 80
R <sub>M</sub> = Total moisture, ar / Total moisture, adjusted *						1 < R <sub>M</sub> ≤ 1.5	1 < R <sub>M</sub> ≤ 3		1 < R <sub>M</sub> ≤ 2.5	0.6 ≤ R <sub>M</sub> < 1
Mean Particle Diameter, d <sub>50</sub> (mm), ar		Parameter not applicable to this matrix								
Samples admissibility after adjustment ⇨		✗	✓	✓	✓	✗	✗	✗ ✗		

\*, Natural drying (T5, T6, T7-Sol.), Decantation (T7-Liq.) or Humidification (T8); \*\*, Milling

**Figure S24.** Application of the Admissibility Grid to the organic fractions organic fractions of MSW, industrial wastes, sludges, and by-products samples within the *Liquid sludges and fats* matrix: Wastes from fruit processing (FPW).