

Encapsulation and delivery of bioactives using cereal based polysaccharides

Adil Gani ^{1*}, Mudasir Ahmad ¹, Asir Gani ²

¹ Department of Food Science and Technology, University of Kashmir, Srinagar-190006, India.

² Department of Food Technology, Faculty of Agro-Industry, Prince of Songkla University, Hat Yai, Songkhla, 90112, Thailand. *Correspondence email: adil.gani@gmail.com

Abstract: Bioactive compounds are playing important role in health related problems, however there are some major limitations for their application in food Industry, like they are chemically unstable, susceptible to oxidative degradation, low bioavailability, less permeability and degradation or fast release during human digestion. The cereal based polysaccharides such as, β -glucan and starch can be used to create a diverse range of systems enabling encapsulation, protection, and delivery of functional components, such as probiotics, antioxidants, other nutraceuticals and metal oxides. In our studies on encapsulation of folic acid, catechin, caffeine, probiotics, anthocyanins and others using biopolymers like starch, resistant starch and β -glucan from various sources, the targeted and slow release of compounds were achieved. The study on nano encapsulation of catechin showed the bioactive properties were retained at higher level in encapsulated catechin compared to free catechin upon in-vitro digestion. Encapsulation of caffeine in different polysaccharide materials (β -glucan, resistant starch, and β -cyclodextrin) showed maximum decline in the release of caffeine followed by resistant starch and β -cyclodextrin under mimicked stomach conditions whereas RS provided more slow release in intestinal conditions. The study on probiotic encapsulation in resistant starch and β -glucan microspheres showed better survival ability than that of free cells in simulated gastrointestinal conditions. The higher content of bioactives or viable cell numbers in the intestinal conditions revealed the protection of core material from adverse conditions of stomach by encapsulation. The research suggests the fortification of such functional micro or nanoencapsules in various food systems to fight with various diseases.

Key words: Encapsulation; Starch; Glucan; Probiotics; Bioactive compounds