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Terpene Glycosides

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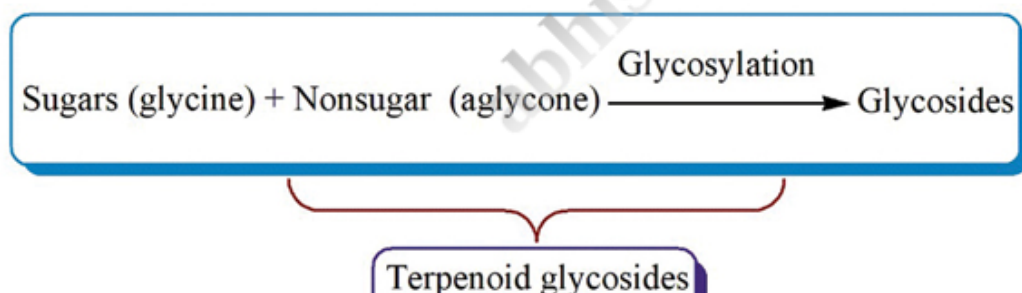
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7.1 Introduction

Glycosides are defined as compounds in which one or more sugars (glycine) are combined with nonsugar molecules (aglycone) through glycosidic linkage [1]. Depending on whether the glycosidic bond lies above or below the plane of the cyclic molecule of sugar, glycosides are classified as β -glycosides or α -glycosides. If the glycone group of any glycoside is glucose then the molecule is called as glucoside. Glycosides can also be classified according to the chemical nature of the aglycone part. For example Steviol glycosides or Stevioside in which steviol is the aglycone part. The process by which glycosides are formed is called glycosylation. Terpene glycosides are terpenoids in which one or more hydroxy functions are glycosylated [2]. Terpene glycosides are present in a variety of plant sources. Several classes of terpenes are glycosylated by which their physicochemical properties and biological activities are affected (Figure 7.1) [3]. As terpene glycosides exhibit promising physiological effects, these are isolated in large numbers and their structures are elucidated by analytical data of FT-IR, ¹H-NMR, ¹³C-NMR, 2D-NMR, LC-MS spectra, circular dichroism (CD) spectra and X-ray analysis. Glycosylated terpenoids are broadly distributed in plant sources and comprise diverse structures due to the combination of aglycones and glycones (carbohydrates) [4,5].



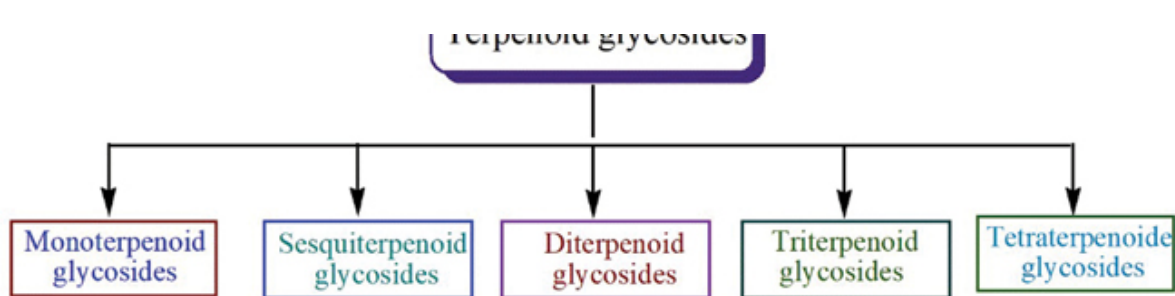


FIGURE 7.1 Types of terpene glycosides.

These are naturally occurring organic compounds with water solubility property. These are non-toxic, odorless and used as complexing agent, solubilizing agent or excipients in food and pharmaceutical industry [6]. Monoterpene glycosides have attracted much attention because these are water soluble, stable at storage condition and odorless pro-aroma molecules which can break down into the desired aroma compounds under controlled conditions [7]. Similarly, steviol glycosides are the diterpene glycosides isolated from the leaves of the stevia plant (*Stevia rebaudiana* Bertoni). These glycosides are the sweeteners and their sweetness range from 40 to 450 times sweeter than sucrose whereas the sweetness intensity and quality mainly depend on the glycosylation pattern of the diterpene aglycone [8]. Whereas the triterpene glycosides such as ginsenosides and oleanolic acid have attracted much attention because they exhibit several biological activities such as anti-viral, anti-inflammatory and neuroprotective effects [9].

7.2 Synthesis of Glycosides

Glycosides are synthesized chemically by different methods that are based on the activation of a leaving group present in the anomeric carbon center. Among these procedures, the classical Koenigs–Knorr reaction has some limitations such as