**Exploitation of protein-pectin-polyphenol interactions for stabilization of reduced-oil white bean aquafaba vegan mayonnaise**

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Aquafaba, a rich source of surface-active soluble proteins and saponins, has become an effective egg substitute in vegan mayonnaise formulations. However, reduced-oil versions of aquafaba mayonnaise often suffer from low emulsion stability and compromised textural/rheological properties. This study aimed to enhance the emulsion stability, rheological, and textural properties of reduced-oil vegan mayonnaise using a combination of citrus pectin (CP) and grape seed extract (GSE). The control reduced-oil mayonnaise (M60) demonstrated the lowest emulsion stability while mayonnaise with 1% (w/v) CP (M60-CP) showed moderate emulsion stability, and mayonnaise with 1% CP and 0.5% GSE (w/v) (M60-CP-GSE) showed the highest emulsion stability. Back extrusion tests revealed that M60-CP-GSE exhibited significantly higher firmness, consistency, and viscosity indexes than M60 and M60-CP. These findings proved the significant contribution of GSE in improved emulsion stability, and textural/rheological properties of aquafaba mayonnaise owing to its ability to interact with hydrocolloids. Zeta potential measurements also showed that the addition of CP increased electronegative charges of oil droplets suggesting roles of repulsive forces formed by pectin carboxyl groups in emulsion stability. Fluorescence microscopy images confirmed that the oil droplets in M60 were coalesced and prone to phase separation, while M60-CP and M60-CP-GSE showed more uniformly packed smaller oil droplets distributed within the mayonnaise matrix. Although the addition of GSE imparted a brownish-red hue to M60-CP-GSE, it provided a reduced-oil vegan mayonnaise with improved textural and rheological properties, emulsion stability, and antioxidant content. This work is one of the first examples of exploiting phenolic interactions to obtain functional emulsion-based vegan food.