SUMMARY ~~OF THE INVENTION~~

In one embodiment~~aspect~~, the present disclosure~~invention~~ relates to fatty amine compositions. The fatty amines are made from a metathesis-derived C_{10}-C_{17} monounsaturated acid, octadecene-1,18-dioic acid, or their ester derivatives. The fatty amines can be made in several ways. In one synthetic approach, the metathesis-derived acid or ester is reacted with ammonia or a primary or secondary amine, and the resulting fatty amide is reduced to give the fatty amine. In another approach, the metathesis-derived acid or ester is reduced to give a fatty alcohol, and the fatty alcohol is aminated in a single or multiple steps.

In one aspect, there is provided a fatty amine having the formula:

$$R^2(R^3)NR^1$$

wherein R^1 is $-(CH_2)_8-CH=CHR^4$ or $-(CH_2)_8-CH=CH-(CH_2)_8-NR^2R^3$; each of R^2 and R^3 is independently substituted or unsubstituted alkyl, aryl, alkenyl, oxyalkylene, or polyoxyalkylene; and R^4 is hydrogen or C_1-C_7 alkyl, wherein when R^4 is C_1-C_7 alkyl, the fatty amine has at least 1 mole % of *trans*-Δ^9 unsaturation.

In another embodiment~~aspect~~, the present disclosure~~invention~~ relates to fatty amidoamines made by reacting a metathesis-derived C_{10}-C_{17} monounsaturated acid, octadecene-1,18-dioic acid, or their ester derivatives with an aminoalkyl-substituted tertiary amine such as DMAPA.

In another aspect, there is provided a fatty amidoamine having the formula:

$$R^3(R^2)N(CH_2)_nNH(CO)R^1$$

wherein (i) R^1 is $-(CH_2)_7-CH=CHR^4$; each of R^2 and R^3 is independently unsubstituted alkyl, substituted or unsubstituted aryl, alkenyl, oxyalkylene, or polyoxyalkylene; R^4 is hydrogen or C_1-C_7 alkyl; and n=2-8, or (ii) R^1 is $-(CH_2)_7-CH=CH-(CH_2)_7-(CO)NH(CH_2)_nN(R^2)R^3$; each of R^2 and R^3 is independently substituted or unsubstituted alkyl, aryl, alkenyl, oxyalkylene, or polyoxyalkylene; R^4 is hydrogen or C_1-C_7 alkyl; and n=2-8, wherein when R^4 is C_1-C_7 alkyl, the fatty amidoamine has at least 1 mole % of *trans*-Δ^9 unsaturation.

The present disclosure~~invention~~ includes derivatives made by sulfonating, sulfitating, or oxidizing the fatty amines or amidoamines.

In another aspect, there is provided a sulfonated, sulfitated, and/or oxidized derivative of the fatty amine as defined herein or the fatty amidoamine as defined herein.

In one embodiment~~aspect~~, the ester derivative of the C_{10}-C_{17} monounsaturated acid or octadecene-1,18-dioic acid is a lower alkyl ester. In other embodiment~~aspect~~s, the ester derivative is a modified triglyceride made by self-metathesis of a natural oil or an unsaturated triglyceride made by cross-metathesis of a natural oil with an olefin.

Fatty amines and amidoamines and their derivatives are valuable for a wide variety of end uses, including cleaners, fabric treatment, hair conditioning, personal care (liquid cleansing products, conditioning bars, oral care products), antimicrobial compositions, agricultural uses, and oil field applications.

In an aspect, there is provided a glyphosate formulation, a water-soluble herbicide composition, an agricultural solvent, or an anionic emulsifier for agricultural compositions each comprising the fatty amine as defined herein, the fatty amidoamine as defined herein, or the derivative as defined herein.

In another aspect, there is provided a hard-surface cleaner, a laundry detergent formulation, or a personal cleanser or handsoap each comprising the fatty amine as defined herein, the fatty amidoamine as defined herein, or the derivative as defined herein.

In another aspect, there is provided a paraffin dispersant for use in oilfield applications, a gas well foamer for use in oilfield applications, or a corrosion inhibitor for use in oilfield applications each comprising the fatty amine as defined herein, the fatty amidoamine as defined herein, or the derivative as defined herein.

In another aspect, there is provided a paint or coating additive composition comprising the fatty amine as defined herein, the fatty amidoamine as defined herein, or the derivative as defined herein.

In another aspect, there is provided a foamer, foam additive, or dispersant for use in gypsum, concrete, or firefighting applications comprising the fatty amine as defined herein, the fatty amidoamine as defined herein, or the derivative as defined herein.

In another aspect, there is provided the use of a composition comprising the fatty amine as defined herein, the fatty amidoamine as defined herein, or the derivative as defined herein as surfactant, emulsifier, skin-feel agent, film former, rheological modifier, biocide, biocide potentiator, solvent, release agent, conditioner, personal care product, household product, industrial or institutional cleaner, as wetting agent or dispersant, as inert ingredient in pesticides, as adjuvant for delivery of pesticides for crop protection, home and garden, and professional applications, in oil field applications, as foam moderator or dispersant for the manufacture of gypsum, cement wall board, concrete additives and firefighting foams, as coalescent for paints and coatings, or as polyurethane-based adhesives.

DETAILED DESCRIPTION OF THE INVENTION

In one aspect, the invention relates to fatty amines made from a metathesis-derived C_{10}-C_{17} monounsaturated acid, octadecene-1,18-dioic acid, or their ester derivatives.

The C_{10}-C_{17} monounsaturated acid, octadecene-1,18-dioic acid, or their ester derivatives used as a reactant is derived from metathesis of a natural oil. Traditionally, these materials, particularly the short-chain acids and derivatives (e.g., 9-decylenic acid