**Supplementary Table 1.** Isotopic signatures of fish feed and feed ingredients from a complementary study [37]. The table shows the values for commercial feed, four experimental feeds (fish meal control and three diets where 70% of the fish meal protein is replaced by plant protein), as well as various feed ingredients (\*) commonly used in the aquaculture industry.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **treatment** | **feed type** | **C (‰)** | | **N (‰)** | |
| defatted | commercial feed | –23.48 | ± 0.48 | – | – |
| undefatted | commercial feed | –24.84 | ± 0.11 | 5.45 | ± 0.55 |
| defatted | fish meal control | –20.50 | ± 0.05 | – | – |
| undefatted | fish meal control | –21.24 | ± 0.49 | 11.37 | ± 0.6 |
| defatted | 70% *Jatropha* | –23.54 | ± 0.04 | – | – |
| undefatted | 70% *Jatropha* | –24.21 | ± 0.24 | 6.72 | ± 0.21 |
| defatted | 70% soya | –24.17 | ± 0.02 | – | – |
| undefatted | 70% soya | –24.32 | ± 0.19 | 4.06 | ± 0.17 |
| defatted | 70% wheat gluten | –25.05 | ± 0.45 | – | – |
| undefatted | 70% wheat gluten | –25.35 | ± 0.89 | 5.05 | ± 0.2 |
| defatted | \*North Atlantic fish meal | –25.88 | ± 0.31 | – | – |
| undefatted | \*North Atlantic fish meal | –22.56 | ± 0.11 | 11.8 | ± 0.16 |
| defatted | \*South American fish meal | –18.74 | ± 0.18 | – | – |
| undefatted | \*South American fish meal | –19.88 | ± 0.63 | 11.66 | ± 0.2 |
| defatted | \*soya meal | –21.74 | ± 0.06 | – | – |
| undefatted | \*soya meal | –25.62 | ± 0.05 | 0.9 | ± 0.08 |
| defatted | \*sunflower meal | –26.02 | ± 0.1 | – | – |
| undefatted | \*sunflower meal | –25.68 | ± 0.49 | 4.50 | ± 0.06 |
| defatted | \*wheat meal | –26.19 | ± 0.07 | – | – |
| undefatted | \*wheat meal | –26.36 | ± 0.08 | 3.69 | ± 0.55 |
| defatted | \*wheat gluten | –28.51 | ± 0.06 | – | – |
| undefatted | \*wheat gluten | –28.75 | ± 0.06 | 3.41 | ± 0.12 |

**Supplementary Table 2.** Isotopic signatures of the macrozoobenthos in a prospective wind park area in the German EEZ.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **treatment** | **species** | **station** | **sample** | **C (‰)** | | **N (‰)** | |
| defatted & decalcified | *Ophiura ophiura* | 865 | S1 | –18.13 | ± 0.04 | – | – |
| defatted | *Ophiura ophiura* | 865 | S1 | –6.80 | ± 0.72 | – | – |
| undefatted | *Ophiura ophiura* | 865 | S1 | –13.39 | ± 0.09 | 13.88 | ± 0.64 |
| defatted & decalcified | *Ophiura ophiura* | 865 | S2 | –17.82 | ± 0.1 | – | – |
| defatted | *Ophiura ophiura* | 865 | S2 | –6.59 | ± 0.54 | – | – |
| undefatted | *Ophiura ophiura* | 865 | S2 | –10.80 | ± 0.21 | 16.16 | ± 0.93 |
| defatted & decalcified | *Ophiura ophiura* | 865 | S3 | –17.95 | ± 0.13 | – | – |
| defatted | *Ophiura ophiura* | 865 | S3 | –6.15 | ± 0.44 | – | – |
| undefatted | *Ophiura ophiura* | 865 | S3 | –9.48 | ± 0.07 | 13.63 | ± 0.08 |
| defatted & decalcified | *Ophiura ophiura* | 865 | S4 | –17.99 | ± 0.08 | – | – |
| defatted | *Ophiura ophiura* | 865 | S4 | –6.45 | ± 0.8 | – | – |
| undefatted | *Ophiura ophiura* | 865 | S4 | –8.99 | ± 0.1 | 13.12 | ± 0.47 |
| defatted & decalcified | *Ophiura ophiura* | 865 | S5 | NA | NA | – | – |
| defatted | *Ophiura ophiura* | 865 | S5 | –4.79 | ± 0.16 | – | – |
| undefatted | *Ophiura ophiura* | 865 | S5 | –10.21 | ± 0.06 | 14.17 | ± 0.98 |
| defatted & decalcified | *Ophiura ophiura* | 865 | S6 | –21.90 | NA | – | – |
| defatted | *Ophiura ophiura* | 865 | S6 | –6.41 | ± 1.95 | – | – |
| undefatted | *Ophiura ophiura* | 865 | S6 | –13.05 | ± 0.23 | 12.82 | ± 0.46 |
| defatted & decalcified | *Corystes cassivelanus* | 865 | S7 | –19.26 | ± 0.25 | – | – |
| defatted | *Corystes cassivelanus* | 865 | S7 | –12.95 | ± 1.31 | – | – |
| undefatted | *Corystes cassivelanus* | 865 | S7 | –18.84 | ± 0.11 | 13.64 | ± 0.48 |
| defatted & decalcified | *Ophiura albida* | 858 | S8 | –17.81 | ± 0.04 | – | – |
| defatted | *Ophiura albida* | 858 | S8 | –6.30 | ± 0.47 | – | – |
| undefatted | *Ophiura albida* | 858 | S8 | –12.41 | ± 0.35 | 14.48 | ± 0.04 |
| defatted & decalcified | *Ophiura ophiura* | 858 | S9 | –18.12 | NA | – | – |
| defatted | *Ophiura ophiura* | 858 | S9 | –7.36 | ± 0.27 | – | – |
| undefatted | *Ophiura ophiura* | 858 | S9 | –12.85 | ± 2.2 | 13.29 | ± 0.39 |
| defatted & decalcified | *Asterias rubens* | 865 | S10 | –15.59 | ± 0.08 | – | – |
| defatted | *Asterias rubens* | 865 | S10 | –11.88 | ± 0.09 | – | – |
| undefatted | *Asterias rubens* | 865 | S10 | –15.32 | ± 0.84 | 12.99 | ± 0.17 |
| defatted & decalcified | *Ophiura albida* | 859 | S11 | –18.58 | ± 0.13 | – | – |
| defatted | *Ophiura albida* | 859 | S11 | NA | NA | – | – |
| undefatted | *Ophiura albida* | 859 | S11 | –12.73 | ± 0.52 | 12.61 | NA |
| defatted & decalcified | *Ophiura ophiura* | 859 | S12 | –18.24 | ± 0.05 | – | – |
| defatted | *Ophiura ophiura* | 859 | S12 | –5.54 | ± 1.31 | – | – |
| undefatted | *Ophiura ophiura* | 859 | S12 | –14.98 | ± 0.66 | 13.12 | ± 0.37 |
| defatted & decalcified | *Ophiura ophiura* | 851 | S13 | –18.19 | ± 0.09 | – | – |
| defatted | *Ophiura ophiura* | 851 | S13 | –9.12 | ± 0.28 | – | – |
| undefatted | *Ophiura ophiura* | 851 | S13 | –14.71 | ± 1.03 | 14.07 | ± 0.49 |
| defatted & decalcified | *Ophiura albida* | 851 | S14 | –18.37 | ± 0.09 | – | – |
| defatted | *Ophiura albida* | 851 | S14 | –6.85 | ± 0.35 | – | – |
| undefatted | *Ophiura albida* | 851 | S14 | –13.43 | ± 0.48 | 13.42 | ± 0.4 |
| defatted & decalcified | *Liocarcinus holsatus* | 865 | S15 | –17.83 | ± 0.13 | – | – |
| defatted | *Liocarcinus holsatus* | 865 | S15 | –16.08 | ± 1.22 | – | – |
| undefatted | *Liocarcinus holsatus* | 865 | S15 | –18.39 | ± 0.26 | 13.96 | ± 0.38 |
| defatted & decalcified | *Ophiura ophiura* | 862 | S16 | –18.18 | ± 0.29 | – | – |
| defatted | *Ophiura ophiura* | 862 | S16 | –7.37 | ± 0.41 | – | – |
| undefatted | *Ophiura ophiura* | 862 | S16 | –15.25 | ± 2.64 | 13.31 | ± 0.06 |
| defatted & decalcified | *Ophiura albida* | 865 | S17 | –18.00 | ± 0.1 | – | – |
| defatted | *Ophiura albida* | 865 | S17 | –6.56 | ± 0.38 | – | – |
| undefatted | *Ophiura albida* | 865 | S17 | –13.42 | ± 0.37 | 14.49 | ± 0.76 |
| defatted | *Turritella terebra* | 859 | S18 | –13.91 | ± 0.2 | – | – |
| undefatted | *Turritella terebra* | 859 | S18 | –17.88 | ± 0.23 | 9.89 | ± 0.01 |
| defatted | *Euspira pulchella* | 859 | S19 | –15.97 | ± 0.64 | – | – |
| undefatted | *Euspira pulchella* | 859 | S19 | –17.73 | ± 0.03 | 11.07 | ± 0.32 |
| defatted | *Nucula nitidosa* | 859 | S20 | –16.74 | ± 0.29 | – | – |
| undefatted | *Nucula nitidosa* | 859 | S20 | –18.87 | ± 0.12 | 10 | ± 0.32 |