Interest in the delivery of probiotics to a range of functional food and beverage application continues to grow because of the increasing scientific evidence of its health benefits. Fruit juice is of interest as delivery vehicle for probiotics due to its healthy image and fruity taste. However, it is a challenge to maintain probiotic viability in fruit juice because of the detrimental effect of low pH environment. This study investigates the survival of probiotics, *Lactobacillus rhamnosus* GG (LGG), encapsulated within a spray-dried matrices containing whey protein isolate (WPI), resistant starch (RS) or a combination of WPI and RS, in apple juice and in citric acid buffer (pH 3.6), during 5 weeks storage at refrigerated (4°C) and non-refrigerated (25°C) conditions. Probiotic survival was measured using plating method and microcapsule integrity was examined using confocal laser scanning microscopy. At 4°C storage, LGG survival in apple juice was maintained over the 5 week period for the microcapsules with WPI alone or WPI:RS (4:1) as the encapsulating matrix. At 25°C storage, a 2 log unit increase of LGG viability was observed for all the microcapsules containing WPI (either alone or in combination with RS) during the first 2 weeks, and the viability was maintained over the 5 weeks storage period. LGG viability of microcapsules in the matrix containing RS alone was lost in the first week at both storage temperatures. Our results has demonstrated that spray-dried LGG in WPI based encapsulant matrices have enhanced protection in fruit juice. The protective effect of the encapsulating matrix was attributed to the pH buffering and gelling capacity of WPI.