lower and upper limits of these regions are very close to each other. Therefore, it is very difficult to distinguish the individual DSC curves as well as DTG profiles. These results predict that not only the rates of the mass losses but also the heat flows are seriously influenced from the type of the oxidizer medium. Increase in the concentration of oxygen caused variations in thermal behavior of biomass in the favor of increasing reactivity.

4. Conclusions

Burning characteristics of some agricultural waste biomass species such as sunflower seed shell, hazelnut shell, rice husk, and olive refuse have been tested under dynamic flows of dry air or oxygen under relatively slow heating conditions in a thermal analyzer. These tests indicated that both the rates of the mass losses from the biomass samples and the heat flow properties are obviously different for each biomass material under dry air. For an example, sunflower seed shell showed such a different weight loss character from the other biomass samples under dry air that it is possible to say that its thermal reactivity is extremely higher than that for the other samples under investigated conditions. Despite this big difference in weight loss characteristics of SSS, heat flow properties determined from DSC curves could not monitored at expected level, and all the samples showed similar heat flow characteristics to some extent. The major ingredients of biomass samples including holocellulose and lignin plays a significant role on the thermal reactivity and the exothermic characteristics of the burning process.

On the other hand, a different situation was detected in the DTG and DSC curves obtained under pure oxygen. That is, almost all the DTG curves for the samples overlapped to form a unique peak as well as the DSC curves. This shows that usage of oxygen instead of dry air eliminated the differences in the thermal reactivity and the burning features of the biomass species under investigated conditions. Also, thermal reactivities of biomasses seriously increased in case of oxygen usage.

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