derivatives have not been made from the C_{18} unsaturated diesters that can be made readily by self-metathesis of a natural oil.

In sum, traditional sources of fatty acids and esters used for making fatty amides and their derivatives generally have predominantly (or exclusively) *cis*- isomers and lack relatively short-chain (e.g., C_{10} or C_{12}) unsaturated fatty portions. Metathesis chemistry provides an opportunity to generate precursors having shorter chains and mostly *trans*-isomers, which could impart improved performance when the precursors are converted to downstream compositions (e.g., in surfactants). New C_{18} difunctional fatty amides and derivatives are also potentially available from oil or C_{10} unsaturated acid or ester self-metathesis. In addition to an expanded variety of precursors, the unsaturation present in the precursors allows for further functionalization, e.g., by sulfonation or sulfitation.

SUMMARY ~~OF THE INVENTION~~

In one ~~aspect~~embodiment, the ~~invention~~present disclosure relates to fatty amide compositions. The amides comprise a reaction product of a metathesis-derived C_{10}-C_{17} monounsaturated acid, octadecene-1,18-dioic acid, or their ester derivatives with ammonia or a primary or secondary amine. The ~~invention~~present disclosure includes derivatives made by one or more of reducing, quaternizing, sulfonating, alkoxylating, sulfating, and sulfitating the fatty amide. In particular ~~aspects~~embodiments, the amine reactant is diethylenetriamine or (2-aminoethyl)-ethanolamine, which provide imidazoline amides or esters, respectively. In one ~~aspect~~embodiment, the ester derivative of the C_{10}-C_{17} monounsaturated acid or octadecene-1,18-dioic acid is a lower alkyl ester. In other ~~aspects~~embodiments, 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 amides 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 one aspect, there is provided a composition comprising:

(i) a fatty amide reaction product of a monounsaturated acid selected from the group consisting of 9-decenoic acid, 9-undecenoic acid, 9-dodecenoic acid, 9-tridecenoic acid, 9-tetradecenoic acid, 9-pentadecenoic acid, 9-hexadecenoic acid, 9-heptadecenoic acid, and octadecene-1,18-dioic acid, or its ester derivative with ammonia or a primary or secondary amine, wherein the primary or secondary amine has one or two hydrogens attached to the amino group and the remaining groups are C_1-C_{10} alkyl, C_2-C_4 hydroxyalkyl, or alkoxylated C_2-C_4 hydroxyalkyl;

(ii) an imidazoline amide or ester reaction product of diethylenetriamine, (2-aminoethyl)ethanolamine (AEEA), or alkoxylated AEEA with two equivalents of a monounsaturated acid selected from the group consisting of 9-decenoic acid, 9-undecenoic acid, 9-dodecenoic acid, 9-tridecenoic acid, 9-tetradecenoic acid, 9-pentadecenoic acid, 9-hexadecenoic acid, 9-heptadecenoic acid, and octadecene-1,18-dioic acid, or its ester derivative; or

(iii) a reduced, quaternized, sulfonated, alkoxylated, sulfated, and/or sulfitated derivative of the fatty amide (i) or the imidazoline amide or ester (ii);

wherein the monounsaturated acid or its ester derivative has terminal Δ^9 unsaturation or at least 1 mole % of *trans*-Δ^9 unsaturation.

In another aspect, there is provided an anionic emulsifier for agricultural compositions, a nonionic emulsifier for agricultural compositions, a dispersant for agricultural compositions, a water-soluble herbicide composition, or an agricultural solvent each comprising the composition as defined above.

In another aspect, there is provided an antimicrobial composition comprising the composition as defined above.

In another aspect, there is provided an aqueous hard-surface cleaner, an industrial hard-surface cleaner, a laundry detergent formulation, a shampoo or hair conditioner, or a personal cleanser or handsoap each comprising the composition as defined above.

In another aspect, there is provided a corrosion inhibitor or paraffin dispersant for use in oilfield applications comprising the composition as defined above.

In another aspect, there is provided a paint or coating additive composition comprising the composition as defined above.