Singh, M. K.; Jayaraman, N., 2009, "Carbohydrate liquid crystals", *J. Indian Inst. Sci*., *89*, 113 – 135.

Ever since the first report of the double melting behavior of alkyl glycosides nearly a century ago, sustained investigations of the LC properties of alkyl glycosides and glycolipids have uncovered many finer details, in relation to their constitutions and configurations. The studies on the LC properties of glycolipids assume even greater significance, as a result of the importance of the glycolipids in many biological functions and cell-membrane functions. Most alkyl glycosides and glycolipids are neutral and non-ionic. Whereas the thermal behavior of the glycolipids have been studied largely, leading to the identification of the varying phases, depending on the constitutions and configurations of the sugar moiety, studies on the lyotropic properties lags behind. Studies on the lyotropic phase bear significance, as a result of the direct relevance to the functions of the cell-membrane systems. The transformation of the chirality present in the sugars to the chiral mesophases has been difficult, due to overwhelming control of the molecular organization through hydrogen-bonding. However, recent studies show that efforts to off-set the hydrogen bonding can permit the formation of chiral mesophases from alkyl glycosides and glycolipids. It is also seen that off-set of the hydrogen bonding through reduction in the hydrogen bonding sites alone is not sufficient, rather, additional interactions, such as aromatic stacking interactions, are beneficial in order to bring-out the chiral mesophases in alkyl glycosides and glycolipids. Having a detailed knowledge on the LC properties, it is worthwhile to encompass the LC phases of glycolipids, having more than a monosaccharide unit and one or two alkyl groups. Amphiphilic glycolipids are emerging prominent, for example, in drug delivery systems. Thus, studies of the inherent properties of the glycolipids will not only have fundamental importance in the area of liquid crystals, but also, in the emerging technologies that rely on the self-assembly and self-organization processes.