In the context of the disclosure, it has been observed that esters of at least one polyol and of a mixture of fatty acids comprising at least one C_5-C_{12} saturated fatty acid and at least one C_{10}-C_{12} unsaturated fatty acid have excellent properties for applications in lubricants.

In an aspect, there is provided a composition of a lubricant base comprising an ester of at least one polyol and of a mixture of fatty acids comprising at least one C_5-C_{12} saturated fatty acid and C_{10}-C_{12} unsaturated fatty acid; wherein C_{10}-C_{12} unsaturated fatty acid is 10-undecylenic acid, wherein the weight ratio of the C_5-C_{12} saturated fatty acid to the 10-undecylenic acid is 1:10 to 10:1, wherein the C_5-C_{12} saturated fatty acid is selected from the group consisting of pentanoic acid, isovaleric acid, caproic acid, heptanoic acid, n-heptanoic acid, caprylic acid, pelargonic acid, capric acid, citric acid, tetrahydrofuran-2,5-dicarboxylic acid, tetrahydrofuran-3,5-dicarboxylic acid, azelaic acid.

The present disclosure results from the unexpected demonstration, by the inventors, that esters of at least one polyol and of a mixture of fatty acids in which the acids are a mixture of 10-undecylenic acid and n-heptanoic acid that are derived from renewable resources have excellent properties for applications in lubricants.

Thus, the present disclosure relates to esters of at least one polyol and of a mixture of fatty acids comprising at least one C_5-C_{12} saturated fatty acid and at least one C_{10}-C_{12} unsaturated fatty acid.

The present disclosure also relates to the use of esters of at least one polyol and of a mixture of linear fatty acids comprising at least one C_5-C_{12} saturated fatty acid and at least one C_{10}-C_{12} unsaturated fatty acid as defined above as a lubricant base.

In another aspect, there is provided the use of the ester of at least one polyol and of a mixture of fatty acids comprising at least one C_5-C_{12} saturated fatty acid and 10-undecylenic acid, wherein the weight ratio of the C_5-C_{12} saturated fatty acid to the 10-undecylenic acid is 1:10 to 10:1, wherein the C_5-C_{12} saturated fatty acid is selected from the group consisting of pentanoic acid, isovaleric acid, caproic acid, heptanoic acid, n-heptanoic acid, caprylic acid, pelargonic acid, capric acid, citric acid, tetrahydrofuran-2,5-dicarboxylic acid, tetrahydrofuran-3,5-dicarboxylic acid, azelaic acid as defined in the composition above, as a lubricant base.

The present disclosure also relates to a lubricant base composition comprising esters of at least one polyol and of a mixture of linear fatty acids comprising at least one C_5-C_{12} saturated fatty acid and at least one C_{10}-C_{12} unsaturated fatty acid as defined above.

The present disclosure also relates to a process for preparing esters comprising the esterification of a mixture of linear fatty acids comprising at least one C_5-C_{12} saturated fatty acid and at least one C_{10}-C_{12} unsaturated fatty acid with at least one polyol, optionally in the presence of a catalyst.

In another aspect, there is provided a process for preparing an ester comprising the esterification of a mixture of fatty acids comprising at least one C_5-C_{12} saturated fatty acid and 10-undecylenic acid, wherein the weight ratio of the C_5-C_{12} saturated fatty acid to the 10-undecylenic acid is 1:10 to 10:1, wherein the C_5-C_{12} saturated fatty acid is selected from the group consisting of pentanoic acid, isovaleric acid, caproic acid, heptanoic acid, n-heptanoic acid, caprylic acid, pelargonic acid, capric acid, citric acid, tetrahydrofuran-2,5-dicarboxylic acid, tetrahydrofuran-3,5-dicarboxylic acid, azelaic acid, with at least one polyol, optionally in the presence of a catalyst.

The present disclosure also relates to esters of at least one polyol and of a mixture of linear fatty acids comprising at least one C_5-C_{12} saturated fatty acid and at least one C_{10}-C_{12} unsaturated fatty acid which are obtained by the process defined above.

In another aspect, there is provided esters of at least one polyol and of a mixture of fatty acids comprising at least one C_5-C_{12} saturated fatty acid and 10-undecylenic acid, wherein the weight ratio of the C_5-C_{12} saturated fatty acid to the 10-undecylenic acid is 1:10 to 10:1, wherein the C_5-C_{12} saturated fatty acid is selected from the group consisting of pentanoic acid, isovaleric acid, caproic acid, heptanoic acid, n-heptanoic acid, caprylic acid, pelargonic acid, capric acid, citric acid, tetrahydrofuran-2,5-dicarboxylic acid, tetrahydrofuran-3,5-dicarboxylic acid, azelaic acid, obtained by the process as defined above.

Detailed description of the invention

The lubricant base compositions according to the invention synthesized from esters of at least one polyol and of a mixture of fatty acids of renewable origin, such as for example erythritol and the mixture of fatty acids in which the acids are a mixture of n-heptanoic acid and 10-undecylenic acid (e.g. a mixture of Oleris® C7 and C11:1 from Arkema), make it possible to achieve properties in terms of thermal stability, oxidation stability, and also viscosity index, which are higher than the usual esters in

CLAIMS

[Claim 1] A composition of a lubricant base comprising an ester of at least one polyol and of a mixture of fatty acids comprising at least one C_5-C_{12} saturated fatty acid and C_{10}-C_{12} unsaturated fatty acid;
wherein C_{10}-C_{12} unsaturated fatty acid is 10-undecylenic acid, wherein the weight ratio of the C_5-C_{12} saturated fatty acid to the 10-undecylenic acid is 1:10 to 10:1, wherein the C_5-C_{12} saturated fatty acid is selected from the group consisting of pentanoic acid, isovaleric acid, caproic acid, heptanoic acid, n-heptanoic acid, caprylic acid, pelargonic acid, capric acid, citric acid, tetrahydrofuran-2,5-dicarboxylic acid, tetrahydrofuran-3,5-dicarboxylic acid, azelaic acid.

[Claim 2] The composition as claimed in claim 1, wherein the mixture consists predominantly of linear fatty acids.

[Claim 3] The composition as claimed in claim 1 or 2, wherein the C_5-C_{12} saturated fatty acid is n-heptanoic acid.

[Claim 4] The composition as claimed in any one of claims 1 to 3, wherein the weight ratio of the C_5-C_{12} saturated fatty acid to the C_{10}-C_{12} unsaturated fatty acid is 8:2 to 2:8.

[Claim 5] The composition as claimed in any one of claims 1 to 4, wherein the weight ratio of the C_5-C_{12} saturated fatty acid to the C_{10}-C_{12} unsaturated fatty acid is 7:3.

[Claim 6] The composition as claimed in any one of claims 1 to 5, wherein the weight ratio of the polyol to the mixture of fatty acids is at least 1:5.

[Claim 7] The composition as claimed in any one of claims 1 to 6, wherein the C_5-C_{12} saturated fatty acid and the C_{10}-C_{12} unsaturated fatty acid are derived from renewable resources.

[Claim 8] The composition as claimed in any one of claims 1 to 7, wherein the polyol is selected from the group consisting of sorbitol, erythritol, xylitol, mannitol, trimethylolpropane, trimethylolethane, pentaerythritol, dipentaerythritol, tripentaerythritol, tetrapentaerythritol, maltose, lactose, sucrose, raffinose, maltotriose, and neopentyl glycol or mixtures thereof.

[Claim 9] The composition as claimed in any one of claims 1 to 8, wherein the polyol is derived from a renewable resource.

[Claim 10] The use of the ester of at least one polyol and of a mixture of fatty acids comprising at least one C_5-C_{12} saturated fatty acid and 10-undecylenic acid, wherein the weight ratio of the C_5-C_{12} saturated fatty acid to the 10-undecylenic acid is 1:10 to 10:1, wherein the C_5-C_{12} saturated fatty acid is selected from the group consisting of pentanoic acid, isovaleric acid, caproic acid, heptanoic acid, n-heptanoic acid, caprylic acid, pelargonic acid, capric acid, citric acid, tetrahydrofuran-2,5-dicarboxylic acid, tetrahydrofuran-3,5-dicarboxylic acid, azelaic acid as defined in the composition of one of claims 1 to 9, as a lubricant base.

[Claim 11] A process for preparing an ester comprising the esterification of a mixture of fatty acids comprising at least one C_5-C_{12} saturated fatty acid and 10-undecylenic acid, wherein the weight ratio of the C_5-C_{12} saturated fatty acid to the 10-undecylenic acid is 1:10 to 10:1, wherein the C_5-C_{12} saturated fatty acid is selected from the group consisting of pentanoic acid, isovaleric acid, caproic acid, heptanoic acid, n-heptanoic acid, caprylic acid, pelargonic acid, capric acid, citric acid, tetrahydrofuran-2,5-dicarboxylic acid, tetrahydrofuran-3,5-dicarboxylic acid, azelaic acid, with at least one polyol, optionally in the presence of a catalyst.

[Claim 12] Esters of at least one polyol and of a mixture of fatty acids comprising at least one C_5-C_{12} saturated fatty acid and 10-undecylenic acid, wherein the weight ratio of the C_5-C_{12} saturated fatty acid to the 10-undecylenic acid is 1:10 to 10:1, wherein the C_5-C_{12} saturated fatty acid is selected from the group consisting of pentanoic acid, isovaleric acid, caproic acid, heptanoic acid, n-heptanoic acid, caprylic acid, pelargonic acid, capric acid, citric acid, tetrahydrofuran-2,5-

dicarboxylic acid, tetrahydrofuran-3,5-dicarboxylic acid, azelaic acid, obtained by the process as claimed in claim 11.