

## Abstract

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**Project Code** : MRG5680044

**Project Title** : The effects of tapioca maltodextrin with different concentration and dextrose equivalent values on the formulation and characteristics of plasma expander

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### **Abstract:**

Volume replacement is a conventional treatment when blood loss from the body to maintain cellular oxygenation activities. Plasma expanders (PEs) are widely used in the volume replacement such as hydroxyethyl starch which is modified corn starch based PE. Maltodextrin from tapioca starch was selected as a study candidate due to its uncomplicated production process and its solubility at room temperature. The formulations of mixture between tapioca maltodextrin and 0.9% sodium chloride solution were prepared and characterized to investigate the effects of dextrose equivalent (DE) and concentration on the physicochemical properties. Viscosity, colloid osmotic pressure and pH of solutions were compared with clinical used PE (6% HES 130/0.4). Plasma viscosity after dilution blood with each formulation was measured. Storage stability of each formulation was also determined. Morphology of red blood cells (RBCs) was observed using microscopy techniques. The results showed that low DE value led to high retrogradation, turbidity and viscosity but low COP and poor solubility. In contrast, high DE value caused the opposite results relative to low DE values. There was a noticeable effect of DE value on RBCs shape changes. Among the prepared solutions, tapioca maltodextrin with DE6 at 10% w/v concentration had comparable properties with 6% HES 130/0.4. However, to use tapioca maltodextrin as a raw material for plasma expander, some properties have to be considered and optimized efficiently. Further studies on other modified tapioca starches are interesting in order to improve the improper properties of tapioca maltodextrin for plasma expander.

**Keywords:** plasma expander, tapioca maltodextrin, dextrose equivalent, colloid, viscosity