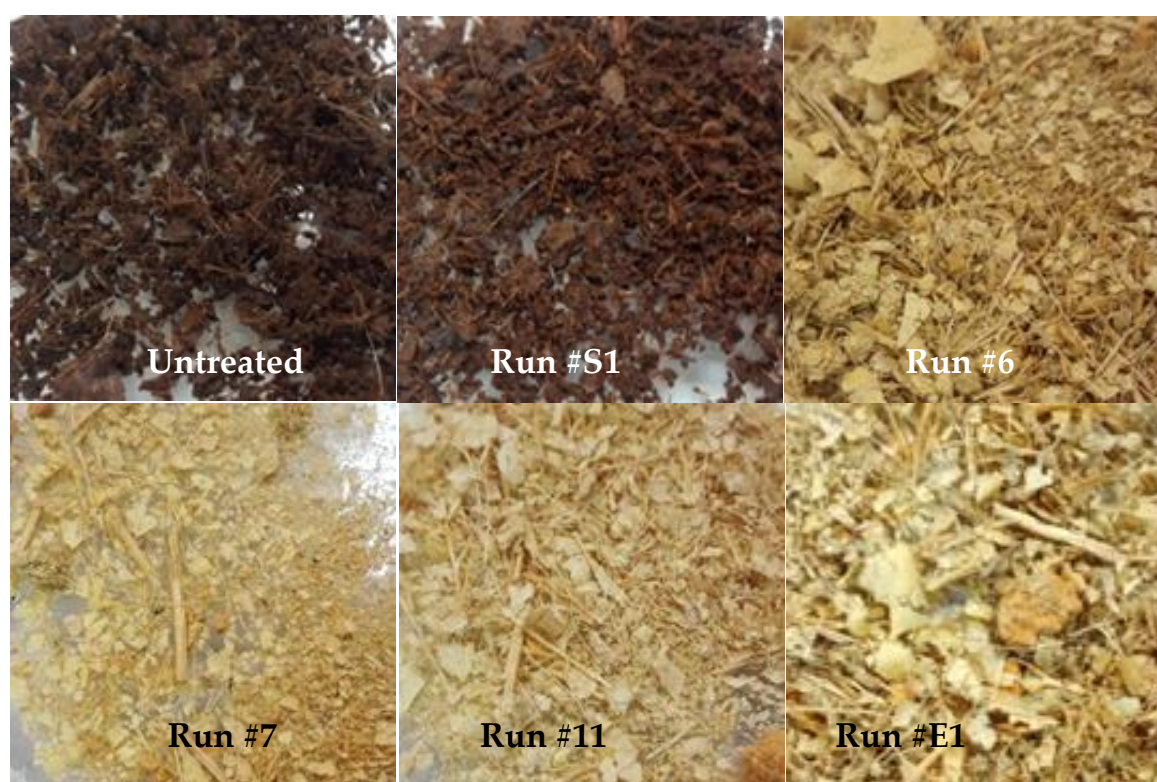


## 4. Results and discussion

### 4.1. Effect of the acid-oxidative hydrolysis on the LCW characteristics

The proximal composition of the *Platanus acerifolia* leaf waste was studied to evaluate their potential for biofuel or biochemical production. LCW moisture was evaluated every time it was used for experiments to assess the exact solid dry mass. Moisture was always around 70% w/w. The dry leaf waste contained a minor amount of ash (3.2% w/w) and ethanol extractives (4% w/w), significant insoluble lignin (44% w/w), cellulose (12% w/w), and hemicellulose (36% w/w). After the hydrolysis, moisture and lignin content were determined to get the solid fraction yield and % delignification. **Figure 1** illustrates a photograph of the untreated sample and samples treated with dilute sulphuric acid (Run #S1, **Table 2**) and the acid-oxidative hydrolysis (Runs #6, #7, #11, and #E1, **Table 2**). There is a significant difference in the color of the sample, which correlates with the lignin content. Still, the appearance of the pre-treated leaf waste is similar to the untreated sample.



**Figure 1:** Photograph of the untreated LCW, the LCW pre-treated with a dilute sulphuric acid solution (Run #S1-Table 2), and the LCW pre-treated by the acid-oxidative hydrolysis at conditions of Run #6, #7, #11, and E1.

Attaining a high solid fraction with the acid-oxidative hydrolysis pretreatment since the carbohydrates usable for bioprocess remain in the solid. The solid fraction decreased as the severity increased (**Figure 2**), mainly related to the temperature effect. The yield has an almost linear negative dependence on the severity factor, particularly for the lowest solid loading. On the contrary, the effect of the severity factor on the delignification efficiency (**Figure 3**) is slightly positive, and an influence of the solid loading is perceived. Despite significant variations, the attained delignification was always larger than 60% except for one condition corresponding to the highest solid loading examined. The highest delignification degree was attained for the lowest examined solid loading, reaching a value of 85.2% for Run #4 of **Table 2**, although solid yield for this condition was less than 50%.