Price + Toxicity

This is my research notes and references for the two sections of the supplement comparison diagram

1. Price

Took a selection of each from amazon (price in US). Not an extensive list just the first ones that came up. Tried to use supplements that only contained iron but not always possible. Compared mg of elemental iron, not mg of supplement.

1.1. Ferrous sulfate

Amazon prices 5/2/15
Nature made 65mg - 2c each
United Research Labs 65mg 100tablets – 6c each
Best Naturals , Iron 65 mg -3c each
21st Century Iron 65 Mg Ferrous Sulfate- 4c
Sundown Naturals Iron Ferrous Sulfate 65 Mg – 5c
Nature’s Blend Ferrous Sulfate 65mg – 9c
Spring Valley - Iron 65 mg – 8c

Average 5.3c/65mg= 4c/50mg elemental iron

1.2. Ferrous gluconate

Amazon prices 5/2/15
Fergon High Potency Iron Supplement Tabs 27 mg - 12c each
Iron Max, 28mg by Dr Clark Store - 9c each
Natures blend Ferrous Gluconate 36mg - 9c each
Mason Vitamins Iron Ferrous Gluconate 240Mg (27mg iron) Tablets, pack of 3 x100 Count Bottle - 4c each
Nature’s Bounty Iron 28 Mg. Ferrous Gluconate – on offer for $1, not including
Padlock laboratories FERROUS GLUCONATE 324MG (38 mg iron) – 9c

Price per 50mg =22, 16, 12, 7, 12 =avg 14c

Gluconate iron with heaps of other stuff. Lots more expensive, not including
Flora Floradix Iron Tablets, 80 Count 10mg - 25c each
Floradix Liquid Iron formula 250ml 10mg/10ml - 56c each
Gaia Herbs Liquid Herbal Iron Bottle 10mg per serving - 67c each

1.3. Ferrous fumarate

Amazon prices 30/1/15
Ferretts Tablets Iron Supplement (325 mg Ferrous Fumarate) 106mg - 25c each
Ferro-Sequels High Potency Iron Supplement caplets (160mg Ferrous Fumarate = 50mg elemental) - 17c each
Freedea Ferrous Fumarate Iron 29 mg. - 250 TAB - 4c each
Swanson Premium Iron (Ferrous Fumarate) 18 mg 60 Caps - 12c each
Twinlab Iron 18 mg Caps, 100 - 3c each

price per 50mg = 12, 17, 7, 33, 8 = avg 13.8c

1.4. Ferrous bisglycinate

amazon prices 27/1/15
Solgar Gentle Iron 25 MG - 8.4c each
Thorne Iron Bisglycinate 25mg - 19c each
Now Foods iron 18mg (Ferrochel®) - 6.8c
Country Life Easy Iron, 25 mg - (ferrochel) - 10.4c
Optimal Iron Plus Cofactors | Iron (as ferrous bisglycinate chelate*) 29 mg - 17.7c
Designs for Health Ferrochel Iron Chelate 27 mg - 13c
Albion Chelated Iron 27mg by Bluebonnet (Ferrochel) -11c
Nature's Bounty Gentle Iron, 28mg - 9c each

Price per 50mg –17, 38, 19, 20, 30, 24, 20, 16 = 23c

Iron as an amino acid chelate/complex. I presume they mean FeBC. Not including
WELLESSE Liquid Mineral Supplement. 18mg (liquid)
Deva Nutrition Deva Vegan Chelated Iron 29 Mg (iron also called Cyanocobalamin)
Natures Plus - Hema-Plex, 30 tablets 85mg

1.5. Ferritin

Amazon price 5/2/15
Ferritin Bioavailable Iron 5 mg 60 Caps by Ecological Formulas (18c each). Isolated from bovine spleen. Lacking competition here, one supplier with an unhelpful website
http://www.ecologicalformulas.net/

Price for 50mg = $1.80

1.6. IPS

Amazon prices 5/2/14
Ferretts IPS Liquid Iron Supplement 40mg per 15ml ($22/237ml) so 50mg = 18.75ml = $1.74
Life Extension Iron Protein Plus 15mg. (Uses ironaid IPS) (18c)=60c/50mg
Ultimate Iron Pro by New Spirit Naturals. No info on their site on how much iron. (50c) not including
Jarrow Formulas Ironsorb 18mg, 60 Capsules (14.6c)=40.5c/50mg
$1.74

Notes and references document for supplement comparison toxicity and price.
www.medium.com/@learngirl
Price for 50mg = $1.74, 60c, 40.5c = 92c

1.7. PIC

Amazon prices 4/1/2015
Not a big selection on amazon. PIC does come in both ferrous and ferric forms. I think these are all ferric but only saw it mentioned for feramax and ferrex.
Feramax 150mg - 84c each (28c/50mg)
Ferrex 150 - 150mg - 15c each (5c/50mg)
NovaFerrum 50mg - 33c each (Also has a couple of liquid iron products)
Cypress Pharmaceutical, Poly Iron Capsules 150 mg (polysaccharide) - 16c each (5c/50mg)

Niferex is another mentioned a lot in studies but not on amazon, I think it’s prescription.

PIC mixed with other iron. Not used.
Tandem by Tandem Iron 106mg in both PIC and fumarate
Feosol Complete Iron with Bifera. (22mg PIC and 6mg HIP as proferrin)

Price for 50 mg - 28, 5, 33, 5 = 18c

1.8. Carbonyl

Amazon listings 13/11/14
Sundown Naturals Perfect Iron 50mg – 9c each
Bariatric Advantage Chewable (Have a few different favours. Comes in different strengths like 18mg-60mg. Think they all have vitamin C) (about 0.25c each)
NAT B CHEWABLE IRON CW 30MG (13c) = (21c/50mg)
Genestra - Seroyal Iron 90 Vegetable Capsules 40mg (13c) = 16c/50mg
Vitron C High Potency Iron Supplement with Vitamin C 65mg (plus vit C) (24c) = 18c/50mg
Feosal Natural release 45mg (14c) = 15.5c/50mg

Price per 50mg – 9, 21, 16, 18, 15.5 = 16c

1.9. HIP

Amazon prices 14/11/14
Proferrin ES Heme Iron Polypeptide (10.5mg) (62c)
Proferrin ES Iron Tablets (12mg) (92c)
Proferrin Forte - 90 tablets (has folic acid) (12mg) (92c)
Proferrin 11mg Heme Iron (90Tablets) (77c)
Feosol Complete Iron with Bifera. (22mg PIC and 6mg HIP as proferrin) (40c) –not including

Price for 50 mg - 2.95, 3.83, 3.50 = $3.4
2. Toxicity
The standard toxicity measurement seems to be LD50, which is the dose at which 50% of the subjects die. Not a great measurement for both the animals 🙏 and for us because animals are very different from us. Still, the only real measurement out there for toxicity and it does give some comparison. Varies hugely from animal to animal and lab to lab. Also to add to the confusion sometimes it’s quoted as supplement mg/kg of body weight, and other times it’s mg of elemental iron/kg. Comparing rats where possible and when I have multiple results I’ve taken an average.

2.1. Ferrous sulfate

<table>
<thead>
<tr>
<th>Source</th>
<th>Animal</th>
<th>mg iron / kg</th>
<th>mg / kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Gossel and Bricker 1994)</td>
<td>Rat</td>
<td>300 *</td>
<td>1500</td>
</tr>
<tr>
<td>(Keith 1957)</td>
<td>Rat</td>
<td>344</td>
<td>1720</td>
</tr>
<tr>
<td>(Nayfield, Kent, and Rodman 1976)</td>
<td>Rat</td>
<td>&gt;320</td>
<td></td>
</tr>
<tr>
<td>(Hoppe, Agnew Marcelli, and Tainter 1955)</td>
<td>Swiss mice</td>
<td>306</td>
<td>1520</td>
</tr>
<tr>
<td>(Hoppe, Agnew Marcelli, and Tainter 1955)</td>
<td>Sprague-dawley rats</td>
<td>298</td>
<td>1480</td>
</tr>
<tr>
<td>Feramax product information</td>
<td>?</td>
<td>Approx. 230</td>
<td></td>
</tr>
<tr>
<td>refs Shelanki 1950 and Boyd &amp; shanas 1963</td>
<td>Rat</td>
<td>298-1000</td>
<td>1490-5000</td>
</tr>
<tr>
<td>FINAL VALUE USED</td>
<td>Rat</td>
<td>315</td>
<td></td>
</tr>
</tbody>
</table>
*calculated from elemental iron of ferrous sulfate as 20%

2.2. Ferrous gluconate

<table>
<thead>
<tr>
<th>Source</th>
<th>Animal</th>
<th>mg iron / kg</th>
<th>mg / kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Hoppe, Agnew Marcelli, and Tainter 1955)</td>
<td>Swiss mice</td>
<td>429</td>
<td>3700</td>
</tr>
<tr>
<td>(Hoppe, Agnew Marcelli, and Tainter 1955)</td>
<td>Sprague-dawley rats</td>
<td>507</td>
<td>4500</td>
</tr>
<tr>
<td>Feramax product information</td>
<td>?</td>
<td>Approx. 320</td>
<td></td>
</tr>
<tr>
<td>FINAL VALUE USED</td>
<td>Rat</td>
<td>507</td>
<td></td>
</tr>
</tbody>
</table>

2.3. Ferrous fumarate

<table>
<thead>
<tr>
<th>Source</th>
<th>Animal</th>
<th>mg iron / kg</th>
<th>mg / kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berenbaum 1960 – can’t find study but quoted <a href="#">here</a></td>
<td>mice</td>
<td>630</td>
<td></td>
</tr>
<tr>
<td>Berenbaum 1960 – can’t find study but quoted <a href="#">here</a></td>
<td>rats</td>
<td>580</td>
<td></td>
</tr>
<tr>
<td>FINAL VALUE USED</td>
<td>Rat</td>
<td>580</td>
<td></td>
</tr>
</tbody>
</table>
### 2.4. Ferrous bisglycinate

<table>
<thead>
<tr>
<th>Source</th>
<th>Animal</th>
<th>mg iron / kg</th>
<th>mg / kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>(R. Anton et al 2006) (Jeppsen 2001)</td>
<td>Rat</td>
<td>560</td>
<td>2800</td>
</tr>
<tr>
<td>FINAL VALUE USED</td>
<td>Rat</td>
<td>560</td>
<td></td>
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</tbody>
</table>

### 2.5. Carbonyl

<table>
<thead>
<tr>
<th>Source</th>
<th>Animal</th>
<th>mg iron / kg</th>
<th>mg / kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Whittaker et al. 2002)</td>
<td>Rat</td>
<td>&gt;50,000 (45x less toxic than sulfate)</td>
<td></td>
</tr>
<tr>
<td>(Boyd and Shanas 1963)</td>
<td>Rat</td>
<td>98,600*</td>
<td>98,600 +/- 26,000</td>
</tr>
<tr>
<td>(Shelanski 1950) referenced <a href="#">here</a></td>
<td>Rat</td>
<td>30,000</td>
<td></td>
</tr>
<tr>
<td>FINAL VALUE USED</td>
<td>Rat</td>
<td>&gt;20,000</td>
<td></td>
</tr>
</tbody>
</table>

* assuming they’re the same since carbonyl is a pure form of iron

### 2.6. Ferritin

<table>
<thead>
<tr>
<th>Source</th>
<th>Animal</th>
<th>mg iron / kg</th>
<th>mg / kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>No info, but a ferric form of iron bound in a protein, so at least lower than the ferrous salts</td>
<td>Rat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AVERAGE</td>
<td>Rat</td>
<td><strong>Unknown but low toxicity</strong></td>
<td></td>
</tr>
</tbody>
</table>

### 2.7. IPS

<table>
<thead>
<tr>
<th>Source</th>
<th>Animal</th>
<th>mg iron / kg</th>
<th>mg / kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Forster 1993)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Says low toxicity but no figures</td>
<td>Rat</td>
<td><strong>Unknown but low</strong></td>
<td></td>
</tr>
<tr>
<td>FINAL VALUE USED</td>
<td>Rat</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2.8. HIP

<table>
<thead>
<tr>
<th>Source</th>
<th>Animal</th>
<th>mg iron / kg</th>
<th>mg / kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proferrin data sheet</td>
<td>mice</td>
<td>20,000</td>
<td></td>
</tr>
<tr>
<td>FINAL VALUE USED</td>
<td></td>
<td>&gt;10,000*</td>
<td></td>
</tr>
</tbody>
</table>

*not sure if the 20,000 is elemental iron or not. Also mice rather than rat LD50. Going safe and putting it at >10,000

### 2.9. PIC

<table>
<thead>
<tr>
<th>Source</th>
<th>Animal</th>
<th>mg iron / kg</th>
<th>mg / kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feramax product info</td>
<td>Rat</td>
<td>&gt;5000</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>FINAL VALUE USED</td>
<td>Rat</td>
<td>&gt;5000</td>
<td></td>
</tr>
</tbody>
</table>

2.10. Final approximated figures
Sulfate - 315
Gluconate - 507
Fumarate – 580
FeBC – 560
Carbonyl >20,000
HIP >10,000
PIC >5,000
IPS & Ferritin – unknown. Considered low toxicity though.

2.11. References used in section
Most linked directly to references in tables above.

“Iron overdose is considered a leading cause of poisoning-related injury and death in young children”