DHA and EPA purification and production by preparative HPLC

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About EPA&DHA

❖ For pharmaceutical applications are made from fish oil

❖ Products: Omacor®/Lovaza™/Epanova®

Eicosapentaenoic acid (EPA): C20:5

Docosahexaenoic acid (DHA): C22:6
Sequential purification of fatty acid stream:

Raw material (EPA 37.25%, DHA 38.15%)

The first step purification

95% EPA

95% DHA

The purity also can reach above 99% with a second step purification

The second step purification

Preparative column

99% EPA
The analytical result of raw material

Mobile phase: methanol/water=88:12(v/v)
Flow rate: 1mL/min; Sample loading: 5μL
Wavelength: 210nm

EPA 37.25%
DHA 38.15%
Application Case ----- EPA&DHA

The first step purification

100mm DAC column
Sample loading: 76g
Application Case ----EPA&DHA

The second step purification

100mm DAC column
Sample loading: all of the EPA from first step

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The final analytical result of EPA

HPLC method
Column: C18 5um 4.6*250mm
Mobile phase: methanol/water=88:12(v/v)
Flow rate: 1mL/min;
Sample loading: 5μL
Wavelength: 210nm

GC method
Column: DB-WAX(l:30m, Diam.:0.53mm, Film:1.00μm)
Gas: He
Detector temperature: 270°C
Injection temperature: 250°C
Column temperature:
a) 0~2 min: 170°C ;
b) 2~30 min: 170°C => 240°C (10°C/min) ;
Sample loading: 2μL
Detector: FID
The final analytical result of DHA

**HPLC method**
Column: C18 5um 4.6*250mm  
Mobile phase: methanol/water=88:12(v/v)  
Flow rate: 1mL/min;  
Sample loading: 5μL  
Wavelength: 210nm

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Sample loading: 2μL  
Detector: FID

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The estimated product yield by linear scale up

<table>
<thead>
<tr>
<th></th>
<th>Sample loading for one injection</th>
<th>Product yield/day</th>
<th>Product yield/month</th>
<th>Product yield/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAC300</td>
<td>0.684kg</td>
<td>EPA 4.05kg</td>
<td>EPA 121.5kg</td>
<td>EPA 1215kg</td>
</tr>
<tr>
<td></td>
<td>EPA 0.25kg</td>
<td>DHA 4.68 kg</td>
<td>DHA 140.4kg</td>
<td>DHA1404kg</td>
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<tr>
<td></td>
<td>DHA 0.26kg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAC500</td>
<td>1.9kg</td>
<td>EPA 11.50kg</td>
<td>EPA 345.1kg</td>
<td>EPA 3451kg</td>
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<tr>
<td></td>
<td>EPA 0.71kg</td>
<td>DHA 12.96kg</td>
<td>DHA 388.8kg</td>
<td>DHA3888kg</td>
</tr>
<tr>
<td></td>
<td>DHA 0.72kg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAC800</td>
<td>4.864kg</td>
<td>EPA 29.16kg</td>
<td>EPA 874.8kg</td>
<td>EPA 8748kg</td>
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<tr>
<td></td>
<td>EPA 1.8kg</td>
<td>DHA 33.48kg</td>
<td>DHA1004kg</td>
<td>DHA10040kg</td>
</tr>
<tr>
<td></td>
<td>DHA 1.86 kg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAC1000</td>
<td>7.6kg</td>
<td>EPA 45.36kg</td>
<td>EPA 1361kg</td>
<td>EPA 13610kg</td>
</tr>
<tr>
<td></td>
<td>EPA 2.8kg</td>
<td>DHA 52.19kg</td>
<td>DHA 1565.7kg</td>
<td>DHA15657kg</td>
</tr>
<tr>
<td></td>
<td>DHA 2.9kg</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: 1. DAC300, DAC500, DAC600, DAC800, DAC1000, these number means the column inner diameter.
2. The recovery for step one and step two is deemed to 90%.
3. The running time for a day is deemed to 20h, for a month is deemed to 30 day, for a year is deemed to 10 month.

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Thank You!