



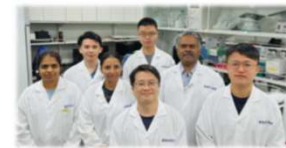
PHYSICOCHEMICAL AND SENSORY EVALUATION OF CHOCOLATES SUPPLEMENTED WITH MANNANPRO[®], A HIGH PURITY POLYSACCHARIDE DERIVED FROM ALOE VERA



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ABSTRACT

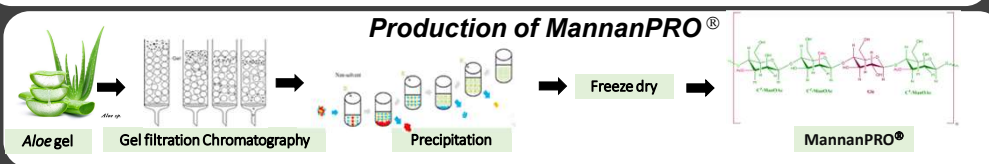
Acemannan is a polysaccharide isolated from Aloe vera, well known for its immunomodulatory, antiviral, antitumor features, and tissue regeneration effects. Two bean-to-bar chocolates with supplementation of 1 % and 5 % MannanPRO[®], a high-purity acemannan isolated using a proprietary fractionation technology, were prepared.

The physical and chemical analyses of these chocolates, demonstrated an increase in viscosity with 1% and 5% supplementation of MannanPRO[®], respectively. The addition of MannanPRO[®] also enhanced the antioxidant activity of the chocolates. No significant changes were observed in the determination of volatile compounds' with the addition of MannanPRO[®]. Aroma and mouthfeel were observed to be excellent, chocolates with 5% MannanPRO[®] offered a strong flavor and taste. Further studies on developing functional chocolates with MannanPRO[®] are underway.

INTRODUCTION

Cocoa seeds of Theobroma cacao tree contain a variety of natural compounds, with polyphenols being the most abundant among them. Cocoa has been associated with a wide range of biological benefits, including its potential antioxidant, antiproliferative, antiapoptotic, anti-inflammatory and anti-cancer properties. Furthermore, cocoa has been investigated in different health conditions, including heart diseases, dyspepsia, nervous system diseases, circulation problems, etc.

Acemannan, β -(1-4)-acetylated polymannose, is a major polysaccharide extracted from aloe vera. Acemannan functions as an immunomodulator and regenerative biomaterial. With unique acetylated mannose molecules, this polysaccharide induces growth factors and synthesis of extracellular matrix, and mineral deposition.



OBJECTIVES

The goal was to characterize the physical and chemical properties of chocolate supplemented with 1 % and 5 % MannanPro[®]. Since chocolate itself is considered as a superfood, we wanted to examine if the addition of high-purity acemannan could support or potentially augment its well known sensory properties and health benefits.

METHODOLOGY

The viscosity, particle size, antioxidant activity, sensory perception, presence of any volatile substances and infrared spectroscopy analyses were performed. The cocoa beans used were 100% Criollo obtained from the Tolima region of Colombia. Acemannan used for these analyzes was provided by Dazzeon Health Sciences, Taiwan. The chocolate stone melangeur was used for preparing of the samples, tempering was carried out manually, following the chocolate tempering curves.



RESULTS

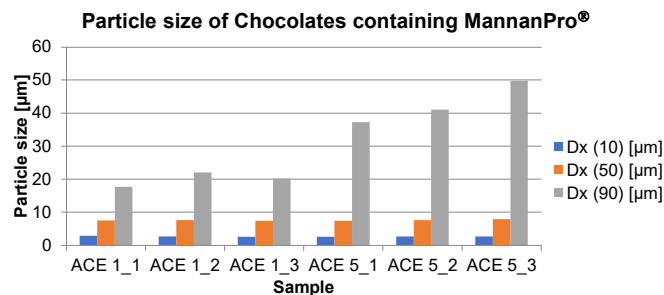
- > **SENSORY EVALUATION** showed that the chocolate with 5 % MannanPRO[®] was preferred by 89 % of the evaluators. The acidic and fruity taste of the final chocolate was particularly well-received. The balance of sweetness was also highly rated.
- > Aroma was better rated for ACE 1 chocolate. This difference in aroma perception is attributed to ACE 5 having a stronger and more pronounced flavour, which had a significant impact on the taste and olfactory experience.
- > Generally – rich aroma, followed by a sweet red-black berry, coffee and tobacco leaf flavor note. In addition, the richness and bitterness of the samples were well balanced.

Samples	η [Pa.s]	Average η [Pa.s]
ACE 1_1	7.61	7.32
ACE 1_2	6.70	
ACE 1_3	7.64	
ACE 5_1	9.79	10.86
ACE 5_2	13.41	
ACE 5_3	9.38	

The **VISCOSITY** of chocolates with 1 % of MannanPro[®] was approximately 0.67 times lower than that of the samples containing 5% MannanPro[®].



The results of **PARTICLE SIZE** showed that in the case of chocolate containing 1% MannanPRO[®], these large particles measured around 20 μm , while in the chocolate with 5% MannanPRO[®] the maximum size of the particles measured were around 50 μm



- > The measurements indicated that the **ANTIOXIDANT ACTIVITY** increased when 5 % of MannanPRO[®] was added. This finding is noteworthy because chocolate typically possesses a naturally high level of antioxidant activity, and when additional ingredients are introduced, it usually experiences a decline in this property.

Following the quantification of **VOLATILE COMPOUNDS**, the most dominant substance in both chocolates was found to be acetic acid. A significant differences was also observed in the butanediol content, which was comparatively higher in ACE 5. It's worth noting that while the chocolates had slightly different smell, their mass spectrometry results were observed to be the same among all tested concentrations of MannanPRO[®]. This variation in aroma could be attributed to the presence of different isomers (R/S) of certain compounds.

CONCLUSION

The incorporation of MannanPRO[®] a high purity acemannan into new functional chocolates presents a promising avenue for enhancing their health benefits. Chocolate with MannanPRO[®] exhibited positive impacts on health, such as enhanced antioxidant activity. The addition of acemannan or varying molecular weight, could offer exciting opportunities to further augment these sensory and health-promoting properties. The combination of chocolate's inherent properties and acemannan's potential health benefits may result in a novel and synergistic way to support overall well-being. Further research and clinical studies warrant to fully explore and validate the potential health benefits of acemannan-infused chocolates, while the preliminary findings suggest a promising opportunity for this innovative fusion of taste and health.

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