**Carbohydrates**
- Mono- and polysaccharides, e.g., α- and β-glucan (e.g., starch), fructose, glycerol up to 50% (w/w) of dry mass

**Tri-glycerides (TAG)**
- Storage lipids (oil droplets) mainly C14-C18 fatty acids up to 70% (w/w) of dry mass

**Proteins**
- Excellent nutritional quality, including all essential amino acids—up to 50% (w/w) of dry mass
- Galactolipids with polyunsaturated fatty acids (≥C20, ω-3), e.g., eicosapentaenoic acid (EPA) up to 7% (w/w) of dry mass

**Membrane lipids**
- Carotenoids (xanthophylls), e.g., astaxanthin, lutein, fucoxanthin
- Phytosterols (C28, C29-sterols, β-sitosterol)
- Cholesterol and related precursors (7-dehydrocholesterol)
- Vitamins, antioxidants
- Colors (phycoerythrin, phycocyanin)

**Use as renewable energy source**
- Bioethanol
- Biodiesel

**Supplements for food & feed for animal nutrition**
- Animal feed in aquacultures
- Fish-oil replacement
- Non-animal protein source

**By-products**

**High-value products for nutrition, chemical and pharma industry**

SOURCE: FRAUNHOFER IGB, GARY BRENNER, BRENNER PHARMA/Food business development; 2017 Protein Trends & Technologies Seminar