

Patentably Distinguishing Your End Products

By Benjamin Spehlmann | July 17, 2012



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An overriding objective of many advanced biofuels is being compositionally similar to petroleum counterparts. Innovation is often marked by advancements in how closely a producer can imitate conventional products, for example in composition and performance characteristics, rather than distinguish over them. Many R&D activities focus on process parameters that allow production of petroleum-mimicking products from the widest possible range of renewable carbon sources. This might lead to a perception that patent protection for advanced biofuel innovators is limited essentially to their improvements in production methods rather than end products. Ultimately, for a biofuel composition to be patentable, it must meet legal standards for novelty and nonobviousness over conventional, known products.

Yet companies are also aware of the significant intellectual property (IP) value associated with protecting products, in addition to processes. Infringement of a process claim requires a competitor to practice some defined set of operating conditions, such as pressure, temperature, reactor residence time. A product claim, however, offers a different, potentially more meaningful scope of protection, namely the ability to exclude production, use or sale of a composition having a defined set of properties (e.g., cetane number, boiling point range, cloud point). The problem of patentably distinguishing a biofuel composition is not overcome merely by specifying that the composition is made according to a particular process. Infringement of a “product-by-process” claim requires a competitor to actually practice the specified process. Such a claim therefore normally provides little value beyond a claim to the underlying process itself.

Potential strategies for claiming biofuel end products, which can provide a process innovator with a desirable scope of patent protection, are discussed below. These involve claiming such products

according to their (a) process-specific properties, (b) greenhouse gas (GHG) emission values or renewable carbon content, and/or (c) blend components.

Process-Specific Composition Features: Any property of a biofuel composition that results from its specific production process, whether significant to its end use, can potentially serve as a patentable basis for distinction. For example, lignocellulosic biomass pyrolysis, combined with hydroprocessing, is known to provide an aromatic-rich product that can substitute for conventional petroleum naphtha reforming. Yet, due to the nature of the cyclic compounds derived from lignin, the pyrolysis product contains only minor amounts of benzene and toluene relative to the petroleum reformat. Specifying a low quantity of benzene, toluene or combination of both could therefore potentially distinguish a bioderived composition or component from its petroleum counterpart.

GHG Emission Value, Renewable Carbon Content: The GHG emission value of a biofuel composition, expressed as CO₂-equivalents per unit of energy according to U.S. government accounting practices, can serve as a defining property of a composition. This is a recognized biofuel property, based on a life-cycle assessment from the time of cultivation in the case of plant sources required for the compositions, up to and including the ultimate fuel combustion. For waste vegetable oils and animal fats, the GHG emissions for obtaining these feedstocks are usually negligible. Specifying a GHG emission value as a basis for patentability may be especially significant if refining process improvements can further reduce this quantity, beyond merely the benefit obtained from renewable carbon-based starting materials. For example, the on-site generation of green hydrogen feedstock for hydroprocessing, by reforming light, renewable carbon-derived byproducts, can reduce added GHG emission values associated with the production process. A similar approach resides in specifying a renewable carbon content of a composition or component, or even the specific source(s) of the renewable carbon.

Blend Components: Many biofuel-based compositions of commercial value are actually blends of components derived from fossil and renewable carbon sources. The desirability for blended compositions stems from (i) the current, limited capacity of biofuel production methods compared to refining processes and (ii) the need to achieve conventional fuel specifications, such as maximum organic oxygen content. Specifying amounts of renewable and nonrenewable components, with each being defined according to its individual composition, can often provide grounds for asserting patentability of a blend. This may be true even if, based on composition alone, the biofuel blend is not easily differentiated from a conventional fuel.

Using these strategies for claiming biofuel compositions can lead to success in obtaining valuable patent protection for your end products, rather than just the associated biorefining process innovations.

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