NATURAL HEALTH PRODUCT

HYDROLYZED COLLAGEN

This monograph is intended to serve as a guide to industry for the preparation of Product Licence Applications and labels for natural health product market authorization. It is not intended to be a comprehensive review of the medicinal ingredient.

Notes
- For the purpose of this monograph, hydrolyzed collagen has no jelling power and is soluble in cold water (Schriebre and Gareis 2007; Moskowitz 2000). The average molecular weight of hydrolyzed collagen is approximately 2-6 kDa (Moskowitz 2000; Oesser et al. 1999).
- Text in parentheses is additional optional information which can be included on the PLA and product label at the applicant’s discretion.
- The solidus (/) indicates that the terms and/or the statements are synonymous. Either term or statement may be selected by the applicant.

Date
June 12, 2013

Proper name(s)
Hydrolyzed collagen (ChemID 2012; ICIDH 2008)

Common name(s)
- Hydrolyzed collagen (ChemID 2012; ICIDH 2008)
- Collagen hydrosylate (ChemID 2012; ICIDH 2008; Moskowitz 2000)

Source material(s)
- Porcine skin (FCC 7; Baziwane and He 2003)
- Porcine bones (FCC 7; Baziwane and He 2003)
- Fish skin (FCC 7; Baziwane and He 2003)
- Fish bones (FCC 7; Baziwane and He 2003)
- Bovine skin/hide split (FCC 7; Schriebre and Gareis 2007; Baziwane and He 2003)
- Gallus gallus (chicken) cartilage (Schauss et al 2012)

Route(s) of administration
Oral
Dosage form(s)

- The acceptable pharmaceutical dosage forms include, but are not limited to capsules, chewables (e.g. gummies, tablets), liquids, powders, strips or tablets.
- This monograph is not intended to include foods or food-like dosage forms such as bars, chewing gums or beverages.

Use(s) or Purpose(s) Statement(s) to the effect of

- Source of the essential amino acids histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, valine for the maintenance of good health and involved in protein synthesis (CNF 2010; Eastoe 1955).
- Source of the non-essential amino acids alanine, arginine, aspartic acid, glutamic acid, glycine, proline, serine, tyrosine involved in protein synthesis (CNF 2010; Eastoe 1955).
- Source of the essential amino acid lysine to help in collagen formation (derMarderosian and Beutler 2011; Baziwane and He 2003; Garrison and Somer 1995; Jansen 1962).
- Helps to reduce joint pain associated with osteoarthritis (Bruyère et al. 2012; Benito-Ruiz et al. 2009; Clark et al. 2008).

Dose(s) Quantity(ies)

Source of the essential amino acids histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, valine

Minimum 5%\(^1\) of each specific amino acid Recommended Dietary Allowance\(^2\) to a maximum of 10 g hydrolyzed collagen, per day (JC 2012; Benito-Ruiz et al. 2009; IOM 2005; Moskowitz 2000).

Source of the non-essential amino acid(s) (alanine, arginine, aspartic acid, glutamic acid, glycine, proline, serine, tyrosine)

Minimum 5%\(^1\) of each specific amino acid Mean Intake\(^3\) to a maximum of 10 g hydrolyzed collagen, per day (JC 2012; Benito-Ruiz et al. 2009; IOM 2005; Moskowitz 2000).

Source of lysine

Minimum 5%\(^1\) of the Recommended Dietary Allowance\(^2\) to a maximum of 10 g hydrolyzed collagen, per day (derMarderosian and Beutler 2011; IOM 2005; Flodin 1997).

Joint pain
1.2 – 10 g hydrolyzed collagen, per day (Bruyère et al. 2012; Benito-Ruiz et al. 2009; Clark et al. 2008).

1 The rationale used to support a minimum dose of 5% of the RDA or MI is based on the Food and Drug Regulations for making a health claim on food containing vitamins and minerals (JC 2012).

2 See Appendix 1 for the Recommended Dietary Allowance (RDA).

3 See Appendix 1 for the Mean Intake (MI).

Refer to Appendix 2 for examples of dosage preparations. The purpose of Appendix 2 is to provide guidance to industry.

**Duration(s) of use**

*Joint pain*

Use for a minimum of 5 months to see beneficial effects (Bruyère et al. 2012; Benito-Ruiz et al. 2009; Clark et al. 2008).

**Risk information**

Statement(s) to the effect of

**Caution(s) and warning(s)**

*Doses above 2.8 g hydrolyzed collagen, per day*

- If you are pregnant or breastfeeding, consult a health care practitioner prior to use.
- If you have liver or kidney disease or if you have been instructed to follow a low protein diet, consult a health care practitioner prior to use (Shils et al. 2006; Goldman and Ausiello 2004).

**Contraindication(s)**

No statement required.

**Known adverse reaction(s)**

May cause mild gastrointestinal disturbances (Moskowitz 2000).

**Non-medicinal ingredients**

Must be chosen from the current NHPD *Natural Health Products Ingredients Database* (NHPID) and must meet the limitations outlined in the database.

**Storage conditions**
Protect from heat and moisture (Ph.Eur. 2012).

**Specifications**

- The finished product specifications must be established in accordance with the requirements described in the NHPD *Quality of Natural Health Products Guide*.
- The medicinal ingredient must comply with the requirements outlined in the *Natural Health Products Ingredients Database* (NHPID). In addition, the medicinal ingredient may comply with the specifications outlined in the Gelatin Monograph published in the British, European, or United States Pharmacopoeias.

**References cited**


References reviewed


Li F, Jia Dongying, Yao K. Amino acid composition and functional properties of collagen polypeptide from Yak (Bos grunniens) bone. Food Science and Technology 2009;42:945-949.


Appendix 1  Minimum doses for Amino Acids present in Hydrolyzed Collagen

Table 1  Recommended Daily Allowance (RDA) and minimum doses\(^1\) for essential amino acids present in hydrolyzed collagen

<table>
<thead>
<tr>
<th>Essential Amino Acids</th>
<th>RDA(^2) (mg/kg/d)</th>
<th>Minimum doses (mg/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histidine</td>
<td>14</td>
<td>49</td>
</tr>
<tr>
<td>Isoleucine</td>
<td>19</td>
<td>66.5</td>
</tr>
<tr>
<td>Leucine</td>
<td>42</td>
<td>147</td>
</tr>
<tr>
<td>Lysine</td>
<td>38</td>
<td>133</td>
</tr>
<tr>
<td>Methionine</td>
<td>19</td>
<td>66.5</td>
</tr>
<tr>
<td>Phenylalanine</td>
<td>33</td>
<td>115.5</td>
</tr>
<tr>
<td>Threonine</td>
<td>20</td>
<td>70</td>
</tr>
<tr>
<td>Valine</td>
<td>24</td>
<td>84</td>
</tr>
</tbody>
</table>

\(^1\) Minimum doses have been calculated as 5% of the RDA with a reference weight of 70kg.
\(^2\) IOM 2005

Table 2  Mean Intake and minimum doses\(^1\) for non-essential amino acids present in hydrolyzed collagen

<table>
<thead>
<tr>
<th>Non-Essential Amino Acids</th>
<th>Mean Intake(^2) (g/d)</th>
<th>Minimum doses (mg/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alanine</td>
<td>3.63</td>
<td>181.5</td>
</tr>
<tr>
<td>Arginine</td>
<td>4.17</td>
<td>208.5</td>
</tr>
<tr>
<td>Aspartic acid</td>
<td>6.52</td>
<td>325</td>
</tr>
<tr>
<td>Glutamic acid</td>
<td>15.22</td>
<td>750</td>
</tr>
<tr>
<td>Glycine</td>
<td>3.2</td>
<td>160</td>
</tr>
<tr>
<td>Proline</td>
<td>5.19</td>
<td>259.5</td>
</tr>
<tr>
<td>Serine</td>
<td>3.51</td>
<td>175.5</td>
</tr>
<tr>
<td>Tyrosine</td>
<td>2.78</td>
<td>139</td>
</tr>
</tbody>
</table>

\(^1\) Minimum doses have been calculated as 5% of the Mean Intake.
\(^2\) IOM 2005

Appendix 2  Examples of dosage preparations and duration of use for Hydrolyzed Collagen

- 10 g hydrolyzed collagen, per day, for two months (Adam 1991)
- 10 g collagen hydrolysate, per day, for 24 weeks (Moskowitz 2000)
- 10 g hydrolyzed collagen, per day, for 6 months (Benito-Ruiz et al. 2009)