# Application of Vegetable Oil-Based Monomers in the Synthesis of Acrylic Latexes via Emulsion Polymerization

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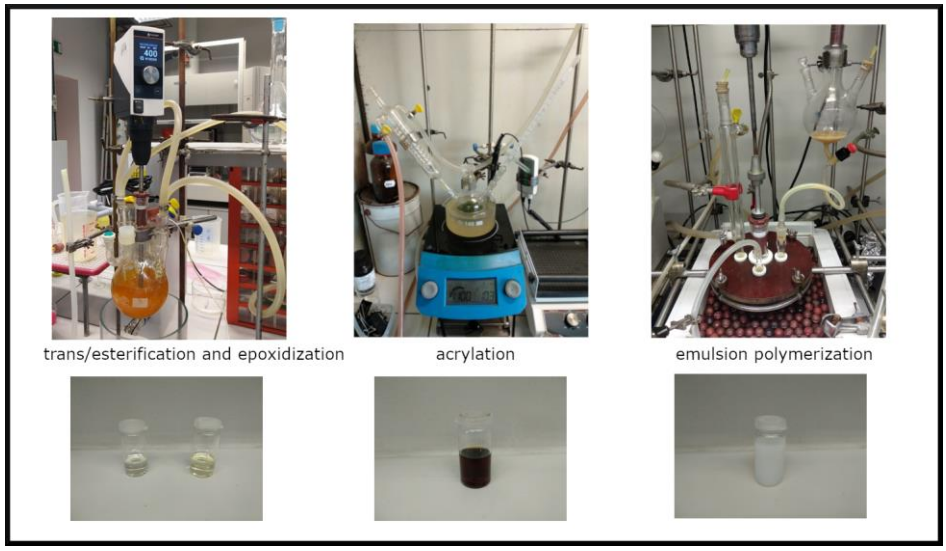


**Figure S1.** Illustration of the preparation process and appearance of bio-based intermediate products, bio-based acrylated monomers and resulting polymer latexes.

*Statistical Evaluation*

A complex statistical analysis of the properties of liquid latexes, latex copolymers, and final coatings was carried out (Figure S2). The principal component analysis and the components weight plot (CWP) were used to determine the relations between the dependent properties of liquid latexes, latex copolymers, and final coatings (Tables 4–6). The explanation of the CWP is as follows: (i) the variables close together have a positive correlation, (ii) the variables standing opposite have a negative correlation, and (iii) the right angle between the variables means no correlation. Only parameters that were significantly affected by the bio-based monomer content were statistically evaluated.

For the RO-based latexes and their coatings (Figure S2a)), the bio-based monomer content and the coagulum content were found to have a positive correlation. On the contrary, these variables were shown to have

a negative correlation with $T_g$, i.e., the increasing content of the incorporated AME_RO monomer increases the formation of coagulum during latex synthesis and decreases the $T_g$ of the copolymer. In addition, a positive correlation was found in the group of parameters that include WCA, ($\overline{M_w}$, and $\overline{M_w}/\overline{M_n}$. From this finding, it can be concluded that the hydrophobic effect (WCA enhancement) is more related to an increase in molar mass of copolymers than to the content of the incorporated AME_RO monomer. No significant correlation was demonstrated between $T_g$, molar mass, and WCA.

For the OA-based latexes and their coatings (Figure S2b)), positive correlations were found in the group of the following parameters: the bio-based monomer content, coagulum content, WCA, $\overline{M_w}$, and $\overline{M_w}/\overline{M_n}$. In this case, increased content of incorporated AME_OA was shown to be associated with: (i) a decrease in colloidal stability during latex synthesis, (ii) an increase in molar mass and dispersity of copolymers, (iii) an increase in coating wettability. A negative correlation was found between this group of properties and the $T_g$ of copolymers, which indicates that increasing the bio-based monomer content, molar mass, and dispersity contributes to $T_g$ decrease.

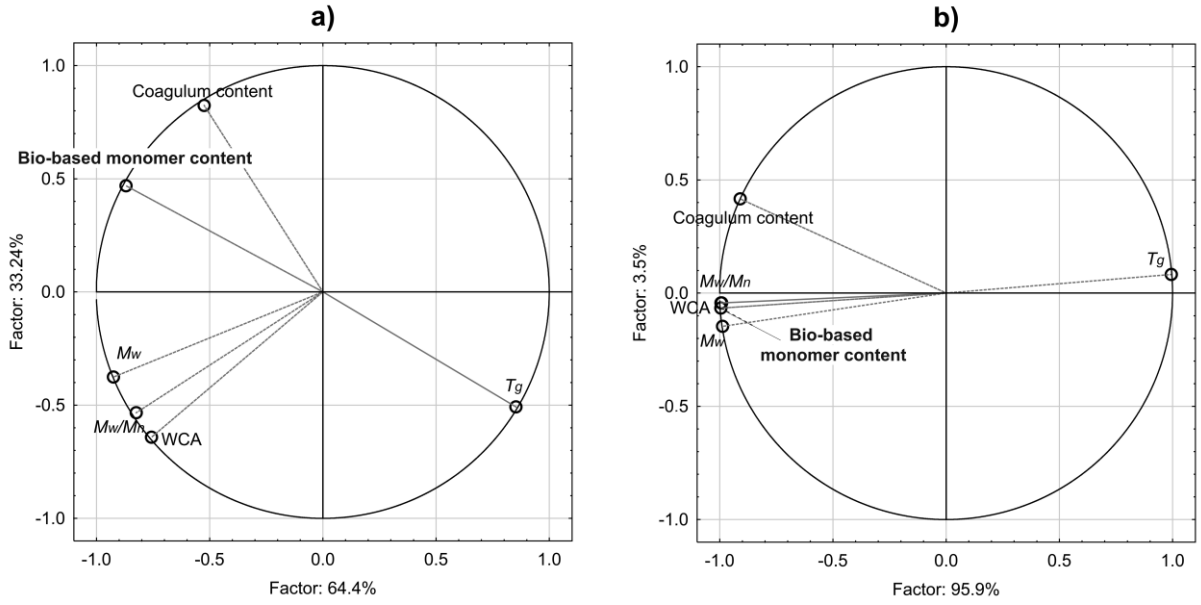


**Figure S2.** Component weight plot for the properties of liquid latexes, latex copolymers, and final coatings modified with AME_RO **(a)** and AME_OA **(b)**.