Wetland Plants

There are artificial wetlands in L'Albufera Natural Park that protect L'Albufera Lake from nutrient pollution, ensuring thus wildlife protection in the park. These nutrients (mainly nitrogen) come from urban water treated in Wastewater Treatment Plants located in the surroundings of L'Albufera Natural Park and from the diffuse emissions of the agricultural fertilization.

The plants growing in the wetlands should be pruned periodically, and therefore they may be available as co-substrate to produce energy in anaerobic co-digestion or co-combustion with the rice straw. The use of biomass rich in nutrients and micronutrients can improve rice straw anaerobic digestion.

Figure 3 shows main plants growing in artificial wetlands. A characterization of nitrogen concentration, carbon-nitrogen ratio and fibre content of these plants is shown in Table 4. Except the yellow lily, the other plants show high total and volatile solids concentration (80-90%). The yellow lily is characterized by higher water content and it may be an adequate substrate to add extra humidity to rice straw. The yellow lily and dry thypa show medium nitrogen concentration (4 g/L). The rest of the plants show high nitrogen content (8-10 g/L). In general, the fibre content is high for all these plants (27-77% of the dry matter). Most of the content of the fibre is cellulose (47-60%) abd hemicelluloses (24-34%). The lignin is the minor component of the fibre (8-11% of the total dry matter). In this sense, Figure 4 shows a comparative analysis of the different wetland plants together with three rice straw samples coming from three different types of rice. The wetland plants show similar fibre content and distribution fractions than the rice straw.

Figure 3. Different wetland plants

Table 4. Characterization of different wetland plants

PARAMETERS	JUNCUS ACUTUS	YELOW LILY	DRY TYPHA	GREEN TYPHA	THICK SCIRPUS	FINE SCIRPUS	REED
[1]TS (%)	80.14	36.03	91.48	82.32	92.2	92.2	92.8
[2]VS (%TS)	80.38	76.75	94.91	89.6	89.95	90.78	91.78
[3]TKN (mg/Kg)	8002	4120	3977	10803	10081	10803	11091
[4]C (g/L)	390	197	436	414	360	414	424
[5]C/N	49	48	110	38	36	38	38
Fiber (g/Kg)	577	141	700	604	543	604	675
Cellulose (g/Kg)	273	85	377	278	255	278	327
Hemicelluloses (g/Kg)	231	34	218	249	207	249	256
Lignin (g/Kg)	73	22	105	77	81	77	92
Fiber (% TS)	72	39	77	73	59	66	73
Cellulose (% TS)	34	24	41	34	28	30	35
Hemicelluloses (% TS)	29	9	24	30	22	27	28
Lignin (% TS)	9	6	11	9	9	8	10

[1]TS: Total solids; [2]VS: volatile solids; [3]TKN: total Kjeldahl nitrogen; [4]C: carbon; [5]C-N: carbon-nitrogen ratio

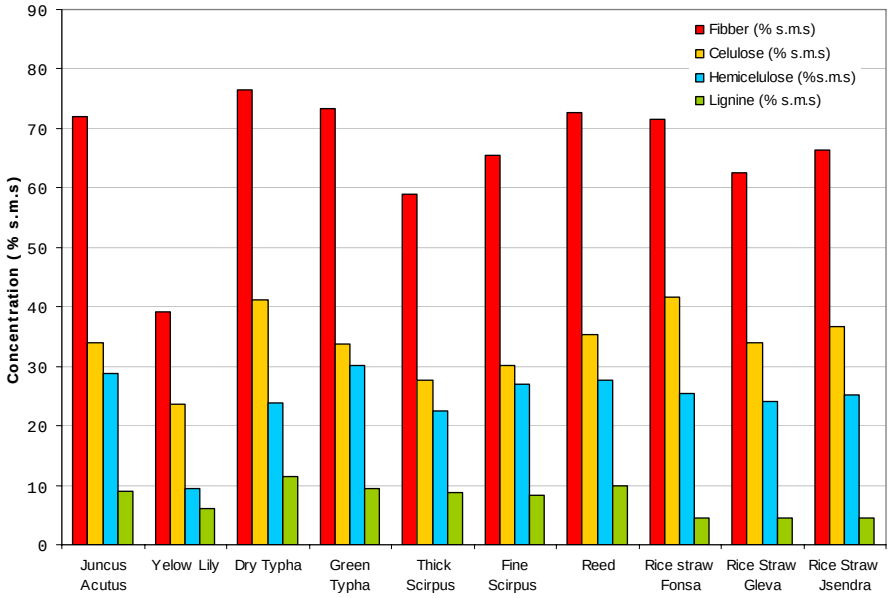

Figure 4. Fibre concentration of the different wetland plants and rice straw