

# Green Engineering Approach for Organic Wastes Treatment Using Supercritical Fluid Technology

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**Abstract Type:** Original Research

**Keywords:** Green Engineering, Zero Emission, Sustainable Development, Sub- and Supercritical Water, Organic Wastes

**Background and Aim:** Recently, due to the accelerating industrial developments and changes in human lifestyles and activities, increasing waste disposals from various local industries and households pose a grave threat to the environment. This might escalate and further contribute to global environmental problems if not promptly given proper consideration. Concerning to this subject and since about 60~80 % of the waste streams in the world is composed of organic wastes, a better, cheaper and cleaner process for the conversion of organic wastes to useful materials would be highly beneficial compare to conventional methods. To attain this goal, development of new recycling technology based on the concept of zero emissions, and conversion of organic wastes to valuable and renewable resources and/or energy sources has become one of the most important themes of the environmental issue of the new millennium.

**Methods and Results:** As a new green conversion method, recently reactions in sub-critical water have been gaining more attention of late. Sub-critical water can provide a new reaction medium and/or act as a catalyst in many chemical reactions. Changes in physical and chemical properties of water under sub- and supercritical conditions, especially in hydrogen bond, ion product and dielectric constant, could facilitate reactions with a wide range of organic compounds resulting in many useful materials.

**Discussion and Conclusion:** The present work was investigated on the development of an efficient conversion process to produce valuable substances from organic wastes. The obtained results showed that using sub-critical water hydrolysis (without catalysts and oxidants), organic wastes could be converted into many valuable materials such as amino acids, organic acids, carbohydrates, proteins and peptides. Moreover, sub-critical water as an efficient reagent and reaction medium resulted in the production of oil and fat, which contain a lot of triglycerides and large variety of fatty acids as important energy sources to produce biodiesel fuel.