DIELS ALDER BASED ESTOLIDE AND LUBRICANT COMPOSITIONS

FIELD

[001] The present disclosure relates to estolide compounds and compositions. In certain embodiments, the estolide compositions contain at least one ene and/or Diels Alder compound.

BACKGROUND

[002] Lubricant compositions typically comprise a base oil, such as a hydrocarbon base oil, and one or more additives. Estolides present a potential source of biobased, biodegradable oils that may be useful as lubricants and base stocks.

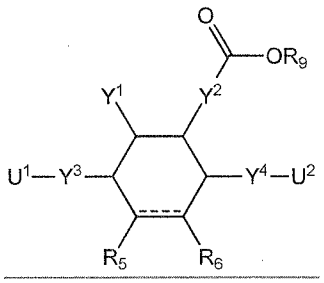
SUMMARY

[003] Described herein are estolide compounds, estolide-containing compositions, and methods of making the same. In certain embodiments, such compounds and compositions may be useful as lubricants or lubricant additives. In certain embodiments, the estolide-containing compositions further include at least one ene and/or Diels Alder compound. In certain embodiments, the ene and/or Diels Alder compound provides pour-point depressing properties and/or anti-wear properties to the estolide-containing compositions.

[003a] In one aspect of the present disclosure, there is provided a composition comprising:

at least one estolide compound; and

at least one compound selected from compounds of Formula II:



Formula II

wherein

Y^1 is an unsubstituted C_5 to C_{10} alkyl that is saturated or unsaturated, and unbranched;

Y^2, Y^3, and Y^4, independently for each occurrence, are selected from unsubstituted C_4 to C_{10} alkylene that is saturated or unsaturated, and unbranched;

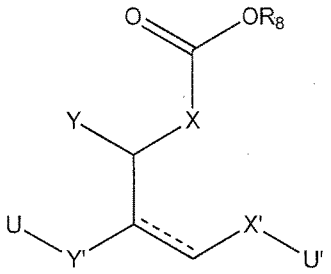
U^1 and U^2, independently for each occurrence, are selected from hydrogen and $-C(=O)OR_{10}$;

R_9 and R_{10}, independently for each occurrence, are selected from optionally substituted alkyl that is saturated or unsaturated, and branched or unbranched; and

R_5 and R_6 are hydrogen, or R_5 and R_6, taken together with the carbons to which they are attached, form an optionally substituted cycloalkyl,

wherein the dashed line represents a single bond or a double bond, and wherein at least one of U^1 or U^2 is $-C(=O)OR_{10}$.

[004] In certain embodiments, the composition comprises at least one estolide compound and at least one compound selected from compounds of Formula I:



Formula I

wherein

X, X', and Y', independently for each occurrence, are selected from an optionally substituted alkylene that is saturated or unsaturated, and branched or unbranched;

Y is selected from optionally substituted alkyl that is saturated or unsaturated, and branched or unbranched;

U and U', independently for each occurrence, are selected from hydrogen and