**Supplementary Table 1.** The SEPP1 Sec content, selenium requirements, and the biomarkers, statistical methods and the selenium species used to assess the selenium requirements of species included in this study.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Class | Species | Sec in SEPP | Se require.(mg/kg DM) | Biomarker\* | Statistical method | Se species | Reference |
| Mammals | Guinea pig (*Cavia porcellus*)1 | 7 | 0.06 | Total kidney TXNRD activity  | BLR | Na2SeO4 | (Jensen and Pallauf 2008) |
| Brown rat (*Rattus norvegicus)* | 10 | 0.10 | Total hepatic GPX activity  | ANOVA | Na2SeO3 | (Weiss et al. 1996, Weiss et al. 1997) |
| Mouse (*Mus musculus*) | 10 | 0.10 | Total hepatic GPX activity  | ANOVA | Na2SeO3 | (NRC 1995) supported by (Sunde et al. 2009) |
| Dog (*Canis lupus familiaris*)2 | 15 | 0.21 | Plasma serum Se concentration | BLR  | Na2SeO3 | (Wedekind et al. 2004) |
| Pig (*Sus scrofa*) | 14 | 0.20 | Total GPX/GPX4 activity in heart/liver, hepatic *Gpx1/Gpx4* mRNA expression  | ANOVA | Na2SeO3 | (Lei et al. 1998) |
| Horse (*Equus ferus caballus*) | 13 | 0.10 | Full life cycle health | - | Forage | (NRC 1997) |
| Cow (*Bos taurus*) | 12 | 0.10 | Full life cycle health | - | Forage | (NRC 1963) |
| Sheep (*Ovis aries*) | 12 | 0.10 | Full life cycle health | - | Forage | (NRC 1985) |
| Birds | Chicken (*Gallus gallus domesticus*) | 13 | 0.15 | Full life cycle health | - | Feed | (NRC 1994) |
| Duck (*Anas platyrhynchos*) | 13 | 0.14 | Full life cycle health | - | Feed | (NRC 1994) |
| Turkey (*Meleagris gallopavo*) | 13 | 0.30 | Total gizzard GPX/GPX4 activity, blood plasma GPX3 | Regression | Na2SeO4 | (Fischer et al. 2008, Sunde and Hadley 2010) |
| Bony fish | Rainbow trout (*Oncorhynchus mykiss*) | 17 | 0.30 | Blood plasma GPX3  | ANOVA | Na2SeO3 | (NRC 2011) assessed from (Hilton et al. 1980) |
| Channel catfish (*Ictalurus punctatus*) | 16 | 0.25 | Total hepatic GPX activity/growth | ANOVA | Na2SeO3 | (Gatlin and Wilson 1984) |
| Zebrafish (*Danio rerio*) | 17 | 0.30 | Growth | Regression | Se-yeast | (Penglase et al. 2014) |
| Loach (*Paramisgurnus dabryanus*)3 | 17 | 0.50 | Oxidative stress response | ANOVA | NaHSeO3 | (Hao et al. 2014) |
| Cobia (*Rachycentron canadum*) 3 | 17 | 0.80 | Growth and whole body/vetebrae Se retention | BLR | Se-DL-Met  | (Liu et al. 2010) |
| Grouper (*Epinephelus malabaricus*) 3 | 17 | 0.70 | Growth and whole body Se retention | ANOVA and BLR | SeMet | (Lin and Shiau 2005) |
| Gibel carp (*Carassius auratus gibelio*) 3 | 17 | 1.18 | Growth | BLR | SeMet | (Han et al. 2011) |
| Yellowtail kingfish (*Seriola lalandi*)3 | 17 | 5.56 | Growth | Regression | Se-yeast | (Le and Fotedar 2013) |

Abbreviations; Sec, selenocysteine, SEPP1, Selenoprotein P; TXNRD, thioredoxin reductase; GPX, glutathione peroxidase; BLR, Broken line regression; Na2SeO4, sodium selenate; Na2SeO3, sodium selenite; Se-yeast, selenoyeast; NaHSeO3, sodium hydride selenite; SeMet, selenomethionine.

\* Methods utilised to analyse tissue GPX activity are unable to distinguish between isoforms, so are listed as total GPX activity. However, in mammals GPX1 is responsible for the majority of total GPX activity (Brigelius-Flohe et al. 2002).

1The authors of the guinea pig study report a Se requirement of 0.08 mg Se/kg DM, which includes a safety margin above the 0.06 mg Se/kg DM predicted with BLR.

2Data from actively growing juvenile animals was utilised in preference to adults

3Sec content of these species were based on closely related species (Gibel carp and loach are both cyprinids, as are common carp (*Cyprinus carpo*) and zebrafish which both have SEPP1 (SEPP1a) with 17 Sec residues) or on salt water fish (Both green spotted pufferfish (Tetraodon nigroviridis) and fugu (*Takifugu rubripes*) have SEPP1 with 17 Sec residues). Overall, the number of Sec residues found in fish SEPP is 15 to 17 (Lobanov et al. 2008).

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