

Commercially available hydrogels

The wound management industry has experienced a period of incredible development in the last five decades, continuously designing more advanced technologies and products (Schreml et al. 2010). Since Winter (1962) established that a moist environment effectively helps and accelerates wound healing, moist wound dressings, such as hydrogels, started gaining popularity over gauze and dry materials (Jones 2005; Jones and Vaughan 2005; Jones et al. 2006). Whilst bearing in mind that the ‘perfect’ dressing for every type of wound and every stage of healing would be very difficult to create, efforts have been made to manufacture new products with specific features (such as particular designs for an easier application or active ingredients added) and keeping the final prices as low as possible (Jones et al. 2006; Leaper 2006). We will mention a few in order to give the reader an idea of the range of hydrogel-based products for wound care now available on the market.

Granugel® (ConvaTec) is an amorphous clear hydrogel containing pectin, carboxymethyl cellulose and propylene glycol. It is indicated for the management of partial and full-thickness wound (such as leg and pressure ulcers) (Williams 1996). Intrasite® Gel (Smith and Nephew) is made from modified carboxymethyl cellulose and propylene glycol and it is used for surgical wounds, venous ulcers, diabetic foot and pressure ulcers. It is relatively simple to apply thanks to an applicator (Applipak system) and is available in different sizes (Williams 1994; Vernon 2000; Eaglstein 2001). Purilon® Gel (Coloplast) also has an applicator, and it is composed of sodium carboxymethyl cellulose, calcium alginate and water. It is usually used in conjunction with a secondary dressing, on dry and necrotic wounds (Caló and Khutoryanskiy 2015). Aquaform™ (Aspen Medical), more specifically its newer version, contains glycerol, starch copolymer, methylparaben and imidazolidyl urea (as preservatives) and purified water. It can be used on flat and cavity wounds with low or no exudate (Timmons et al. 2008). Aquaflo® (Covidien) is a flat hydrogel dressing and is produced from polyethylene glycol and propylene glycol. It has a unique disc shape and is transparent to aid monitoring of the wound. First Water Ltd., which was recently acquired by Scapa Group plc, manufactures Woundtab®, a flat hydrogel containing carboxymethylcellulose, sulphonated copolymer, glycerol and water indicated for chronic wounds (Caló and Khutoryanskiy 2015). Another well-known hydrogel composition is a Kikgel™ developed by Rosiak et al., which is made from the combination of a natural polymer (such as agar) and a synthetic one (such as polyvinyl pyrrolidone) crosslinked by gamma radiation (Rosiak 1995; Dabbagh et al. 2010), this dressing is intended for chronic ulcers and burns. Nu-Gel® (Systagenix) is a hydrogel dressing made of polyvinyl pyrrolidone and water, indicated for dry, partial and full-thickness wounds (Ovington 2007; Eaglstein 2001).

Hydrogel wound care products now often contain active ingredients such as antimicrobial agents in order to prevent bacteria colonization of the wound and infections that would delay healing (Leaper 2006). For instance, colloidal or ionic silver has been proposed in several wound care products as an efficient antimicrobial to be used against pathogens such as *Pseudomonas aeruginosa* and *Staphylococcus aureus* (Foster 1996; Seth et al. 2012). Silvasorb® (Medline) is a polyacrylate gel produced using the MicroLattice™ technology, containing ionic silver. It is suitable for chronic