Claims

1. Process for preparing methylmercaptopropionaldehyde from gaseous acrolein and methyl mercaptan, characterized in that, in one process step, simultaneously,

(a) gaseous acrolein is absorbed from a mixture at least comprising one compound from the group consisting of the hemithioacetal of methylmercaptopropionaldehyde, methylmercaptopropionaldehyde and methyl mercaptan,

(b) in this mixture, acrolein is reacted with methyl mercaptan and/or the hemithioacetal of methylmercaptopropionaldehyde in a liquid phase to give methylmercaptopropionaldehyde and

(c) impurities and by-products are removed from this mixture,

wherein the process step is performed in a reactive absorber and the methyl mercaptan used contains 1.5-5% by weight of dimethyl sulphide and 0-3% by weight of dimethyl ether.

~~2. Process according to Claim 1~~, characterized in that the mixture comprises the hemithioacetal of methylmercaptopropionaldehyde, formed by addition of methyl mercaptan onto methylmercaptopropionaldehyde ~~in a concentration between 0.1 and 10% by weight.~~

~~3. Process according to claim 2, characterized in that the mixture comprises the hemithioacetal of methylmercaptopropionaldehyde~~ in a concentration between 1 and 10% by weight.

~~4. Process according to at least one of Claims 1 to 3, characterized~~ and in that the impurities and by-products are removed from the mixture by stripping at 0.3 to 5 bara, ~~preferably at 1 to 2 bara,~~ and, at 5 to 70°C, ~~preferably at 5 to 20°C~~.

2. Process according to Claim 1, characterized in that the impurities and by-products are removed from the mixture by stripping at 1 to 2 bara, and at 5 to 20°C.

~~5~~3. Process according to at least one of Claims 1 to ~~4~~2, characterized in that the impurities removed comprise at least one compound from the group consisting of dimethyl sulphide, acetaldehyde, water, dimethyl disulphide, methanol, carbon dioxide, propane, propene, hydrogen sulphide and dimethyl ether.

6. Process according to at least one of Claims 1 to 5, characterized in that methyl mercaptan is supplied to the mixture continuously in liquid and/or gaseous form.

74. Process according to at least one of Claims 1 to 63, characterized in that the process step is performed in the presence of a homogeneous and/or heterogeneous catalyst.

85. Process according to Claim 74, characterized in that the catalyst is dimethylbenzylamine and/or triethanolamine.

96. Process according to at least one of Claims 74 and 85, characterized in that the concentration of the catalyst in the mixture is in the range from 50 to 500 ppmw, preferably in the range from 130 to 150 ppmw.

107. Process according to at least one of Claims 1 to 96, characterized in that the ratio between methyl mercaptan and acrolein in the mixture is adjusted to a value between 0.95 and 1.1 mol/mol, preferably between 1.00 and 1.01 mol/mol, more preferably between 1.004 and 1.009 mol/mol, and especially preferably to 1.005 mol/mol.

118. Process according to Claim 107, characterized in that the ratio between methyl mercaptan and acrolein in the mixture is adjusted with the aid of an inline near infrared (NIR) measurement.

129. Process according to at least one of Claims 1 to 118, characterized in that the input concentration of the gaseous acrolein in the mixture is detected with the aid of an inline Fourier transform infrared (FTIR) measurement in order to adjust the feed rate.

1310. Process according to at least one of Claims 1 to 129, characterized in that at least one compound from the group consisting of inorganic and organic acids, preferably acetic acid and tartaric acid, and inorganic and organic bases, preferably triethanolamine, is supplied continuously to the mixture.

1411. Process according to at least one of Claims 1 to 1310, characterized in that water is not removed additionally from the methylmercaptopropionaldehyde obtained.

1512. Process according to at least one of Claims 1 to 1411, characterized in that the methyl mercaptan is in the form of crude mercaptan comprising greater than 87% by weight methyl mercaptan, 0.2-1% by weight of dimethyl disulphide, greater than zero to 2% by weight of water, and greater than zero to 2% by weight of methanol.